THE EFFECT OF SYNCHRONOUS ONLINE VERSUS TRADITIONAL INSTRUCTION IN TEACHING JAZZ MUSIC

by

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(Under the Direction of Skip Taylor)

ABSTRACT

The focus of this investigation examines music students' personal experience and learning outcomes when comparing synchronous online to traditional instruction in Jazz Concepts. In order to effectively deliver synchronous online music instruction that rivals traditional in-person instruction, the implementation of technology must serve to emulate a face-to-face experience and provide for an equivalent learning opportunity. This study evaluates 2 groups of undergraduate Music & Technology instrument majors from a small private for-profit college located in the southeastern United States. A total of 20 students participated ranging in age from 19 to 37 (M = 23.9, SD = 3.9). Students were randomly divided into an online group (N = 10) with 6.8 average years playing experience and an in-person group (N = 10) with 8.9 average years playing experience. The study took place over a 5-week period of time and included an instructional unit in jazz history, jazz theory, and jazz improvisation. Elements explored included a comparison of student learning outcomes between the two methodologies, the

implementation of technology as a teaching mechanism, and an analysis of the participants' experience and perceptions of achievement given the specific medium of instruction. Results showed no statistical effect or significance in data analysis, however, the in-person group consistently had greater gains and higher percentage scores from pre-test to post-test for all 3 units. An anonymous student survey questionnaire was disseminated that revealed varied student opinions and experiences as a result of the study. In addition, implications for future use of technology in music education are explored, as well as an examination of what instructional modifications have been found effective in the implementation of online learning in modern educational settings.

INDEX WORDS: Online Learning, Distance Education, Music Technology, Jazz History, Jazz Theory, Jazz Improvisation

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To my parents,

Gideon Grau (violinist/conductor) and Irene Rosenberg Grau (pianist/composer),

and to my lovely wife, Heather and two sons, Ben and Gabe.

In Loving Memory of Dr. Ken Keaton;

my mentor, my colleague, and dearest friend.

Your inspiration and influence forever lives on!

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TABLE OF CONTENTS

List of Tables

CHAPTER 1: INTRODUCTION

The focus of this investigation examines music students' personal experience and learning outcomes when comparing synchronous online to traditional instruction in Jazz Concepts. In order to effectively deliver synchronous online music instruction that rivals traditional in-person instruction, the implementation of technology must serve to emulate a face-to-face experience and provide for an equivalent learning opportunity. According to William Bauer (2020), being able to use technology effectively requires not only an understanding of technology but also the pedagogical approaches for utilizing technology in a particular content area. In addition, constraints of technology for use in a specific instructional context need to be considered. Developing digital technologies will enable everyone to learn and be active musical participants throughout their lives. For this to happen, it requires the leadership of proficient music educators who thoughtfully consider the role of technology in emerging ways of musical participation (Bauer, 2020).

Need for the Study

The dissemination of information is constantly changing by developments in computer technologies, internet usage, and web-based and mobile-app development. Advancements in computer technologies regarding online learning is an evolving educational format consistently used in colleges, universities, and K-12 education.

Specifically, educational institutions and educators are now more inclined to examine the role of technology in shaping their teaching methodologies. As educators, we are obligated to examine and understand these new methodologies for learning, and as teachers, we are expected to embrace new technologies for students to utilize. Sue Workman, Vice President for University Technology/CIO at Case Western Reserve University, explains in her article *Mixed Realty: A Revolutionary Breakthrough in Teaching and Learning*:

> Technology is finally evolving that has the potential to revolutionize teaching and learning, research, entertainment, and information sharing for the individual. Teaching and learning with technology, prior to this point, was mostly limited to supplementary collaboration tools for communication: learning management systems and electronic texts. The technology was simply an electronic aid to traditional didactic teaching, adding a little modern muscle to the same ways we have taught and learned for decades. We are now entering an era where technology really does the teaching, providing an entirely new mechanism for learning (Workman, 2018, para. 1).

A review of published literature in music education finds limited scientific research specifically addressing distance learning in jazz music. Some general research does exist on music achievement, music self-concept, or student course satisfaction among students enrolled in undergraduate music appreciation courses (Eakes, 2009) and effectiveness of e-learning environments enabling students to compose music collaboratively using synchronous and asynchronous resources (Biasutti, 2015). Littles (2014) presented a

dissertation surveying the perceptions of music faculty toward course suitability for online delivery and found that Music History, Music Appreciation, and Religious Studies in Music were the most commonly offered online undergraduate courses. Music Education, Music Research, and Music Technology were the most common graduate courses. Littles' research suggests that Music Appreciation, Music Business, Music History, and Music Research are somewhat suitable for online delivery, while courses such as Composition, Music Education Methods, Sight Singing & Ear Training, and Applied Instrumental Lessons were not necessarily considered suitable for online delivery (Littles, 2014).

Today's climate, however, has seen a sudden dramatic shift in teaching methodology because of the world-wide COVID-19 pandemic, and most educational institutions are essentially forced to deliver curricula online. Ralph (2020) points out in a survey study conducted by Bay View Analytics, "This sudden shift from face-to-face instruction to distance-learning has been disruptive, forcing a sea change in behaviors and practices in academia. 97% of the institutions surveyed, faculty with no previous online teaching experience were called upon to move classes online" (Ralph, 2020, p.1). Although this particular Jazz Concepts experiment was conducted prior to the pandemic outbreak, there was an overlap in finalizing student scores that negatively affected the results due to the disruption of school closures.

No doubt that politicians now realize how much money can be potentially be saved through online learning, possibly eliminating parts or all of the brick and mortar educational institutions over the next many years. Has COVID-19 created a "Pivot-Chord" in the delivery of educational information for current and now future teaching formats? Certainly, it has forced academia to embrace technology in ways not discussed before.

Therefore, there is a need for continued research in this area—specifically jazz history, theory, and improvisation—and the technological challenges educators and institutions face in being able to effectively deliver jazz instruction online.

Purpose for the Study

The purpose of this study was to examine the difference in students' learned knowledge, skills, and experience regarding learning outcomes between synchronous online delivery and traditional in-person instruction as related to Jazz Concepts. Elements explored included a comparison of student learning outcomes between the two methodologies, the implementation of technology as a teaching mechanism, and an analysis of the participants' experience and perceptions of achievement given the specific medium of instruction.

Essential Research Questions

This study sought to answer the following research questions:

A. How do student learning outcomes compare in 3 primary areas of jazz (history, theory, improvisation) in synchronous online versus in-person instruction?
B. How does technology affect student learning when comparing synchronous online to in-person instruction?
C. How does synchronous online versus in-person instruction affect the participants' overall interaction?
D. Is student motivation to learn affected by instructional delivery method?

E. Does student perception of learning in jazz differ given the medium of instruction?

In addition, this research focuses on what institutional and instructional modifications have been found effective in the implementation of online learning in modern educational settings.

Design of Study and Methodology

This teaching unit focused on student mastery of three primary areas of jazz music. For each area, a base pre-assessment of student knowledge was used as a comparative tool with final post-assessment scoring data:

1. Historical knowledge – students were rated on their ability to demonstrate fundamental understanding of significant jazz artists, recordings, styles, dates, and genres.
2. Theoretical knowledge – students were rated on their ability to demonstrate fundamental concepts of rhythm, chord voicings, scales/modes, voice leading, and composition.
3. Improvisation and Performance Ability – students were rated on their ability to execute components required for effective jazz improvisation: Statement of melody, tone, stylistic interpretation, musical feel, soloing, and overall artistic presentation.

CHAPTER 2: RELATED LITERATURE

A review of published literature in music education finds limited scientific research specifically addressing online learning in jazz music education. Therefore, the focus of this chapter examines the following areas:

- Conceptions about Online Learning and Distance Education
- Web-based Instructional Methodologies
- Studies of Online Learning in Music
- Contemporary Models for using Technology in Music Education
- Utilizing Technology for Teaching Jazz Music

Conceptions about Online Learning and Distance Education

In her book, *Online Learning in Music: Foundations, Frameworks, and Practices*, Bowman (2014) points out "Although there is a considerable body of research on distance learning and online learning in general, comparatively little exists with regard to online learning in music" (p.31). Online education in music is subject to the same issues as online education generally, but it presents additional challenges due to the nature of the various music sub disciplines (e.g., music education, music history, music theory, and music therapy). Bowman's book is a resource of references offering insights into the development of online learning in music, perspectives on theoretical models for design and development

of online courses, and principles for good practice in online education. Bowman provides an overview of online education in music, including guidelines and accreditation standards for online instruction as well as current research on web-based learning in music. She also explores several theoretical models for online course design, as her research encompasses studies that span from the late 1990's to 2014, suggesting there is no single model for online learning in music and instructors should develop multiple models on the basis of current theories and theoretical frameworks. Bowman asserts that some academically oriented music courses, such as music history, music education philosophy, and psychology of music, may fit within existing models of online learning, while others make unique demands upon existing structures and call for models and approaches tailored specifically to their requirements, such as music theory and applied music studies (Bowman, p. ix).

Since its inception, Distance Education*,* in general, has taken on varied approaches and methodologies as the development of the internet and expansion of technology has defined the tools necessary for effective online instructional delivery. Rees (2002) noted some evidence of "employing the internet as the primary vehicle for distance instruction with video streaming, desktop videoconferencing, web-based course management systems, chat rooms, threaded discussion groups, and on-line testing" (p. 259) among the resources being used for online instruction, suggesting that distance education was by that time evolving into online education (Colwell & C. Richardson, pp. 257–273). While there is some indication that new, technology-based approaches may be increasing in some areas of music education (Dammers, 2012; Dorfman, 2016; Williams, 2012), the empirical evidence that is available suggests that most music educators have not made extensive use

of technology, particularly for instructional purposes. Over the years, researchers have found that music teachers had primarily used technology for administrative tasks with few direct applications to student learning. Rees pointed out a trend toward use of the same technologies and pedagogies in on-campus and off-campus instruction in music: "As the technology and pedagogy blur distinctions between how students in these populations receive instruction, so will distance learning lose much of its identity as a discrete mode of instructional delivery" (p. 258).

For music educators, the idea of using ONLY online instructional delivery presents significant challenges, especially when teaching applied instrumental lessons and ensembles where students are expected to perform in real-time together. For the implementation of online education to truly be effective in teaching music, it might be best integrated as a supplemental tool; to provide a combination of face-to-face teaching via technology with in-person instruction. Bowman points out that research generally supports the effectiveness of online education as compared with traditional face-to-face education, with results ranging from "no significant difference to modest superiority" in online learning outcomes. But in the case of online instruction as compared with traditional instruction, it is "not a matter of either/or, or replacing one with the other. It is more a matter of both/and, in different contexts" (2014, p. 12). Garrison & Vaughan suggest that "the time has come to reject the dualistic thinking that seems to demand choosing between conventional face-to-face and online learning, a dualism that is no longer tenable, theoretically or practically" (2008, pp. 4–5). Keeping in mind that current technologies have the capability to support high-quality learning experiences, it would be more productive and useful to investigate how best to use web-based technologies in support of

high-quality learning outcomes rather than continue to pit instructional delivery modes against each other (Bowman, pp. 12-13). Watson, Murin, Vashaw, Gemin, & Rapp (2012) suggested a movement toward use of technology to transform education regardless of delivery mode: "The gold standard of quality in any classroom is the teacher....Digital learning does not represent an alternative to teachers; it presents a new opportunity for innovative teachers seeking new challenges—or seeking to work in a technology-rich environment that is similar to that of most other professions" (2012, p. 63). In music, this also presents opportunities for real time performance, feedback, musical interaction, and performing together from various locations in and out of the state or country.

When comparing results of studies where online learning is compared to face-to-face, Bowman explained:

> The focus on delivery medium masks the more significant issue of appropriate pedagogy—the way the medium and technologies are used in support of learning. At a fundamental level, the characteristics of a high-quality online course and a high-quality traditional course should be the same. Among those characteristics are relevant content, current scholarship and materials, sound pedagogical techniques and strategies, intellectually challenging activities and experiences appropriate to the level of the course, use of technology appropriate to the course, and interaction with a vibrant learning community (2014, p. 16).

There appears to be a trend of preconceptions amongst educators and administrators about which instructional methodology is better. Surveys presented in journals such as

Inside Higher Ed have polled chief academic officers, school administrators, and teachers who have concerns about quality of online education. In a report entitled *Conflicted: Faculty and Online Education* (2012), Allen, Seaman, Lederman, & Jaschik presented the views of over 4,500 faculty, 25 percent of whom were teaching online courses. Some consider online outcomes inferior to those of face-to-face instruction and question the value of online learning. Findings suggest faculty who teach both online and blended courses had more positive views about online learning, while two-thirds considered online outcomes somewhat inferior to face-to-face outcomes, and the other third considered the outcomes comparable (Allen et al., 2012).

Web-Based Instructional Methodologies

A 2010 study presented by Ward, Peters & Shelley (2010) entitled *Student and Faculty Perceptions of the Quality of Online Learning Experiences,* examined Synchronous Interactive Online Instruction (SIOI) with the quality of learning in face-to-face and asynchronous online learning environments. They examined an online course medium used in graduate-level courses in educational leadership from two vantage points: 1) instructor perceptions regarding the quality of courses delivered via online instruction, and 2) student perceptions regarding the quality of courses delivered via online instruction. The study found that instructors and students viewed SIOI favorably. The mean student ratings for the dimensions of instructional quality were the same for SIOI and face-to-face course formats in all but one dimension, but mean ratings for SIOI and face-to-face formats were consistently higher than those for asynchronous online instruction. The single exception was for the dimension ease of access to the course; the SIOI and asynchronous

online formats were rated higher than the face-to-face format in this quality dimension. The authors' findings suggest that it is possible to achieve levels of effectiveness in an online instructional format similar to those that are realized in face-to-face delivery. There was evidence of concern about the quality of student collaboration and the authors suggest instructors need to capitalize on available mechanisms for interaction and collaboration (Ward et al., 2010).

In 2012, Samuel Leong, Associate Dean at the Hong Kong Institute of Education, published *Navigating the Emerging Futures in Music Education,* in which he claims "the world is having to rediscover and reinvent itself in the face of emergent futures resulting from multiple dynamics, including the breakdown of traditional structures, new capabilities of advanced technologies, new educational agendas and new human needs" (p. 233). His article navigates through several key predictions and developments relevant to music education and technology and urges for a future that is strongly linked with global knowledge in the digital and conceptual age. Even in 2012, Leong was pointing to the growth of the internet becoming increasingly interconnected with the "concomitant explosion of the digital information universe" (p. 234). Samuel Leong refers to Daniel Pink, author of several books about business, work, and behavior, and his views of how music education should "reposition itself tuning into the emerging trends and developments. As more emphasis is given to creativity and the arts, music education practices need to devote more attention to developing learners' digital literacies, analytical and critical thinking, and the other twenty-first-century skills with reference to the realities of the cultural and creative industries" (p. 240). Music education plays a significant role

with other arts education disciplines in making a direct contribution to resolving the social and cultural challenges facing today's world (Long, 2012).

In 2012, the Australian Journal of Music Education published a study entitled *Teaching Music as a University Elective Course Through E-learning* by Mu'tasem Adileh, Director of Ethnomusicology Research and Studies Center, Al-Quds University, Jerusalem. This study compared students' course achievement and attitudes toward music learning between two course delivery methods: blended and face-to-face. The participants consisted of 179 university students taking a music course as a university elective course at Al-Quds University. Students' final course scores and attitude scores toward music learning were evaluated at the end of the study and a significant difference was found between the face-to-face and the blended group. The analysis showed that the blended group was more successful than the traditional face-to-face group in terms of both course achievement and attitudes toward music learning. Adileh claimed that, despite the fact that online learning is a widely used practice with many advantages, face-to-face and online learning are still side-by-side in the educational world. He pointed out how researchers believe that there will always be a place for instructor-led educational programs, while others feel that online learning can be more successful than face-to-face learning and may take the place of face-to-face learning in the future. Adileh concluded that the blended learning environment, with interactive materials including instructional videos, screen captures, and assessment simulations, yielded the most effective environment for success (Adileh, 2012).

Renee Crawford (2013) published an article for the Australasian Journal of Educational Technology entitled *Evolving Technologies Require Educational Policy*

Change: Music education for the 21st century. She referred to the evolution of technology and its effect on the future needs and requirements of society, where online applications and social networking capabilities have accelerated in popularity revealing their potential. Crawford implied that technology in music education has resulted in collaborative projects not constricted by walls or location, and that music education should be accessible to all young people through social media, blogging and interactive creative musical activities to engage students in all locations, including rural and remote areas. Crawford pointed out her research in the learning and teaching outcomes of Project Music X, an online music education project designed to fill an important gap in the provision of music education programs in regional and remote schools using a range of web 2.0 technologies. She explored the 21st century classroom for music education, including online resources, digital learning, in-school workshops, online master classes and live concert streaming where a range of musical styles were covered. Her article addresses how "technology in this context does not only align with the thinking of young people, but also provides a platform for students in remote and rural areas to engage with high quality music education and performance experiences that they would otherwise not have access to" (Crawford, 2013, para. 1). In responding to this shift in thinking and finding a practical way to enhance music education and performance experiences for young people, Crawford pointed to an increasing number of high quality online resources and applications available to teachers and students dedicated to the idea that musical performances and teachers should be available to anyone, anywhere at any time. Using technology in the context applied to these examples of online resources aligns with the thinking of a digital society and makes music education from all over the world more accessible (Crawford, 2013).

Studies of Online Learning in Music

Green (2003) conducted a study that compared the effectiveness of traditional and computer-assisted instruction on general music achievement and guitar performance skills (tonal, rhythm, harmonic, and melodic performance skills) of eighth grade students with higher or lower audiation abilities. For this study, Green provided all students instructional content from Interactive Guitar software. According to Green, results following a 5-week instructional period indicated that the type of instruction had no effect on either general music achievement or guitar performance skills. Green reported that, regardless of type of instruction, students with higher musical aptitude achieved higher levels of performance skills (Green, 2003).

Ryder (2004) implemented a study that developed and tested an internet-based unit of study on vocal science for high school-level choral music students. The focus was to study the effects on both student knowledge of vocal anatomy and function, and student attitudes toward the study of vocal science and online learning. Data was gathered through pre- and post-tests and surveys. According to Ryder, students showed significant gains in knowledge as a result of instruction. Specifically, the surveys indicated students were comfortable with internet use for schoolwork, and they considered the study of vocal science an important subject (Ryder, 2004).

Dye (2007) investigated desktop videoconferencing utilizing iChat as an environment for applied music lessons for middle school band students. The study analyzed the results of 25 recorded lessons which indicated that most participant behaviors, such as instructors' diagnosing and directing of activities, and maintaining positive rapport and

communication, were comparable to those in traditional applied lessons. Dye's study noted a tendency toward less modeling of musical behaviors by instructors and more music-specific questioning among all participants. According to Dye, all participants considered distance learning elements, like reliable technology, suitable training, and instructional design important. Based on the results of the study and immediate feedback provided by the participants, Dye concluded desktop videoconferencing to be a promising environment for applied lessons (Dye, 2007).

Scarnati & Garcia (2007) described the process of redesigning a junior-level music history course for online delivery. The jazz history course was originally offered via interactive instructional television in a traditional lecture-based format using a chronological survey approach that did not provide for interactivity and engagement with content. The authors changed the format to a reverse chronological approach employing a learner-centered pedagogy with integrated online media resources. They included video games for teaching musical concepts in order to promote engagement with content, knowledge construction, and participant interactions via discussion groups and collaborative group projects. Scarnati & Garcia implemented the redesigned course through the WebCT Vista learning management system. A student survey revealed mixed reactions to the reverse chronological format, generally positive responses to the multimedia components, and mostly positive responses to the video games. According to Scarnati & Garcia, over half the students in the online course received A or B grades, but no grades from the previous interactive instructional television course were available for purposes of comparison. The authors concluded that the survey results supported the effectiveness of the redesigned course (Scarnati & Garcia, 2007).

Dammers (2009) explored the feasibility of using personal computers and readily available videoconferencing technology for online applied music lessons between a college professor and an eighth-grade trumpet student. The researcher noted that there was little research on synchronous performance instruction because of the relative newness of videoconferencing technology. Specifically, the advantages were the availability of lessons over a long distance, convenience, and ease of sharing recordings for duet playing. According to Dammers, there were multiple challenges, including delay, interpersonal dynamics, visual limitations, the need to restrain movement due to the wearing of headphones, and issues related to volume control. Dammers concluded that this type of instruction, although feasible and functional, was not equivalent to face-to-face applied instruction because of the nature of music performance as a synchronous experience. He acknowledged that it could be used as a supplement to music instruction and indicated that possible applications may include applied instruction in small towns and rural areas, clinics or master classes, and interviews with composers and performers (Dammers, 2009).

Lockett (2010) studied the perceptions of instrumental students that were enrolled in a for-profit music academy regarding the effectiveness of online instruction as compared with face-to-face instruction. A survey revealed no significant difference in effectiveness scores between online and face-to-face learning between Skype and iChat delivery methods. Student interviews suggested that during face-to-face instruction, participants expected more instructor interaction and hands-on instruction, while technology, communication software, and learning through the instructor were the principle issues in online instruction (Lockett, 2010).

Seddon & Biasutti (2010) conducted an experiment with 3 participants over a period of 6 weeks that studied learning strategies used by young adult students learning to play an improvised 12-bar blues with both hands on a keyboard in an asynchronous online e-learning environment. The study implemented text, illustrations, and supporting audio examples within a sequencing program. A remote facilitator was available through e-mail for support and advice. Each hour-long session was videotaped, and at the end of each session, participants sent MIDI files of their work to the facilitator for feedback on how to proceed. Video data analysis revealed that learning activities consisted of instruction, copying, practicing, playing, and evaluating. Interviews with participants were conducted upon completion of the sessions. The findings of the study provided insight into the learning strategies adopted by the 3 participants in this particular learning situation and provided empirical support for theories of learning to play by ear (Seddon & Biasutti, 2010).

Orman & Whitaker (2010) compared multiple aspects of face-to-face and online applied instrumental music lessons involving three middle school students—a saxophonist and two tubists. They analyzed extensive digital video and transcripts of all lessons for sequential instruction patterns, performance, focus of attention, eye contact, and other nonverbal behaviors. A comparison of face-to-face with online lessons revealed that teacher modeling and off-task behaviors occurred more frequently in face-to-face lessons, while student performance and eye contact increased in online lessons. Orman and Whitaker found few differences in focus of attention and issues related to venue, although there were concerns about audio and video quality (Orman & Whitaker, 2010).

Littles (2014) doctoral dissertation suggested that Music Appreciation, Music Business, Music History, and Music Research were found to be suitable for online delivery, while courses such as Composition, Music Education, Methods, Sight Singing & Ear Training, and Applied Instrumental/Vocal Lessons were not. Littles conducted a survey and found faculty perceptions of online music courses resulted in a wide range of opinions from positive to strongly negative, indicating that this topic remains a polarizing issue in the field of music. Based on the findings of his survey, Littles suggested further research should include developing a theoretical framework for online music course delivery, faculty training in online course design, and developing a holistic approach to online course development to include the institution, faculty, and students (Littles, 2014).

Contemporary Models for Using Technology in Music Education

Dr. William I. Bauer, Professor of Music Education and Director of the Online Master of Music in Music Education program in the School of Music of the University of Florida, published a book entitled *Music Learning Today: Digital Pedagogy for Creating, Performing, and Responding to Music,* in which he presents an approach to conceptualizing and utilizing technology as a tool for music learning. His book is designed for use by pre- and in-service music teachers and provides recommendations required to become an expert with music technology, implementing lessons and curriculum that take advantage of technology in assisting students to develop musicianship (Bauer, 2020). In this book he stated how being able to use technology effectively requires not only an understanding of technology itself, but also pedagogical approaches for utilizing technology in a particular content area. In addition, the affordances and constraints of a technology for use in a

specific instructional context need to be considered. Baur explains how teachers must have a well-developed Technological Pedagogical and Content Knowledge (TPACK). The Technological Pedagogical and Content Knowledge Model is a way to use technology for student learning within a specific educational context. The components of TPACK have a dynamic relationship, influencing each other in ways that may impact how learning occurs in the context of any particular environment, possibly affecting a teacher's choice of technology, pedagogical approach, or even the specific content to be studied. Bauer asserted that technology is viewed as a tool to serve the learning of subject matter content, and teachers "must consider the affordances and constraints of a technology when determining whether its use is appropriate and beneficial to students' achievement of curricular outcomes" (pp. 7-10). He points out:

> It is imperative that music teachers are open to and actively consider ways in which new technologies may be able to enhance and transform the traditional when appropriate. Current and developing digital technologies hold the promise of a more musical culture and society, allowing everyone to learn and be active musical participants throughout their lives. For this to happen it will require the leadership of technologically proficient music educators who thoughtfully consider the role of technology in traditional and emerging ways of musical participation and expression (Bauer, pp. 14-15).

Utilizing Technology for Teaching Jazz Music

Utilizing technology to deliver instructional content is commonplace amongst jazz educators, as it often serves as a tool for students to interact and play together. Technology can be used to help prepare students for performing jazz, and the amount of web-based resources and interactive software platforms available are abundant.

Creativity in improvisation is activated through interacting with other performers, the audience, and the environment (Hallam, 2008). Especially important is learning to react to what other musicians do and adapting one's improvisation accordingly (Kenny & Gellrich, 2002). Bauer states, "The formal and informal feedback received from fellow musicians and audiences during performances can inform and influence further development in improvisation. The willingness to take risks is an attribute of skilled improvisers. If performers are afraid to make mistakes, they most likely will not take creative chances and may even feel intimidated by the whole improvisation process" (p. 54). Commercially available play along tracks can be used to assist improvisation development. Software is available that provide accompaniments for jazz and pop standards where tempos can easily be adjusted, or keys can instantly be transposed. By using notation or music production software, teachers can use these accompaniments and make them available to students to use as practice tools. In addition, there are numerous software applications for learning music theory, as well as free online resources. As internet bandwidth becomes more robust, "the ability to jam online will undoubtedly become more feasible—and some people are already experimenting with this" (p. 186).

The purpose of this study was to examine the difference in students' learned knowledge, skills, and experience regarding learning outcomes between synchronous online delivery and traditional in-person instruction as related to Jazz Concepts. This study sought to answer the following research questions:

A. How do student learning outcomes compare in 3 primary areas of jazz (history, theory, improvisation) in synchronous online versus in-person instruction?
B. How does technology affect student learning when comparing synchronous online to in-person instruction?
C. How does synchronous online versus in-person instruction affect the participants' overall interaction?
D. Is student motivation to learn affected by instructional delivery method?
E. Does student perception of learning in jazz differ given the medium of instruction?

Initial Hypothesis of Author

I hypothesize that students learning in an online platform only will not learn the material or improvise as effectively as the students in the in-person class. Furthermore, the in-person students will rate different aspects of the course higher on the course evaluation than the online students. Although technology offers some significant enhancements for teaching, the need for immediate interaction between teacher and student is paramount. This interaction can be replicated through some virtual environments, but technology, in general, lacks the subtlety, quality, and precision needed for fine awareness and detailed listening of music. Often an immediate

adjustment is required for a student to reach full musical potential, and while virtual environments do provide video and audio, they cannot provide any physical corrections occasionally needed and often implemented by the teacher (i.e. posture, finger or bowing positioning, embouchure, etc.). In addition, although synchronous online learning tools can provide a simulated face-to-face scenario, the video and audio quality rarely compete with real time face-to-face interaction. Nevertheless, as technology continues to advance and online teaching continues to become the norm, there will most likely be a paradigm shift in the way teaching occurs, and perhaps a redefining of overall quality and awareness of musical aesthetics in general.

CHAPTER 3: METHODOLOGY

In order to determine whether students benefitted more from a synchronous online or in-person course, I first developed a curriculum in Jazz Concepts with a focus on 3 areas required for mastery of jazz music: history, theory, and improvisation (see Appendix A for unit lesson plans). I recruited participants from a small private for-profit music and media college with approximately 250 students, located in the southeastern United States. This college offers Associate of Applied Science degrees in Music & Technology, and Music Production & Audio for Media. The students were already enrolled in a program that provided an opportunity for them to take courses in either traditional in-person or online formats. Therefore, students were aware and had all previously experienced both teaching methodologies throughout their enrollment. I personally asked 26 Music & Technology instrument majors to participate as volunteers in the study and 20 students agreed to participate. They were informed that there would be no monetary compensation for the study, and it was an extra-curricular activity that would have no impact on their grade. There were 19 males and 1 female, ranging in age from 19 to 37 (M = 23.9, SD = 3.9). The students were a mix of White (n = 11), Black (n = 4), Hispanic (n = 1), Asian (n = 3), and mixed ethnicity (n = 1). Years of playing experience ranged from 4 to 15years (M = 7.85, SD = 3.3) on guitar (n = 16), bass guitar (n = 1), and piano (n = 3).

Students were randomly assigned into two equal groups of 10 for either the online synchronous section or the in-person section regardless of instrument, age, experience, or

ethnicity. The average age of the online group was 25.5 with 6.8 average years playing instrument. The average age of the in-person group was 22.3 with 8.9 average years playing instrument. Each group was scheduled for separate sessions of either online or in-person instruction containing identical lesson objectives, assignments, activities, and lecture.

Implementation of Study

The instruction was conducted over a 5-week period between January 2020 and March 2020 and divided into 3 equal lesson units of jazz history, theory, and improvisation. The 2 formats of instructional delivery were presented separately to each group of students. The online students met twice per week for 2-hour sessions in 2 separate groups of 5 utilizing Zoom web-conference platform. The in-person students met twice per week for 2-hour sessions in 2 separate groups of 5 onsite in a classroom. Students were provided pre- and post-assessments to gauge their knowledge and competency in each of the 3 areas of focus. All instruction was completed prior to COVID-19 pandemic closures. The final performance assessment was completed after school closures. The assessments were given at the beginning and end of each unit as such:

Jazz History			Jazz Theory			Jazz Improvisation			
Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10
History Pre			History Post Theory Pre			Theory Post Improv Pre			Improv Post (due 1wk after Session 10)

Technology and Equipment used for Instructional Delivery

The lesson units of jazz history, theory, and improvisation were presented to both groups using Canvas Learning Management System. The theory and history assessments both utilized the "Quiz" tool and were accessed by students either by computer or mobile device. The improvisation assessment utilized the "Assignment" tool, which enabled students to upload their performance files into the LMS for storage and playback. All video and audio demonstrations were presented via the LMS and all student assessment grades were stored in the LMS electronic grade book.

The in-person lecture presentations occurred on-site in a classroom. An Apple iMac computer served as the presentation tool, which was connected to a large external LED cinema display centrally located for students to view. The speakers were Yamaha NS-10M studio monitors, powered by an Alesis RA-100 power amp and BBE Sonic-Maximizer, which provided stereo audio and real-time instrument playback. Instrument demonstrations utilized Apple Logic Pro, iRealPro, and Noteflight software platforms. The students submitted their final presentations via file upload functionality located within Canvas LMS.

The synchronous online lecture presentations were broadcast from the same classroom using an Apple iMac computer utilizing Zoom web-conferencing software. The history and theory lessons were presented utilizing screen share functionality along with Canvas LMS. For instrumental demonstrations and improvisation lectures, the built-in iMac camera (for face), and two separate Eagle Eye Cube USB cameras by Polycom (for close-ups and overhead shots of hands) were implemented. The audio connection to the

computer employed a Bluebird SL condenser microphone connected to an Apogee Duet USB audio interface.

Lesson Overview

The jazz history unit encompassed the first 3 sessions. The pre-assessment was given at the beginning of the session and took approximately 30 minutes to complete (see Appendix A). It contained an overview of significant figures in jazz history in chronological order; which included personnel, recordings, places of origin, musical styles, big bands, small groups, soloists, instrumentalists, vocalists, and socio-economic elements. It should be noted that the students had not studied jazz history in any depth as part of their music technology curriculum. The jazz history lesson plan covered the same content presented in the pre-assessment in the same chronological order exactly. The post-assessment was exactly the same as the pre-assessment to gauge comprehension.

The jazz theory unit encompassed sessions 4, 5, and 6. At the beginning of session 4, students took the jazz history post-assessment, and, after a short break, they were then presented with the jazz theory pre-assessment (see Appendix A), which took approximately 45 minutes to complete. The jazz theory unit presented fundamental to advanced concepts encompassing scales, chords, progressions, rhythmic elements, chart reading, melody, tone, musical feel, and improvisation techniques. Lessons were presented to guitar, bass and keyboard students who were at relatively equivalent competency levels and years of playing experience. Since music theory is a required component of the music technology curriculum in which students were enrolled and the focus of jazz harmony is prevalent in

the musical styles presented in the program. Therefore, some students came into the study already with some core knowledge in jazz theory.

The jazz improvisation component was covered in sessions 7-10. At the beginning of session 7, all participants took the jazz theory post-assessment, and were then presented with the jazz improvisation pre-assessment (see Appendix A). This required the students to perform a swing or bossa nova composition in its appropriate stylistic nature and solo (improvise) through chord changes as if they were performing it for the first time---such as on a professional gig or recording studio session. During the presentation of the unit, I demonstrated the pieces and discussed critical elements of style pertaining to the musical genres of swing and bossa nova. Historical and stylistic influences as related to the pieces were discussed at length and examples of famous recordings were referenced while sociological factors were discussed as well as stylistic elements as they pertained to the era. I presented examples of how melodies of jazz standards are interpreted and often embellished in the phrasing of various arrangements and interpretations of the tunes, encouraging students to compare and discuss famous recordings. Instrument tone was discussed, and students learned appropriate techniques for effective statement of melodies of jazz standards. For the pre and post assessments in jazz improvisation, students were required to play the melody with accuracy and appropriate feel. Students were required to improvise through chord changes demonstrating their theoretical knowledge and technical grasp of scales/modes/voice leading. The instructor demonstrated how to approach each tune melodically and harmonically and offered improvisation techniques for outlining chord changes through the use of scales/modes. Melodic phrasing and comping techniques were discussed, and jazz solos of significant artists were examined that demonstrated

appropriate rhythmic interpretation and musical feel for each piece. Students performed their piece of choice in its entirety along with a pre-recorded track and demonstrated their knowledge of the lesson criteria presented. The instructor prepared the students for a final presentation (post assessment) focusing on proper performance techniques utilized in jazz styles.

At the culmination of the study, both the jazz improvisation pre- and post-assessment submissions were evaluated by 3 judges from the music and media college and evaluated the students' ability to perform each piece effectively. The three staff members included the President, Director of eLearning, and the Director of Music & Technology, and all had extensive performance experience (combined total = 60+ years) in jazz music. The judges were blind to the identity of the student and whether the audio recording was a pre- or post-assessment.

It is important to note that 6 out of 20 students did not submit their final post-assessment in a timely manner due to the COVID-19 pandemic breakout. After several emails and phone calls prompting the remaining students to finish the assessment, they submitted their jazz improvisation recordings to Canvas LMS. After all students submitted the final post-test, I sent each group an anonymous survey asking them to rate their experience as participants in the study.

Data Analysis

I compiled all the pre- and post-assessment data from Canvas LMS and the judges' evaluations of the improvised performances. Two-sample T-tests were performed to compare outcomes in 3 areas required for mastery of jazz music: history, theory, and

improvisation for the group as a whole, and between online teaching and in-person instruction. Additionally, I compiled the survey results for each group and matched question responses to their appropriate research question for analysis.

CHAPTER 4: RESULTS

This chapter provides an overview of student scores and student survey questionnaire results. The raw scores of the 3 units (history, theory, improvisation) aimed to provide an answer to the following research question posed at the onset of this study:

A. How do student learning outcomes compare in 3 primary areas of jazz (history, theory, improvisation) in synchronous online versus in-person instruction?

The student survey questionnaire results aimed to provide an answer to the following research questions posed at the onset of this study:

B. How does technology affect student learning when comparing synchronous online to in-person instruction?
C. How does synchronous online versus in-person instruction affect the participants' overall interaction?
D. Is student motivation to learn affected by instructional delivery method?
E. Does student perception of learning in jazz differ given the medium of instruction?

Data is presented in the form of reference tables to determine the difference between the 2 groups---online vs. in-person. The history and theory pre- and post-test

scores were tabulated directly from Canvas “Quiz” function and exported from the LMS grade book. The improvisation scores are taken from averaging the external judges’ scores. In each table, students are anonymously denoted utilizing the letters A – T as such:

- Online = A – J
- In-Person = K – T

This denotation is used for consistency in all subsequent tables, as well as for individual participant reference in Chapter 5 discussion.

Table 4.1 provides a broad overview of all individual student scores in percentage, as well as overall mean and standard deviation for each group and all participants combined.

Table 4.1

Student Information and Scores in % (Raw Data)

		Jazz History		Jazz Theory		Jazz Improvisation		Combined Total *M/SD*	
Online		Pre	Post	Pre	Post	Pre	Post	Pre	Post
A		20	70	58	68	91	89		
B		34	67	95	99	83	82		
C		26	29	47	49	84	76		
D		6	64	26	52	80	88		
E		52	63	60	63	80	83		
F		18	100	25	70	70	78		
G		67	80	35	52	81	73		
H		35	100	63	100	83	97		
I		46	83	43	95	78	71		
J		29	80	57	81	78	76		
	Mean	**33.3**	**73.6**	**50.9**	**72.9**	**80.8**	**81.3**	**55**	**75.9**
	SD	**17.9**	**20.6**	**20.8**	**19.8**	**5.3**	**8.1**	**8.20**	**6.98**
In-Person									
K		32	88	98	98	79	87		
L		26	98	55	88	86	90		
M		6	82	64	92	85	90		
N		64	88	33	87	80	88		
O		15	92	53	81	89	93		
P		30	85	55	81	85	95		
Q		29	84	41	69	81	80		
R		57	92	94	99	89	91		
S		47	94	52	81	84	82		
T		80	90	79	88	97	95		
	Mean	**38.6**	**89.3**	**62.4**	**86.4**	**85.5**	**89.1**	**62.2**	**88.3**
	SD	**23.0**	**4.9**	**21.5**	**8.9**	**5.3**	**5.0**	**9.82**	**2.30**
Total	***Mean***	**36.0**	**81.5**	**56.7**	**79.7**	**83.2**	**85.2**	**58.6**	**82.1**
	SD	**20.2**	**16.6**	**21.4**	**16.5**	**5.7**	**7.7**	**8.74**	**5.12**

The combined total student scores for history, theory and improvisation for all participants show a pre-test of $M = 58.6$, $SD = 8.74$, as compared to the post-test of $M = 82.1$, $SD = 5.12$. Therefore, the overall increase from pre- to post-scores for all participants was 23.5%. The online group alone scored an overall pre-test of $M = 55$, $SD = 8.20$, compared to their overall post-test score of $M = 75.9$, $SD = 6.98$, with a pre/post increase of 20.9%. The in-person group alone scored an overall pre-test of $M = 62.2$, $SD = 9.82$,

compared to their post-test score of $M = 88.3$, $SD = 2.30$, with a pre/post increase of 26.1%. This indicates the in-person group scored 5.2% better than the online group when combining the overall history, theory and improvisation pre- to post-scores.

The following tables 4.2 – 4.8 denote score outcomes for each individual unit: history, theory, and improvisation respectively.

Jazz History Results

All student pre- and post-test scores for jazz history are denoted below, as well as the overall mean and standard deviation for each group (see Table 4.2).

Table 4.2

Student Pre/Post Scores for Jazz History

Jazz History Scores												
											M	***SD***
Online	A	B	C	D	E	F	G	H	I	J		
Pre	20	34	26	6	52	18	67	35	46	29	**33.3**	**17.9**
Post	70	67	29	64	63	100	80	100	83	80	**73.6**	**20.6**
In-Person	K	L	M	N	O	P	Q	R	S	T		
Pre	32	22	6	64	15	30	29	57	47	80	**38.6**	**23.0**
Post	88	98	82	88	92	85	84	92	94	90	**89.3**	**4.9**

The pre-test results in jazz history indicate the in-person group scored slightly higher than the online group. The online group average score was $M = 33.3$, $SD = 17.9$, compared to the in-person group score $M = 38.6$, $SD = 23.0$. This yields a difference of 5.3%, indicating the in-person group had slightly more jazz history knowledge going into the study. Both groups had pre-assessment scores as low as 6%, which indicates that at least 1 student from each group had very little knowledge in jazz history prior to participating in the study. In addition, the online group high score of 67% compared to the

in-person group score of 80%, yielding a difference of 13%, suggests the in-person group had more jazz history knowledge at the beginning of the study.

The post-test results in jazz history show the in-person group scored higher than the online group, with $M = 73.6$, $SD = 20.6$, compared $M = 89.3$, $SD = 4.9$. This yielded a 15.7% difference in favor of the in-person group. Additionally, the lowest online student post-test score of 29% compared to the lowest in-person student score of 82% shows a significant 53% difference between at least 2 students at the culmination of the study.

An overall analysis of pre- and post-tests in jazz history show the in-person group increased their average score from 38.6% to 89.3% (+50.7%) as compared to the online group, which increased their average score from 33.3% to 73.6% (+40.3%).

T-test results for the jazz history unit is demoted below, which calculate the difference of increased scores between pre- and post-tests for all participants (see Table 4.3).

Table 4.3

Jazz History T-test Results - Difference Between Pre- and Post-tests

Jazz History T-test															
											M	***SD***	***t***	***df***	***p***
Online	A	B	C	D	E	F	G	H	I	J					
	50	33	3	58	11	82	13	65	37	51	**40.3**	**25.67**			
													0.967	**17.657**	**.3466**
In-Person	K	L	M	N	O	P	Q	R	S	T					
	56	72	76	24	77	55	55	35	47	10	**50.7**	**22.31**			

There was no significant increase of students' assessment $t(17.657) = 0.967$, $p = .3466$, despite the online group pre- to post-test scores ($M = 40.3$, $SD = 25.67$) and the in-person group pre- to post-test scores ($M = 50.7$, $SD = 22.31$). Therefore, there is insufficient statistical evidence showing that online and in-person teaching

methodologies differ with respect to jazz history. However, the difference shows in favor of the in-person group by 10.4%.

Jazz Theory Results

All student pre- and post-test scores for jazz theory are denoted below, as well as the overall mean and standard deviation for each group (see Table 4.4).

Table 4.4

Student Pre/Post Scores for Jazz Theory

Jazz Theory Scores												
											M	***SD***
Online	A	B	C	D	E	F	G	H	I	J		
Pre	58	95	47	26	60	25	35	63	43	57	**50.9**	**20.8**
Post	68	99	49	52	63	70	52	100	95	81	**72.9**	**19.8**
In-Person	K	L	M	N	O	P	Q	R	S	T		
Pre	98	55	64	33	53	55	41	94	52	79	**62.4**	**21.5**
Post	98	88	92	87	81	81	69	99	81	88	**86.4**	**8.9**

The online group scored $M = 50.9$, $SD = 20.8$, compared to the in-person $M = 62.4$, $SD = 21.5$, yielding a difference of 11.5%. Furthermore, the online group had a low score of 25% compared to the in-person score of 33%, and a high score of 95% compared to the in-person score of 98%. This indicates the in-person group had slightly more jazz theory knowledge going into the study.

The post-test results in jazz theory also indicate the in-person group scored higher than the online group, with $M = 86.4$, $SD = 8.9$, compared to $M = 72.9$, $SD = 19.8$, yielding a 13.5% difference in favor of in-person students. Additionally, the lowest score of 49% for online compared to the lowest score of 69% for in-person shows a gap of 20% between at least 2 students at the culmination of the study.

An overall analysis of pre- and post-tests indicates the in-person group increased their average score from 62.4% to 86.4% (+24%) as compared to the online group's increase of 50.9% to 72.9% (+22%).

Table 4.5 denotes T-test results for the jazz theory unit, calculating the difference of increased scores between pre- and post-tests for all participants.

Table 4.5

Jazz Theory T-test Results - Difference Between Pre- and Post-tests

Jazz Theory T-test															
											M	***SD***	***t***	***df***	***p***
Online	A	B	C	D	E	F	G	H	I	J					
	10	4	2	26	3	45	17	37	52	24	**22.0**	**18.04**			
													0.2644	**17.66**	**.7945**
In-Person	K	L	M	N	O	P	Q	R	S	T					
	0	33	28	54	28	26	28	5	29	9	**24.o**	**15.71**			

There was no significant increase of students' assessment $t(17.66) = 0.2644$, $p = .7945$, despite the online group pre- to post-test scores ($M = 22.0$, $SD = 18.04$) and the in-person group pre- to post-test scores ($M = 24.0$, $SD = 15.71$). Therefore, there's insufficient statistical evidence showing that online and in-person teaching methodologies differ with respect to jazz theory. However, the difference shows in favor of the in-person group by a small margin of 2%.

Jazz Improvisation Results

Table 4.6 is a tabulation of the 3 judges' scores for each student pre and post assessment with an overall average pre/post scores tabulated in the 2 right columns. It

should be noted that the judges were unaware of students' identity or whether the recorded submissions were pre or post.

Table 4.6

Jazz Improvisation Judges' Scores

	Judge 1		Judge 2		Judge 3		Average	
Online	Pre	Post	Pre	Post	Pre	Post	Pre	Post
A	84	85	95	92	95	90	91	89
B	80	78	88	88	80	80	83	82
C	84	75	85	74	82	80	84	76
D	68	73	88	96	85	95	80	88
E	77	75	80	82	83	92	80	83
F	67	72	72	82	70	80	70	78
G	75	65	81	75	87	80	81	73
H	76	95	90	97	84	99	83	97
I	73	68	80	60	80	84	78	71
J	74	70	80	83	80	75	78	76
						M	**80.8**	**81.3**
						SD	**5.3**	**8.1**
In-Person								
K	73	82	80	90	85	90	79	87
L	89	93	95	92	75	85	86	90
M	82	87	94	96	80	86	85	90
N	72	76	87	96	80	92	80	88
O	83	87	95	96	90	97	89	93
P	81	90	88	98	87	97	85	95
Q	73	75	85	85	84	80	81	80
R	87	88	92	93	87	92	89	91
S	76	75	85	83	92	87	84	82
T	94	95	98	96	98	95	97	95
						M	**85.5**	**89.1**
						SD	**5.3**	**5.0**

The results of the judges' improvisation data indicate that the average online group improvisation score increased by 0.5% as compared to the in-person group score of 3.6%. The individual scores taken from the judges' improvisation data, as well as the mean and standard deviation for each group is denoted below (see Table 4.7).

Table 4.7

Student Pre/Post Scores for Jazz Improvisation

Jazz Improvisation Scores												
											M	***SD***
Online	A	B	C	D	E	F	G	H	I	J		
Pre	91	83	84	80	80	70	81	83	78	78	**80.8**	**5.3**
Post	89	82	76	88	83	78	73	97	71	76	**81.3**	**8.1**
In-Person	K	L	M	N	O	P	Q	R	S	T		
Pre	79	86	85	80	89	85	81	89	84	97	**85.5**	**5.3**
Post	87	90	90	88	93	95	80	91	82	95	**89.1**	**5.0**

The pre-test in jazz improvisation shows the in-person group scored slightly higher than the online group at the inception of the study. The online group scored $M = 80.8$, $SD = 5.3$ compared to the in-person $M = 85.5$, $SD = 5.3$, yielding a difference of only 4.7%. At least 1 student in the online group had a low score of 70% compared to another in-person student score of 79%, and 1 online student high score of 91% compared to an in-person student score of 97%. This indicates the in-person group had slightly higher jazz improvisation capabilities going into the study.

The post-test results in jazz improvisation also indicate the in-person group scored higher than the online group, with $M = 89.1$, $SD = 5.0$, compared to $M = 81.3$, $SD = 8.1$, yielding a 7.8% difference in favor of in-person students.

An overall analysis of pre- and post-tests show the in-person group increased their average score from 85.5% to 89.1% (+3.6%) as compared to the online group's increase of 80.8% to 81.3% (+0.5%). Table 4.8 denotes T-test results for the jazz improvisation unit, calculating the difference of scores between pre- and post-tests for all participants.

Table 4.8

Jazz Improvisation T-test Results - Difference Between Pre/Post-tests

Jazz Improvisation T-test															
											M	***SD***	***t***	***df***	***p***
Online	A	B	C	D	E	F	G	H	I	J					
	-2	-1	-8	8	3	8	-8	14	-7	-2	**0.5**	**7.58**			
													1.1237	**14.305**	**.2796**
In-Person	K	L	M	N	O	P	Q	R	S	T					
	8	4	5	8	4	10	-1	2	-2	-2	**3.6**	**4.33**			

There was no significant increase of students' assessment $t(14.305) = 1.1237$, $p = .2796$, despite the online group pre- to post-test scores ($M = 0.5$, $SD = 7.58$) and the in-person group pre- to post-test scores ($M = 3.6$, $SD = 4.33$). Therefore, there's insufficient statistical evidence showing that online and in-person teaching methodologies differ with respect to jazz improvisation.

Jazz Concepts Student Survey Results

This section addresses the 20-question student survey questionnaire, which contained 19 multiple choice questions and 1 essay question (see Appendix D). An identical version of the survey was disseminated to each group anonymously at the culmination of the study. As mentioned at the beginning of this chapter, the results of the student survey questionnaire aimed to provide answers to research questions B – E. To answer the research questions, I extracted the survey data by subject (20 students) and converted to a Likert scale (Strongly agree = 2, Somewhat agree = 1, Neither agree nor disagree = 0, Somewhat disagree = -1, Strongly agree = -2).

Survey questions Q1 and Q19 are presented separately (see Table 4.9), These are general questions about students' experience and do not point directly to specific research questions.

Table 4.9

Student Survey Questions 1 and 19 (no direct reference to research questions)

Student Survey Questions 1 and 19			
Q1: This course had a positive influence on my growth as a musician and inspired me to continue studying jazz.			
Online	8 strongly agree	2 somewhat agree	
In-Person	8 strongly agree	2 somewhat agree	
Q19: I would recommend the instructional delivery format I experienced to others studying jazz music.			
Online	5 strongly agree	2 somewhat agree	3 somewhat disagree
In-Person	7 strongly agree	3 somewhat agree	

Q1 yielded 8 strongly agree, 2 somewhat agree ($M = 1.20$, $SD = 0.40$) for the online group, and 8 strongly agree, 2 somewhat agree ($M = 1.20$, $SD = 0.40$) for the in-person group.

Q19 yielded 5 strongly agree, 2 somewhat agree, 3 somewhat disagree (M = 1.80, SD = 0.87) for the online group, and 7 strongly agree, 3 somewhat agree (M = 1.30, SD = 0.46) for the in-person group. Overall, all but one of the students indicated the course and delivery of the course were beneficial.

Survey questions Q2 - Q5 point to research question B, how does technology affect student learning when comparing synchronous online to in-person instruction? (see Table 4.10).

Table 4.10

Student Survey Questions 2 – 5 (reference to research question B)

Student Survey Questions 2 - 5			
Q2: The instructional delivery used in this course was effective and helpful in the learning process.			
Online	9 strongly agree	1 neither agree nor disagree	
In-Person	8 strongly agree	2 somewhat agree	
Q3: Audio examples were clear and easy to hear.			
Online	8 strongly agree	1 somewhat disagree	1 strongly disagree
In-Person	8 strongly agree	2 somewhat agree	
Q4: Video examples were well chosen and clearly visible.			
Online	7 strongly agree	2 somewhat agree	1 somewhat disagree
In-Person	9 strongly agree	1 somewhat agree	
Q5: The instructor was clearly visible and easy to hear.			
Online	8 strongly agree	2 neither agree nor disagree	
In-Person	10 strongly agree		

Q2 yielded 9 strongly agree and 1 neither agree nor disagree (M = 1.20, SD = 0.60) for the online group, and 8 strongly agree and 2 somewhat disagree (M = 1.20, SD = 0.40) for the in-person group.

Q3 yielded 8 strongly agree, 1 somewhat disagree, 1 strongly disagree (M = 1.70, SD = 1.42) for the online group, and 8 strongly agree and 2 somewhat agree (M = 1.20, SD = 0.40) for the in-person group,

Q4 yielded 7 strongly agree, 2 somewhat agree, and 1 somewhat disagree (M = 1.50, SD = 0.92) for the online group, and 9 strongly agree, and 1 somewhat agree (M = 1.10, SD = 0.30) for the in-person group.

Q5 yielded 8 strongly agree, and 2 neither agree nor disagree (M = 1.20, SD = 0.40) for the online group, and 10 strongly agree (M = 1.00, SD = 0.00) for the in-person group.

Survey questions Q6 – Q8 point to research question C, how does synchronous online versus in-person instruction affect the participants' overall interaction? (see Table 4.11).

Table 4.11

Student Survey Questions 6 – 8 (reference to research question C)

Student Survey Questions 6 – 8			
Q6: The instructional format allowed the teacher to effectively engage all participants.			
Online	9 strongly agree	1 somewhat agree	
In-Person	8 strongly agree	1 somewhat agree	1 neither agree nor disagree
Q7: The instructional format allowed the teacher to provide feedback through personal interaction with students.			
Online	8 strongly agree	1 somewhat agree	1 somewhat disagree
In-Person	7 strongly agree	3 somewhat agree	
Q8: The instructional format provided sufficient opportunities for student-to-student interaction.			
Online	7 strongly agree	2 somewhat agree	1 somewhat disagree
In-Person	6 strongly agree	4 somewhat agree	

Q6 yielded 9 strongly agree, 1 somewhat disagree (M = 1.10, SD = 0.30) for the online group, and 8 strongly agree, 1 somewhat agree, and 1 neither agree nor disagree (M = 1.30, SD = 0.64) for the in-person group.

Q7 yielded 8 strongly agree, 1 somewhat agree, 1 somewhat disagree (M = 1.40, SD = 0.92) for the online group, and 7 strongly agree, 3 somewhat agree (M = 1.30, SD = 0.46) for the in-person group.

Q8 yielded 7 strongly agree, 2 somewhat agree, 1 somewhat disagree (M = 1.50, SD = 0.92) for the online group, and 6 strongly agree, 4 somewhat agree (M = 1.40, SD = 0.49) for the in-person group.

Survey questions Q9 - Q13 and point to research question D, is student motivation to learn affected by instructional delivery method? (see Table 4.12).

Table 4.12

Student Survey Questions 9 – 13 (reference to research question D)

Student Survey Questions 9 – 13				
Q9: The instructional delivery I experienced positively affected my motivation to learn this subject.				
Online	8 strongly agree	2 somewhat agree		
In-Person	9 strongly agree	1 somewhat agree		
Q10: If given a choice, I am more motivated to learn a subject when the content is delivered in an online format.				
Online	3 strongly agree	6 neither agree nor disagree	1 strongly disagree	
In-Person	3 strongly agree	3 neither agree nor disagree	2 somewhat disagree	2 strongly disagree
Q11: If given a choice, I am more motivated to learn a subject when the content is delivered in an in-person format.				
Online	4 strongly agree	2 somewhat agree	3 neither agree nor disagree	1 strongly disagree
In-Person	7 strongly agree	3 somewhat agree		
Q12: The use of technology as a supplemental teaching tool positively affected my motivation to learn this subject.				
Online	4 strongly agree	3 somewhat agree	3 neither agree nor disagree	
In-Person	4 strongly agree	3 somewhat agree	3 neither agree nor disagree	
Q13: My motivation to learn jazz music is not affected by technology or the instructional delivery format.				
Online	5 strongly agree	2 somewhat agree	3 neither agree nor disagree	
In-Person	2 strongly agree	2 somewhat agree	4 neither agree nor disagree	2 strongly disagree

Q9 yielded 8 strongly agree, 2 somewhat agree (M = 1.20, SD = 0.40) for the online group, and 9 strongly agree, 1 somewhat agree (M = 1.10, SD = 0.30) for the in-person group.

Q10 yielded 3 strongly agree, 6 neither agree nor disagree, 1 strongly disagree (M = 2.60, SD = 1.20) for the online group, and 3 strongly agree, 3 neither agree nor

disagree, 2 somewhat disagree, 2 strongly disagree (M = 3.00, SD = 1.48) for the in-person group.

Q11 yielded 4 strongly agree, 2 somewhat agree, 3 neither agree nor disagree, 1 strongly disagree (M = 2.20, SD = 1.25) for the online group, and 7 strongly agree, 3 somewhat agree (M = 1.30, SD = 0.46) for the in-person group.

Q12 yielded 4 strongly agree, 3 somewhat agree, 3 neither agree nor disagree (M = 1.90, SD = 0.83) for the online group, and 4 strongly agree, 3 somewhat agree, 3 neither agree nor disagree (M = 1.90, SD = 0.83) for the in-person group.

Q13 yielded 5 strongly agree, 2 somewhat agree, 3 neither agree nor disagree (M = 1.80, SD = 0.87) for the online group, and 2 strongly agree, 2 somewhat agree, 4 neither agree nor disagree, 2 strongly disagree (M = 2.80, SD = 1.33) for the in-person group. Survey questions Q14 - Q18 and point to research question E, does student perception of learning in jazz differ given the medium of instruction? (see Table 4.13).

Table 4.13

Student Survey Questions 14 – 18 (reference to research question E)

Student Survey Questions 14 – 18			
Q14: My knowledge and interest in jazz history has increased as a result of this course.			
Online	8 strongly agree	1 somewhat agree	1 neither agree nor disagree
In-Person	8 strongly agree	1 somewhat agree	1 neither agree nor disagree
Q15: My ability to comprehend jazz theory increased as a result of this course.			
Online	6 strongly agree	3 somewhat agree	1 neither agree nor disagree
In-Person	5 strongly agree	3 somewhat agree	2 neither agree nor disagree
Q16: My theoretical understanding of jazz improvisation has improved because of this course.			
Online	6 strongly agree	3 somewhat agree	1 somewhat disagree
In-Person	5 strongly agree	3 somewhat agree	2 neither agree nor disagree
Q17: This course helped me to apply my theoretical knowledge to my skill as an improviser.			
Online	7 strongly agree	3 somewhat agree	
In-Person	7 strongly agree	2 somewhat agree	1 neither agree nor disagree
Q18: The pre and post assessments properly gauged my knowledge of jazz theory, history, and improvisation.			
Online	8 strongly agree	1 somewhat agree	1 somewhat disagree
In-Person	7 strongly agree	2 somewhat agree	1 neither agree nor disagree

Q14 yielded 8 strongly agree, 1 somewhat agree, 1 neither agree nor disagree (M = 1.30, SD = 0.64) for the online group, and 8 strongly agree, 1 somewhat agree, 1 neither agree nor disagree (M = 1.30, SD = 0.64) for the in-person group.

Q15 yielded 6 strongly agree, 3 somewhat agree, 1 neither agree nor disagree (M = 1.50, SD = 0.67) for the online group, and 5 strongly agree, 3 somewhat agree, 2 neither agree nor disagree (M = 1.70, SD = 0.78) for the in-person group.

Q16 yielded 6 strongly agree, 3 somewhat agree, 1 somewhat disagree (M = 1.60, SD = 0.92) for the online group, and 5 strongly agree, 3 somewhat agree, 2 neither agree nor disagree (M = 1.70, SD = 0.78) for the in-person group.

Q17 yielded 7 strongly agree, 3 somewhat agree (M = 1.30, SD = 0.46) for the online group, and 7 strongly agree, 2 somewhat agree, 1 neither agree nor disagree (M = 1.40, SD = 0.66) for the in-person group.

Q18 yielded 8 strongly agree, 1 somewhat agree, 1 somewhat disagree (M = 1.40, SD = 0.92) for the online group, and 7 strongly agree, 2 somewhat agree, 1 neither agree nor disagree (M = 1.40, SD = .066) for the in-person group.

The final essay question (Q20) provides insight into individual student experiences and their opinions as a result of participation in the study (see Table 4.14).

Table 4.14

Student Survey Question #20 Responses (Essay)

Student Survey Question #20
Q20: Please provide your thoughts about your overall educational experience as a result of participating in this course. Identify the most and least helpful elements. (ESSAY)
Online Group
"Joshua Grau stressed the importance of jazz history to me and has inspired me to dive deeper into the studies. His passion has rubbed off on me and I pass on his teachings to my students as well. The most helpful element was his ability to demonstrate every concept he talked about."
"This course was a great experience and I gained knowledge throughout the course. The most helpful element was definitely the theoretical side of the course. Learning about jazz modality and harmony in the online platform was surprisingly helpful. The least helpful aspect was also the online side too. In some situations, with performance-based courses, the online platform can be restricting as it would be expected."
"I felt that the format and videos with discussions was a great way to teach. It was very comprehensive and engaging and very useful. I would have preferred to be in person just to get a more hands-on feel but overall it was a great experience."
"I can say that I learned a lot from this course. I didn't know much about the history of jazz, but through this coarse and its material I improved not only the history but my interest and playing of jazz. I wasn't the biggest fan of the quality of the online learning but if improvements get made in the technology it could be a solid learning experience."
"I enjoyed the online video conferences with Josh and going over historical content as it pertains to jazz. I loved the wealth of information and I was able to digest it at my own pace with the online learning format. If I were to add something, I would probably add musical exercises that lined up with whatever jazz musician we were learning about that week, that way we all could absorb some of these great

musicians and use their ideas and phrases to influence our own musical voice. Great course, even greater teacher."

"I enjoyed the experience. I would still prefer in-person teaching in lieu of online lessons."

"Due to the nature of the relationship between the weather and one's internet connection, often the video and audio examples can be difficult to follow or hear properly. Online classes also make it more difficult to discuss with the teacher or other students individually, due to the entire class all being on the same call. However, the convenience of not having to drive anywhere is unbeatable, allowing students to balance their often very active lives with their schoolwork much easier. It's a tough decision, choosing between online and offline education, they both have their pros and cons. Ultimately though, in-person is the more effective option, though if the student finds that they have too little time to study/work while dealing with the daily commute to the institution, then online classes are often a sufficient replacement. Disregarding the technological deficiencies of the class, the information itself was very useful and Dr. Grau came across as very passionate about the topics discussed."

"I'm not really sure what the least helpful element would have been, but I would say that Zoom was the most helpful element to learning online because it not only provides a means of communication for the student and the teacher, but it also works well as a teaching tool because of the screen sharing abilities which allows for better understanding when explaining conceptual information."

In-Person Group

"I thought overall it was a good introduction to jazz. I really enjoyed the history segments and videos watched; I feel like that is where I learned the most. Things got strange towards the end with COVID and all which I feel like affected the theory segments for me. Also, I would say some of the material taught was hard for me to follow thoroughly. I think I would have enjoyed the course more if it were a one on one lesson. Some students knew more theory than I and it accelerated the course. Overall great experience, I enjoyed the soloing parts but again I'd say that applying the theory and techniques were a bit of a challenge for me because my lack of understanding the material quick enough."

"I learned a great deal about the history of jazz through this course - having access to documentary videos through the online portion gave me a more relatable way to learn the material. Having Josh explain the history in addition to the videos helped further and gave me a sense of culture to connect with beyond simply understanding when things happened. I feel that while the time period given to absorb, practice, and develop improvising techniques was too short to show or feel any measurable progress in a musical fashion - I did truly learn a lot that will perhaps continue manifesting over time and practice. Josh gave me insight on using Lydian over a maj7 chord where I would typically think to use Ionian - it made sense that this is a valid option but should be used cautiously and sparingly for maximum effect. I made a point to demonstrate that I learned that from my initial playing over the tune Blue Bossa, to the second playthrough a week later. I don't necessarily think my playing itself was better or worse, but I did demonstrate that I learned that much. At that point the challenge becomes making it natural and musical in my playing and doing that in a mere week of time for the level of musician I am was very unlikely. I have since developed a much better sense of using that concept and I believe that to ultimately be the goal of any learning - to eventually make sense of a topic and use it appropriately and naturally. I had in person work with Josh and I do believe that this was maybe a benefit vs online. Josh is an excellent teacher and I am unsure if you can truly get the full extent of how much he can teach through a purely online platform since it lacks the immediate and direct level of feedback and observation he has to offer."

"I feel like this course helped me a lot getting better at playing jazz and understanding the harmony and melody and its inner workings a bit better."

> "The course helped me personally connect with aspects of jazz that I had not considered, such as history and geography of its origins."
>
> "The class was a great learning experience. We thoroughly went through each component of jazz from history, to theory. The most helpful elements were the combination of in person teaching, with the use of educational videos to pull info from. Our instructor is very knowledgeable in this field, and the videos aided him well in teaching the class."
>
> "It was a good experience overall to learn about jazz history and theory in an in-person class where we could easily ask questions and learn the material. The most helpful part of the course was going over improvisation strategies and being able to play the song together in person. The videos and listening examples were interesting and helpful to the learning as well."
>
> "My overall educational experience was immensely improved in jazz knowledge and skill as a result of this course. All elements were helpful, especially the one on one help with improvising tactics."
>
> "The course was overall a very helpful experience. The historical aspect of it made jazz more intriguing. Not a lot of time was spent on the theory part of it, but the instruction given for the improv portion was very helpful."

The essay question divulges useful information about the students' experiences as participants in the study. It provided an opportunity for them to be able to express themselves without constraints of multiple-choice responses that might not necessarily reflect their true feelings or observations during the study. The student responses provide supportive and critical viewpoints for both methodologies and help to answer the research questions in a broader sense.

The following table denotes the calculated average of Q2 - Q5, Q6 - Q8, Q9 - Q13, Q14 - Q18 for each subject with respect to research questions (RQ) B-E, respectively (see Table 4.15).

Table 4.15

Average of survey responses for Q2 - Q5, Q6 - Q8, Q9 - Q13, Q14 - Q18

	Average RQ B		Average RQ C		Average RQ D		Average RQ E	
	Online	In-Person	Online	In-Person	Online	In-Person	Online	In-Person
	2.0	2.0	2.0	2.0	0.6	0.6	2.0	1.6
	2.0	2.0	2.0	2.0	1.2	0.4	1.8	2.0
	0	1.75	-0.333	1.333	0.8	0.4	1.2	0.6
	2.0	2.0	1.666	2.0	1.2	2.0	1.4	2.0
	1.25	2.0	2.0	2.0	1.0	0.8	-0.2	2.0
	2.0	1.75	2.0	1.333	1.2	0.6	2.0	1.2
	0.75	1.5	1.333	1.666	0.4	1.8	1.6	1.8
	2.0	2.0	2.0	2.0	0.8	1.2	2.0	2.0
	2.0	1.75	2.0	0.666	1.4	1.0	2.0	0.4
	2.0	2.0	2.0	1.666	2.0	1.0	2.0	1.4
Mean	1.6	1.875	1.666	1.666	1.06	0.98	1.58	1.5
SD	0.709	0.177	0.737	0.444	0.453	0.553	0.689	0.598

T-test results for research questions B – E are indicated below and help to provide further information for analysis based on student survey responses (see Table 4.16).

Table 4.16

T-test Results: Student Survey Responses for Research Questions B – E

T-test results for Research Questions B - E					
	M	***SD***	***t***	***df***	***p***
Question B					
Online Group	1.6	0.709			
			1.19	18	.2495
In-Person Group	1.87	0.177			
Question C					
Online Group	1.66	0.737			
			0	18	1
In-Person Group	1.66	0.444			
Question D					
Online Group	1.06	0.453			
			-0.353	18	.2776
In-Person Group	0.98	0.553			
Question E					
Online Group	1.58	0.689			
			-0.2772	18	.7848
In-Person Group	1.5	0.598			

From the output, all the tests give *p*-value greater than 0.05, demonstrating that there is insufficient statistical evidence to conclude students' learning, interaction, motivation, perception would be affected by instructional delivery methods.

CHAPTER 5: CONCLUSION

Final Examination of the Study

The focus of this investigation was to examine music students' personal experience and learning outcomes when comparing synchronous online to traditional instruction in Jazz Concepts. Though the results showed no statistical evidence that one type of instruction produced better outcomes, the traditional in-person instructional methodology was a more effective platform in terms of scores and student preference.

For this study, the in-person group consistently had greater gains and higher percentage scores from the pre-test to the post-test in jazz theory, history and improvisation. There are many factors to consider that may have provided this result. I made a great effort to be sure the unit lesson plans were presented to the 2 groups as thoroughly and equally as possible. Challenges occurred in the utilization of technology, especially during the improvisation unit, where creative interaction between players is paramount. During the online lessons, students simply could not play together due to latency constraints of internet speed, whereas the in-person students were provided the opportunity for real-time musical interaction. This in itself is of monumental importance to the process of learning to play jazz. It is evident that until technology can provide for a seamless virtual connection for musicians to play together in real-time, online teaching will pale in comparison to in-person teaching.

Research Question A

How do student learning outcomes compare in 3 primary areas of jazz (history, theory, improvisation) in synchronous online versus in-person instruction?

To address this question, I evaluated each unit area separately as such:

Jazz History – This subject is perhaps the least challenging to present effectively in an online delivery format. The results of this study show the in-person group increased by 10.4% over the online group in pre- to post-scores. This difference between the groups may be affected by outliers of scores that skew the data creating a wide variance. For example, student participant C (online group) scored only a 3% increase from pre- to post-test, which indicates he made little or no effort to actually comprehend the jazz history unit (other factors could also be examined, such as his ability to see or hear the lesson content appropriately given the circumstances of his internet connection or technology). If student C were removed from the online group's total score, it would bring the average a little closer to the in-person group, but not significantly. Another interesting factor that occurred are the scores of 2 students (online participant D and in-person participant M) who both scored only 6% on the pre-test but increased to 64% and 82% (respectively) on the post-test. Both students are classically trained musicians and came into the study with minimal jazz knowledge or experience. Lastly, in-person student participant T (age 25 with 12 yrs. experience), achieved the highest pre-test score of 80% indicating substantive jazz history knowledge, and increased to 90% on the post-test. Obviously, the diversity of population and student experience played a critical factor in determining learning outcomes of such a small sample size.

Jazz Theory – The online and in-person pre- to post-scores increased similarly for both groups (22% and 24%, respectively), yielding only a 2% difference in favor of the in-person group. This indicates both groups experienced comparable learning outcomes in jazz theory. Although the in-person group scored higher on pre- and post-tests, both groups had participants who studied music theory prior to the study, and possibly had varying amounts of knowledge pertaining to jazz in general. This could be attributed to their individual instrument lessons or the music theory requirements of the Music & Technology curriculum. However, there are also 2 students whose results may have skewed the data; one appearing in each group. It is evident that online student participant C scored only a 2% increase between pre and post-tests, as his scores were 47% and 49% respectively. This indicates (as in jazz history) he lacked any real substantive theory knowledge both at the onset and culmination of the unit or had little interest in learning jazz to begin with. The other outlier could be attributed to in-person student participant K, who scored 98% on both the pre- and post-tests with no change, indicating his solid knowledge of jazz theory at both the onset and culmination of the unit. The difference in these 2 students' pre/post scores were so minimal they could be considered outliers, however, when I calculated the results by exempting their scores, I found no significant change.

Jazz Improvisation – as mentioned earlier, this was perhaps the most challenging component to teach in an online setting. The score results actually conveyed some interesting outcomes; as several students decreased in their score from the pre-test to the post-test. As previously mentioned, the students were judged by 3 external staff members to provide a non-biased result. These judges were not provided any information about the students or privy to whether the recorded submissions were pre or post. They also had no

knowledge to which group students were assigned—they simply rated the improvisation performances on a 100% scale. Since improvisation in jazz is an expression of artistic competency and considered highly subjective to evaluate, the student scores were calculated by averaging the 3 judges' subjective assessments of the pre- and post-submissions.

The improvisation unit pre- to post-test results showed the in-person group increased minimally over the online group by only 3.1%. Although both groups' overall average scores increased between pre and post-tests, only 4 online and 7 in-person students improved their improvisation scores. 9 out of 20 participants actually scored lower on their post-test than the pre-test. How could this be? I personally found this to be surprising, but the judges' average score results indicated these particular students did not improve in terms of improvisation criteria.

What factors might have led to this decline for 9 students? Upon closer evaluation of the online group, we can see student participants A (-2%), B (-1%) and J (-2%) decreased minimally, whereas student participants C (-8), G (-8), and I (-7) encountered more significant drops. In-person student participants Q (-1), S (-2%), and T (-2%) also decreased minimally. Overall, the online group performed less favorably than the in-person group, but data indicate both groups had participants who were less inclined to practice their improvisation assignments, or appropriately prepare their final submissions. Perhaps they did not comprehend the lesson concepts or experience the same level of instruction as others in their group. Furthermore, some students may have been adversely affected by the stress and emotional disruption brought about by the COVID-19 pandemic, as several of

their improvisation post tests were submitted after the required date and after school closures.

Another important factor to consider when evaluating a student's ability to improvise is the setting in which they are performing. All of the participants in this study were required to perform their pre-test in front of other students in real-time. This presented a challenge for the online group, because they had to play along with the background track from their computer while others listened on the Zoom conference. Students' incentive to play for one another may have been an inspiring element to consider in their performance. Although students were only given a few minutes to look over the chart and chord changes prior to their pre-test improvisation attempt, they may have been more compelled to play by ear rather than thinking about the theoretical challenge of playing through the chord changes. This in itself is an element of improvisation worth mentioning, as being able to play by ear may yield a more effective and creative result than improvising within theoretical constraints. Another factor to consider is that while recording their post-tests, some students felt intimidated and/or constrained by knowing they were going to be judged on their ability to improvise through chord changes. This is only a hypothetical theory on why several of the students' scores may have decreased, however, it is worth consideration.

Improvisation occurs best when there is interaction between musicians. Although these students did not actually play together for the pre-test, they were listening to each other's attempt. Since improvisation is a subjective art form and difficult to judge, it is understandable that musicians might perform with more creativity and freedom of expression when playing by ear, rather than concentrating on required components or

constraints set forth by an assignment. This actually goes to the core of musicianship and is a key component in jazz improvisation.

Research Question B

How does technology affect student learning when comparing synchronous online to in-person instruction? To address this question, I evaluated the student survey questions 2 –5. Responses indicated the student experience was relatively similar between both groups. Since the exact same technology was used for both groups in my presentation, any differences would have occurred from the online students' receiving computer or mobile device, Zoom connection, and audio speakers or headphones. Many online students used their computers to log into Canvas during the presentations and followed along with my lecture outline using headphones. It was also evident that some online students use their mobile devices (iPads, iPhones, Androids) to attend Zoom conferences, and were not necessarily concerned about the overall quality of the video or audio during the presentation.

Responses also indicate that at least one student in the online group had a very hard time hearing audio examples, whereas the in-person group was relatively satisfied with audio examples. Effectively transmitting audio via online instruction can be challenging for both the teacher and student, as several technological factors are at play. Since almost all of the online students were relatively satisfied with the audio transmission, the problem may have been on the dissatisfied student's receiving end. This could be due to a poor internet connection and other anomalies that occur while playing audio via Zoom. Other factors could be the student's speakers or headphones were malfunctioning. It is

disappointing to know that this student didn't bring it to my attention and attempt to remedy the situation. If the audio connection is not strong, or the signal transmission is intermittent, the online learning experience can be a frustrating.

In terms of whether video examples were well chosen and clearly visible, responses indicate the majority of other students were very satisfied, but that at least 1 online student had a less-than-stellar experience concerning video transmission. A closer analysis of the student survey indicated this student was the same student who had trouble hearing the audio. Again, this is surprising to me, because Zoom's screenshare function was used when I displayed video clips of the jazz artists being discussed, which normally transmits a very clear representation of my screen. This particular student may have had a poor internet connection or a malfunctioning computer or mobile device. The student may have felt the video examples were not well chosen, and perhaps didn't represent an appropriate representation of the artist or topic being presented. This particular question would have been better divided into 2 separate questions, as it points to 2 different results.

Both groups appeared to be able to see and hear me appropriately, which is an obvious result for in-person lectures. The presentation for the improvisation unit for online students utilized 3 cameras, which allowed for front, overhead, and up-close hand visualization options. Again, if the technology is unable to provide a clear representation of the instructor or the content being presented, the online learning experience will be less than optimal. Any online students who had difficulty seeing or hearing me either had technical troubles or did not prepare themselves to participate in a proper learning environment. I did notice some students were reluctant to broadcast their webcams and needed to be persuaded to turn them on. Others moved around while carrying their phones,

which may have created serious disruption to the learning process. As the instructor, I continually prompted students to sit still (perhaps at a desk or workstation) and participate appropriately, as would be expected of them in a brick-and-mortar classroom.

Research Question C

How does synchronous online versus in-person instruction affect the participants' overall interaction? To address this question, I evaluated the student survey questions 6 – 8. These questions asked them to conceptualize how the experience was for others, and not just for themselves. They indicated that I was able to engage online participants effectively, which certainly was the goal. But, from an educator's perspective, I know it requires considerable effort to appropriately reach an online audience, simply because of the technology and preparation needed for effective online delivery when teaching an instrument. Since a group of students appear as small picture icons on your screen, the interaction is much different than in-person communication. I find myself speaking louder and over-enunciating my speech to make sure I was heard (even while wearing a lavalier microphone). This is often the case for student-to-teacher interaction as well, which can be a problem unless appropriate audio/video setup has been implemented prior to the lecture. There were several occurrences where I needed to ask my students to speak up or repeat themselves, or play a passage again due to poor connectivity or background noise. When it came to teaching improvisation online, the real challenge was making sure the student could clearly see and hear my instrument as closely as possible to being in-person. Unfortunately, just using a built-in laptop camera and microphone doesn't always provide an equivalent face-to-face experience.

The responses concerning instructional format allowing me to provide feedback through personal interaction indicated that even the in-person group experienced a slightly less-than-stellar interaction with me. The online group had 1 student whose response suggested they had not received appropriate feedback or interaction. It is difficult to discern if the instructional format was indeed the reasoning behind these responses. I personally felt I was able to provide equivalent personal interaction for both groups, regardless of technology. Sometimes it requires muting online participant's microphones or asking that students move to a quiet place while in class or prohibiting them from driving while attending Zoom sessions. Just as in the in-person setting, sometimes students need to sit tight while the teacher works with other individuals.

When asked if the instructional format provided sufficient opportunities for student-to-student interaction. The online group responded with 7 strongly agree, 2 somewhat agree, and 1 somewhat disagree, which is understandable given online musical interaction is limited due to the Zoom connection. Surprisingly, however, the in-person group responded with only 6 strongly agree, and 4 somewhat agree. Since in-person instruction usually allows for unlimited student-to-student interaction (if the teacher allows as such), apparently some participants felt inhibited in this regard during the study. It is hard to know if the 4 students who somewhat agree attribute their inhibition to the improvisation unit, where they had opportunities to play together. However, when the pre-test occurred for improvisation, its play along format was administered with a pre-recorded track and not as an interactive ensemble. Ideally, for creative improvisation to occur, interaction between players is paramount. I decided to use pre-recorded play along tracks for both groups simply because it was impossible for the online group to play together in

real-time, and both groups needed to adhere to the same format. It is interesting to find only 1 online student somewhat disagreed with there being sufficient opportunities to interact with one another. I would have expected more online students to respond negatively to this question.

Research Question D

Is student motivation to learn affected by instructional delivery method? To address this question, I evaluated the student survey questions 9 – 13. Students were asked if they felt more motivated to learn a subject when the content is delivered online versus in-person. These questions elicited the most diverse responses of all the survey questions and were posed to the entire group of students because all of them experienced both methodologies outside of this study. More than half the group responded indifferent (neither agree nor disagree), and hopefully feel motivated to learn regardless of the delivery method. Of the remaining responses, the in-person group leaned heavily in favor of being more motivated by in-person delivery. Since the responses were so varied, and the sample population of this study was so small, it was difficult to discern which method of delivery was more motivating to students. When asked if the use of technology positively affected students' motivation to learn this subject, both online and in-person groups responded with mixed results, which indicates student's motivation to learn jazz music was not necessarily affected by technology or the instructional delivery format. It is my belief that motivation to learn is not really defined by the mechanism of instruction, but more so by interest in the topic. It is interesting to know, however, if a student feels less inclined to attend an online session because it lacks in substance or meaningful

interaction. In a music setting, the virtual world leaves much to be desired, especially in terms of participation and playing together.

Research Question E

Does student perception of learning in jazz differ given the medium of instruction? To address this question, I evaluated the student survey questions 14 – 18. These questions addressed students' perception of learning and both groups responded favorably overall for history, theory and improvisation. This indicates that, regardless of medium of instruction, learning does occur and it's really up to the teacher (and the participants) to eliminate technological anomalies or constraints. One student in the in-person expressed less-than-stellar response in terms of his increased skill as an improviser. This could because he already had significant ability to play jazz and was not challenged enough or not significantly interested in the playing assignments. The ability to improvise varies enormously amongst students. Some tend to grow impatient waiting for others to grasp and apply the concepts. Certain students are harder on themselves to achieve this ability. This student may have felt his increased skill was minimal due to a flaw in my teaching, or by the fact he did not practice much to better himself. Another student also responded somewhat unfavorably to the pre- and post-tests accurately assessing their knowledge in the 3 areas. Although the assessments were comprehensive, my perception is that the improvisation component may have been significantly difficult for some of the participants, and they felt their performance wasn't truly representative of their abilities.

Problems with the Study

In retrospect, I feel several factors about this study were problematic. The primary drawback was that the number of participants did not constitute a large enough pool for the data results to have power. Ideally, I would have preferred to have twice as many students take part in the study. Secondly, the study was done entirely voluntarily, and many students may have felt overwhelmed by the amount of time and information in which I was asking them to commit. I sensed, as several weeks past, that some students were becoming less interested in following through with the commitment I had requested of them. This was evident when certain participants would show up late or leave early from our scheduled meeting times. Perhaps this is par-for-the-course and occurs with any college class, however, I felt it may have skewed the results. If Jazz Concepts were an actual required course that counted towards a grade, the students' effort may have been much stronger. Additionally, my assumption that all participants were eager to learn about jazz was somewhat miscalculated, as it quickly became apparent several students knew almost nothing about the subject and I felt strained getting them to embrace what I assumed was of monumental importance. Ideally, asking volunteers to take a pre-survey that presented a comprehensive overview of what was going to be covered would have been wise and would have also possibly helped equalize the groups in terms of knowledge. It was obvious that several students agreed to participate simply out of loyalty to me. Lastly, although the lesson presentations were all completed prior to the COVID-19 pandemic taking full effect, rounding up the improvisation post-test submissions was very challenging. Only after several weeks of phone calls, emails, and

text messages, did all the students finally get all the final submissions uploaded to Canvas LMS.

Other aspects concerning online learning are commonplace but worth mentioning. Students like to use their cell phones when attending class. Often, they are sprawled out on a sofa, or lying in bed, or sometimes even driving. For a required course, it can be mandated that online students sit at a desk, have pencil/paper ready, ensure that their webcam is on, and be ready to share their screen. However, for a volunteer situation such as this, I found myself asking students to take our sessions seriously—almost to the point where I was asking for a favor. This overly empowers students and creates a negative scenario for the teacher. If I were to implement another study of this kind, it would certainly not include a volunteer population.

Insight from a College President

The private for-profit college whose students participated in this study has been in operation since 1985. The current President, who has been in his position since 1992, agreed to be interviewed to express his thoughts concerning the future of online learning and challenges with evolving educational practices. Below is a synopsis of his viewpoint as a result of my interview with him:

> Providing a clear and concise approach to distance learning, for-profit institutions pioneered the post-secondary online educational experience. Now, in the wake of the COVID-19 pandemic, online education is at the forefront of the educational landscape. It is becoming increasingly clear that online education is a part of the new normal, and the for-profit model continues to lead the charge into quality distance education. Nevertheless, private schools must conquer a variety of challenges not presented to traditional educational models. These challenges, while often restricting, force schools of this type to remain agile and progressive.
>
> Having been raised on technology, current and upcoming generations expect some degree of flexibility in their schedules. These students expect to have education delivered in much the same way as they receive their media - on their own time. For that reason, in order to remain relevant and enticing, schools must be responsive to the students' needs.
>
> Incorporated in the for-profit degree model is the inclusion of software and vocational certifications. Many companies now look to an individual's specific certifications, rather than overarching degrees, as an indicator of expertise. This is not to discredit the traditional university experience, however, a more succinct educational pathway may better suit certain students.

> The government requirement placed on private for-profit institutions to maintain Title IV Federal Funding mandates a job placement rate of 70%. This regulation is not found in the public university systems. For this reason, the for-profit sector must remain responsive to employers' needs, and stay up to date on cutting edge technology in order to provide students with a relevant education. Another challenge for the private education sector is the requirement to maintain compliance with regulatory agencies. These regulatory groups include state governments, accrediting agencies, Homeland Security, Department of Education, Federal Auditors, Veterans' Administration. Many of these regulators are not completely autonomous and are subject to political volatility. These agencies provide important quality control, but often hold schools to antiquated standards that can affect an institution's ability to place students in jobs.

Although there is still limited scholarly research available in terms of COVID-19's impact on education and society, an article entitled *Post-Covid-19 Education and Education Technology 'Solutionism': a Seller's Market*, by Marko Teräs, Juha Suoranta, Hanna Teräs & Mark Curcher (July 2020), points out how educational institutions must adapt with an unprecedented push to online learning. The authors are critical of possible problems that may arise from adoption of commercial digital learning solutions whose design are not necessarily driven by best pedagogical practices. The study points to the impact on learners being unprecedented, where in April 2020 over 1,500,000,000 students worldwide from primary to tertiary level could not attend school (UNESCO 2020). These rapid moves from classroom to online teaching have "set aside the more profound questions related to national educational policies and theoretical grounds and

premises. Different actors in administrative positions provide their accounts of how to make sense of the situation and ensure the continuation of teaching and learning" (para. 2). Politicians are on the front line making educational policy and setting restrictions and measures based on health experts' assessments and constructing official and authoritative narratives. How do educational institutions and teachers across the world transfer their work from classrooms and lecture halls to digital platforms almost overnight? This rapid transition has revealed gaps and shortcomings in how online learning is to be adopted in educational institutions (Teräs et al., 2020).

Concluding Thoughts and Predications for the Future

As a college administrator, it is incumbent on me to provide strategies that enable my institution to remain competitive. Since online education has more than established itself as a new norm, ensuring that it is effectively presented and comparable to in-person instruction is essential for the sustainability of my institution. Long before the pandemic occurred, my college had engaged in a deliberate and concentrated effort toward online course development and becoming a competitive distance learning institution. The purpose of this study is a consequence of this effort. As a result of the COVID-19, however, we embarked upon an immediate overhaul of our facilities to accommodate for online delivery. The Emergency U.S. Coronavirus Aid, Relief, and Economic Security (CARES) Act helped us to outfit every classroom and recording studio with multiple cameras, flat screen monitors, and powerful Apple computers. Being that we are a music and media college, our instructors often need to teach online courses utilizing the equipment we have onsite

(i.e. recording consoles, audio/video production labs, post-production facilities, computer labs with specific music software etc.). Therefore, the internet connection has been upgraded to provide extremely high bandwidth so that audio/video can be streamed unimpeded from multiple classrooms at once. Our Canvas LMS is intergraded with Zoom web-conferencing so each course has built-in video broadcast tool with cloud-based recording, and customizable grade book/attendance book features. Additional lighting, acoustical panels, sound proofing, and peripherical gear; such as lavalier microphones and wireless headsets, have been provided to all instructors. The goal was to continue operating at full capacity in an online delivery format so that every student's educational experience would remain as close to in-person instruction as possible. It has been challenging teaching what is normally hands-on in an online format. Fortunately, our current student enrollment has surpassed pre-pandemic enrollments, and we've succeeded in making this unexpected and swift transition to virtual education.

For other music institutions to be equally successful, school administrators and teachers must be willing to embrace the technology needed to engage students as effectively as possible. It may require an infrastructure overhaul that can handle emergency scenarios such as COVID-19. All schools worldwide, especially those in the private for-profit sector, have been thrust into uncharted territories and are now quickly realizing that a successful online educational model may be the only option to keeping their doors open (virtually). This changes everything, as education is now experiencing a paradigm shift of epic proportions!

At the conclusion of the study, I learned that historical and theoretical concepts in jazz are practical and conducive to online teaching methodology. However, the improvisational component still leaves much to be desired and remains an area that will likely require the most attention for effective online implementation. Simply put, until internet speed allows for real time interaction between players without any latency, this type of teaching is best done in person. Although there are software and hardware platforms on the brink of providing a viable solution to latency, the technology is not yet fully functional. Future research and studies will need to occur that examine how technology will provide a seamless virtual experience between musicians and educators. The good news is, we will soon be able to achieve this, and bands, orchestras, choirs, and all types of musical ensembles will inevitably flourish in an online world.

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APPENDICES

Appendix A: Jazz Concepts Lesson Plan

Instructor: Joshua Grau

Class Location: Music and Media College - Rm302a & Online

Class Meeting Times: 2hr sessions, 2 times per week (TBD)

Unit Duration: 5 weeks

Objectives of Unit:

The students participating in this experimental study were engaged in a 5-week volunteer workshop focusing on jazz history, theory and improvisation. The purpose was to analyze the student experience and learning outcomes from two contrasting lesson delivery methods:

- Synchronous online instructional delivery
- Traditional in-person instructional delivery

Each lesson was presented identically via both delivery formats. The purpose was to utilize two teaching methodologies and compare individual student outcomes. competencies, knowledge and improvisation ability at the culmination of the unit. The result will yield comparative data that will help to provide a hypothesis examining technological advancements currently used for online music teaching in jazz concepts and the implications for the future in music education.

Unit 1: Historical Overview of Jazz Music

Three 2hr lecture presentations (synchronous online and in-person)

Topics covered:

- The Blues
- New Orleans
- Louis Armstrong
- Swing Era
- Duke Ellington
- 1940s Bebop

- Charlie Parker & Dizzy Gillespie
- 1950s Latin and Afro-Cuban Jazz
- 1960s Miles Davis, John Coltrane, Thelonoius Monk
- Significant jazz vocalists: Ella Fitzgerald, Sarah Vaughan, Billie Holiday, Tony Bennett, Frank Sinatra, Bobby Darin, Michael Buble
- 1970s Bill Evans, Chick Corea, John McLaughlin, Herbie Hancock
- The Rise of Fusion: Pat Metheny, The Brecker Brothers
- 1980 MIDI & Electronic Jazz Production, Pop & Smooth Jazz
- 1990-current: Significant Contemporary Jazz Artists

Listening Session:

- Selected Musical Examples
    - Blues
    - Swing
    - Bossa Nova
    - Latin
    - Fusion
    - Avant-Garde

Unit Assessment:

- Students are given a pre-unit assessment gauging their current knowledge of jazz history.
- At culmination of unit, students are given a post-unit assessment to gauge difference in their knowledge and understanding of specific learning outcomes.

Unit 2: Theoretical Overview of Jazz Music

Three 2hr lecture presentations (synchronous online and in-person)

Topics covered:

- Blues fundamentals
    - Blues progressions (I IV V)
    - Blues scale, pentatonics and improvisational techniques

- Overview of modes
    - Ionian (major scale)
    - Dorian
    - Phrygian
    - Mixolydian (altered dominant, lydian dominant, diminished scale)
    - Lydian
    - Aeolian (natural minor)
    - Locrian
- Overview of diatonic harmony and transposition
    - Major scale chords: I ii iii IV V vi vii
    - Minor scale chords: i ii III iv v (V) VI VII (vii)
- Common jazz chord progressions
    - Ii V I
    - I vi ii V
    - Tritone substitutions
    - Chromatic harmony
- Chord voicings
    - Closed, open, rootless, drop 2, quartal
- Modal Jazz and free-form improvisation
- Pop, Fusion and Modern jazz compositional techniques

Unit Assessment:

- Students are given a pre-unit assessment gauging their current knowledge of jazz theory.
- At culmination of the unit, students are given a post-unit assessment to gauge differences in their knowledge and understanding of specific learning outcomes.

Unit 3: Improvisation in Jazz Music

Four 2hr lecture presentations (synchronous online and in-person)

Topics covered:

- Soloing through chord changes
- Target tones and voice leading
- Rhythmic awareness, groove and variation in feel
- 2 jazz standards to learn (TBD)
    - Statement of melody
    - Legitimacy of tone
    - Improvisation through chords
    - Comping techniques
    - Rhythmic feel
- Practice performance
    - Recorded video of each tune played along with pre-recorded accompaniment track
    - Peer-review critique session
- Final performance
    - Recorded video of each tune played along with pre-recorded accompaniment track
    - Reviewed and scored by a panel of judges not associated with lesson delivery

Unit Assessment:

- Students are given a pre-unit assessment gauging their current knowledge of jazz theory
- At culmination of the unit, students are given a post-unit assessment to gauge differences in their knowledge and understanding of specific learning outcomes.

Appendix B: Jazz History – Pre-/Post-Test

Jazz History (50 possible points)

Q1: Explain the origins of The Blues. (4pts)

Q2: What is the significance of Congo Square? (1pts)

Q3: Name 3 significant jazz figures to come from New Orleans. (3pts)

Q4: Who is credited with recording the first jazz record? (1pts)

Q5: What type of piano style emulated the ragtime "oompah" bass? (1pts)

Q6: What is the name of the famous jazz song that refers to slaves hanging from trees? (1pts)

Q7: Name 3 compositions made famous by Duke Ellington. (3pts)

Q8: Who is the guitarist who played with the Count Basie Orchestra and what is he most famous for? (2pts)

Q9: Name 2 prominent characteristics about Wes Mongomery's playing. (2pts)

Q10: What trumpeter and saxophonist are most notably credited for defining bebop jazz? (2pts)

Q11: What is the name of the best-selling Miles Davis album? (1pts)

Q12: What is the name of the saxophonist who wrote Giant Steps? (1pts)

Q13: Which Brazilian composer is most known for his Bossa-Nova compositions? (1pts)

Q14: Name 3 prominent female jazz singers. (3pts)

Q15: What instrument did Bill Evans play? (1pts)

Q16: Name 3 of the members of the Rat Pack. (3pts)

Q17: Chick Corea is known to be the keyboardist/leader for which two prominent jazz groups? (2pts)

Q18: Who was the guitarist and leader of the Mahavishnu Orchestra? (1pts)

Q19: Which jazz guitarist is most notably known for unaccompanied chord solos of standards? (1pts)

Q20: What is the most famous tune written by Erroll Garner? (1pts)

Q21: Who wrote the tune Summertime? (1pts)

Q22: Identify the following tune: *My Favorite Things* (1pts)

Q23: Identify the following tune: *The Girl from Ipanema* (1pts)

Q24: Identify the bass player on this recording of Birdland by Weather Report: *Jaco Pastorius* (1pts)

Q25: Identify the following guitarist: *Pat Metheny* (1pts)

Q26: Identify the following singer: *Frank Sinatra* (1pts)

Q27: Identify the following tune: *Billie's Bounce* (1pts)

Q28: Identify the following composer: *Scott Joplin* (1pts)

Q29: What kind of big band jazz style is this tune associated with? *Swing* (1pts)

Q30: Identify the following tune: *Got A Match* (1pts)

Q31: What style of jazz would this tune be associated with? *Avant-Garde/Free Jazz* (1pts)

Q32: Who is the pianist/composer in this clip? *Thelonius Monk* (1pts)

Q33: Who is the singer of this famous version of Mack The Knife? *Bobby Darin* (1pts)

Q34: What style of jazz is this tune associated with? *Fusion* (1pts)

Q35: What is the name of this Brecker Brothers tune? *Some Skunk Funk* (1pts)

Appendix C: Jazz Theory – Pre-/Post-Test

Jazz Theory (75 possible points)

Q1: Name the notes that make up the Ab Dorian scale? (7pts)

Q2: What chord would be used as a tritone substitution of C7alt chord? (1pt)

Q3: What mode would you use when soloing over a Major 7 #11 chord? (1pt)

Q4: What intervals make up the Major 6th Diminished scale devised by Barry Harris? (8pts)

Q5: What scale would you use when soloing over a Dominant 13 b9 chord and what intervals make up this scale? (8pts)

Q6: Name all the notes contained in the B7 Altered Dominant scale? (7pts)

Q7: In a jazz blues tune in the key of Bb, what chords would commonly be used for the turnaround? (1pts)

Q8: What are the diatonic 7th chords that occur in F# melodic minor? (7pts)

Q9: What notes occur in a Fm7b5 chord? (4pts)

Q10: What 7th chord is considered to be the sub-dominant in the key of B major? (1pts)

Q11: Explain the difference between tonal harmony and modal harmony. (4pts)

Q12: What would you call an E7 chord in the key of G? (1pts)

Q13: What is the interval that occurs between the 3rd and the 7th in any dominant chord? (1pts)

Q14: In a major scale, what diatonic note should be avoided when improvising over a major 7th chord? (1pts)

Q15: What is George Russell most noted for and what book did he write? (2pts)

Q16: What is the name of this chord? *Diagram: C6/9* (1pts)

Q17: John Coltrane's "Giant Steps" is based on tonal centers that define what type of triad? (1pts)

Q18: What kind of chord voicing structure is most often used in modal jazz? (1pts)

Q19: What scale would you use when soloing over an Eb9#11 chord in the key of D major? (1pts)

Q20: What are the primary tonal centers used in "All The Things You Are?" (5pts)

Q21: The fully diminished 7th chord essentially serves what purpose in jazz harmony? (1pts)

Q22: What is this chord progression referred to asand what scales would be used over the B section? *Oleo* (2pts)

Q23: Define what a Drop 2 voicing is (be specific and give an example). (3pts)

Q24: Name all the notes in the Eb Blues scale? (6pts)

Appendix D: Student Survey Questionnaire

Q1: This course had a positive influence on my growth as a musician and inspired me to continue studying jazz.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q2: The instructional delivery used in this course was effective and helpful in the learning process.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q3: Audio examples were clear and easy to hear.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q4: Video examples were well chosen and clearly visible.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q5: The instructor was clearly visible and easy to hear.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q6: The instructional format allowed the teacher to effectively engage all participants.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree

- Somewhat disagree
- Strongly disagree

Q7: The instructional format allowed the teacher to provide feedback through interaction with individual students.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q8: The instructional format provided sufficient opportunities for student-to-student interaction.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q9: The instructional delivery I experienced positively affected my motivation to learn this subject.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q10: If given a choice, I am more motivated to learn a subject when the content is delivered in an online format.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q11: If given a choice, I am more motivated to learn a subject when the content is delivered in an in-person format.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q12: I feel the use of technology as a supplemental teaching tool positively affected my motivation to learn this subject.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q13: In general, my motivation to learn jazz music is not affected by technology or the instructional delivery format.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q14: My knowledge and interest in jazz history has increased as a result of this course.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q15: My ability to comprehend jazz theory increased as a result of this course.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q16: My theoretical understanding of jazz improvisation has improved because of this course.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q17: This course helped me to apply my theoretical knowledge to my skill as an improviser.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q18: The pre and post assessments properly gauged my knowledge of jazz theory, history, and improvisation.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q19: I would recommend the instructional delivery format I experienced to others studying jazz music.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Q20: Please provide your thoughts about your overall educational experience as a result of participating in this course. Identify the most and least helpful elements. (ESSAY)