11-30-2023

Secondary Music Teachers' Perspectives on Virtual Concert Band Instruction

Jessica D. Dixon
Walden University

Walden University

College of Education and Human Sciences

This is to certify that the doctoral dissertation by

Jessica D. Dixon

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Jennifer Courduff, Committee Chairperson, Education Faculty
Dr. David Perry, Committee Member, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2023

Abstract

Secondary Music Teachers' Perspectives on Virtual Concert Band Instruction

by

Jessica D. Dixon

MA, Walden University, 2023

MA, Rutgers University, 2017

BS, Delaware State University, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Education—Learning, Instruction, & Innovation

Walden University

November 2023

Abstract

The research problem explored in this qualitative study was the lack of literature from the perspectives of K–12 music teachers on using virtual technology to instruct secondary concert bands. This study showed the challenges and successes experienced with the use of this technology and their impact on music teachers' overall view of using virtual means for secondary concert band instruction. The conceptual framework included Vygotsky's sociocultural theory of cognitive development, which is applicable to community-based learning (in this case, in the concert band ensemble), and Siemens's theory of connectivism, which is useful in addressing education using virtual technology. Audio-recorded, semistructured interviews were conducted with nine music teachers who taught secondary concert bands virtually. An inductive thematic analysis of the data was completed. The results of this study indicated that the participants held a negative view of virtual technology and its use for concert band instruction. This negative perspective was due to the inadequacies of the virtual technology and its inability to allow concert band students to play collectively in a virtual setting, inhibiting music teachers from teaching and assessing performance-based standards. Additionally, the results indicated that the successes and challenges experienced by the music teachers while teaching secondary concert bands using virtual technology did, to some degree, impact their overall view of using virtual technology for concert band instruction. The potential social implications of this study lie in improving the adequacy and accessibility of virtual technology used for music education and districts providing this technology to their music teachers and their students to improve student outcomes in music education in a virtual setting.

Secondary Music Teachers' Perspectives on Virtual Concert Band Instruction

by

Jessica D. Dixon

MA, Walden University, 2023

MA, Rutgers University, 2017

BS, Delaware State University, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Education—Learning, Instruction, & Innovation

Walden University

November 2023

Dedication

I dedicate this doctoral study to my family. To my daughter: Thank you for all your patience and understanding as I completed my studies and for all the encouraging words and love you provided on those long nights I stayed up to write. You are my reason for doing this! To my mom: Thank you for all your support and encouragement. Especially for body-doubling when I needed it! To my family: Thank you for sitting with me and letting me work wherever we were. As I wrote, the support of just being present and encouraging was more important than you will ever know. Thank you for listening, being there when I needed to vent, and encouraging me when I wanted to give up. You all had a hand in the success of this journey. I love you all and could not have done this without you!

Acknowledgments

I want to acknowledge and thank the Walden faculty, staff, and students I have interacted with throughout my doctoral journey. Dr. Jennifer Courduff—Thank you for always being supportive, encouraging, and inspiring. Your advice and ability to redirect my focus to the end goal allowed me to keep pushing and finish! Dr. David Perry—Thank you for being a part of this doctoral journey and helping me to complete it. Thank you to my fellow doctoral students who supported me and encouraged me from afar. Your encouragement and personal successes helped keep me motivated and showed me that I would get there! "Onward!" as Dr. C. would say! Go, Team Courduff!

Table of Contents

List of Tables

List of Figures

vi

Chapter 1: Introduction to the Study

Introduction

Over the past several years, due to the onset of the COVID-19 pandemic, the K–12 public school systems have experienced increased use of virtual platforms to teach and learn a variety of subjects (Birnbaum et al., 2022; Habe et al., 2021; Jackowicz & Sahin, 2021; Rodari Meisner & McKenzie, 2023). Music education was among these many K–12 subjects that moved to virtual teaching and learning and, like many other subjects, faced challenges and experienced successes that came with using virtual platforms to teach and learn (Beirnes & Randles, 2023; Biasutti et al., 2022; Gül, 2021; Ismail et al., 2022). However, music education experienced several technological challenges that, although experienced by other subjects, had a more significant impact on the success of the virtual teaching and learning of music education (Hash, 2021; Joseph & Merrick, 2021; MacRitchie et al., 2022; Matee et al., 2023; Saetre & Zhukov, 2021). These technological challenges significantly impacted instrumental music ensembles, making it difficult to collaborate and hindering teacher and student success with teaching and learning ensembles in a virtual environment (Hash, 2021; Joseph & Merrick, 2021; MacRitchie et al., 2022; Matee et al., 2023; Saetre & Zhukov, 2021). Many teachers and students held negative views about using virtual technology for teaching and learning because of the technological challenges they experienced (Ekici, 2022; Gül, 2021; Kuebel & Haskett, 2023; Nsairat et al., 2022; Yildiz et al., 2021).

As technology improves and becomes more prevalent in education, all K–12 subjects must find ways to successfully use technology for teaching and learning,

especially for music education subjects. Understanding the perspectives of music teachers and their students in using this technology for teaching and learning is critical to addressing technology challenges and meeting technological needs, especially for those teachers and students of instrumental music ensembles. For music education to successfully use technology for teaching and learning, the perspectives of secondary music teachers need to be considered, especially regarding virtual concert band ensemble instruction. It is also essential to consider whether music teachers' challenges and successes impact their perspective on using virtual technology for secondary concert band learning and teaching.

In the remainder of Chapter 1, I explore the study's background, providing the scope and gap of the research and why it is significant to music education. I look at the problem and purpose statements, providing evidence of the problem and intent of the study, including the concept of interest. Chapter 1 also states the research question and reviews the study's conceptual framework, relevance, and connections between its essential elements. Additionally, Chapter 1 addresses the nature of the study, providing a rationale, key concepts, the methodology used, and definitions of key concepts and terms used within the paper. Furthermore, I clarify and address assumptions, provide scope, identify delimitations, describe study limitations related to design or methodology, and identify and address any biases.

Background

Virtual teaching and learning in education have been examined and studied in various ways and with multiple lenses that allow for a more in-depth understanding of the

topic and variables that affect it (Demir et al., 2021; Frikha et al., 2022; Idin, 2020; Jackowicz & Sahin, 2021; Klevetova et al., 2021). Since the COVID-19 pandemic, virtual teaching and learning have been studied more often, especially within the scope of music education (Beirnes, 2022; Bucura, 2022; Joseph, 2020; Yadigaroglu, 2021). The virtual teaching and learning of all aspects of music education, including general music; vocal; and instrumental; have been studied through various lenses (Akarsu, 2021; Daugvilaite, 2021; Ekici, 2022; Norman, 2022). These lenses include gender, special education, adult education, teaching, learning, and the perspectives of both teachers and students (Beirnes, 2022; Biasutti et al., 2022; Clipper & Lee, 2021; Culp & Robison, 2022; Jefferson, 2021; Norman, 2021; Tsugawa, 2023).

Although there is current research surrounding the virtual teaching and learning of music education using a variety of and in combination with various lenses, the topic of the perspectives of secondary music teachers in teaching concert bands virtually has yet to be explored. A study of the views of secondary music teachers on virtually teaching concert bands is necessary to understand how secondary music education teachers perceive the effectiveness of virtual teaching and learning. It is also essential to know how the challenges and successes of teaching and learning concert bands virtually affect the secondary music teachers' perception of teaching and learning for secondary concert bands in a virtual setting.

Problem Statement

The problem is the lack of literature on the perspectives of secondary music teachers regarding virtual concert band ensemble instruction and whether the challenges

and successes impact their overall view of virtual teaching and learning. Due to the onset of the COVID-19 pandemic and its impact on education, research within the past few years has addressed the teaching and learning of various subjects in a virtual setting. Current studies on teaching and learning music education in a virtual environment examine the topic through several lenses, including teacher and student perspectives, general music, instrumental music, vocal music, special education, gender, adult learners, K–12, and higher education.

Music educators have used technology to assist in the teaching and learning of music; however, the use of virtual platforms to teach the various topics of music education is new, specifically for public K–12 music teachers and their students, and only recently became the center of much research due to the COVID-19 pandemic. Through this study, I explored the use of technology for music education and provided findings that could assist in future studies on technology use for music education. Using this study, I provided evidence for the need for adequate and appropriate quality audio and visual technology in the K–12 music education classroom, especially for those teachers and students of instrumental music ensembles, and accessibility for all music teachers and their students.

Purpose of the Study

The purpose of this study was to understand instrumental music teachers' perspectives on using virtual settings to teach secondary concert bands. I used constructivism with the conceptual framework supported by George Siemens's (2005) connectivism theory and Lev Vygotsky's (1978) sociocultural theory of cognitive

development. Constructivism supports the understanding that although the experiences of these secondary music teachers may be similar, the perceived realities of what they have experienced directly impact their perspective on using virtual technology to teach concert bands.

Through this qualitative study, I explored secondary music teachers' perspectives on teaching concert bands in a virtual setting. I also explored music teachers' perspectives on the challenges and successes of teaching secondary concert bands in a virtual environment and whether those challenges and successes impacted their view of virtual teaching and learning of secondary concert bands.

Research Question

Main RQ: What are secondary music teachers' perspectives on using virtual technology for concert band instruction?

Sub-RQ: How do the challenges and successes experienced by secondary music teachers impact their view of using virtual technology for concert band instruction?

Conceptual Framework

The conceptual framework for this study uses a constructivist approach along with Siemens's (2005) theory of connectivism and Vygotsky's (1978) sociocultural theory of cognitive development. Connectivism is a framework for understanding learning in the digital age and indicates that students create avenues of learning when internet-based technologies are used (Siemens, 2005). The sociocultural theory of cognitive development addresses how students develop or acquire knowledge through interactions with members of society who are more knowledgeable (Vygotsky, 1978).

Vygotsky proposed community-based learning, while Siemens extended Vygotsky's work to include virtual settings, which Chapter 2 addresses in further detail.

Figure 1

Interconnectedness of Constructivism, Connectivism, and Sociocultural Development
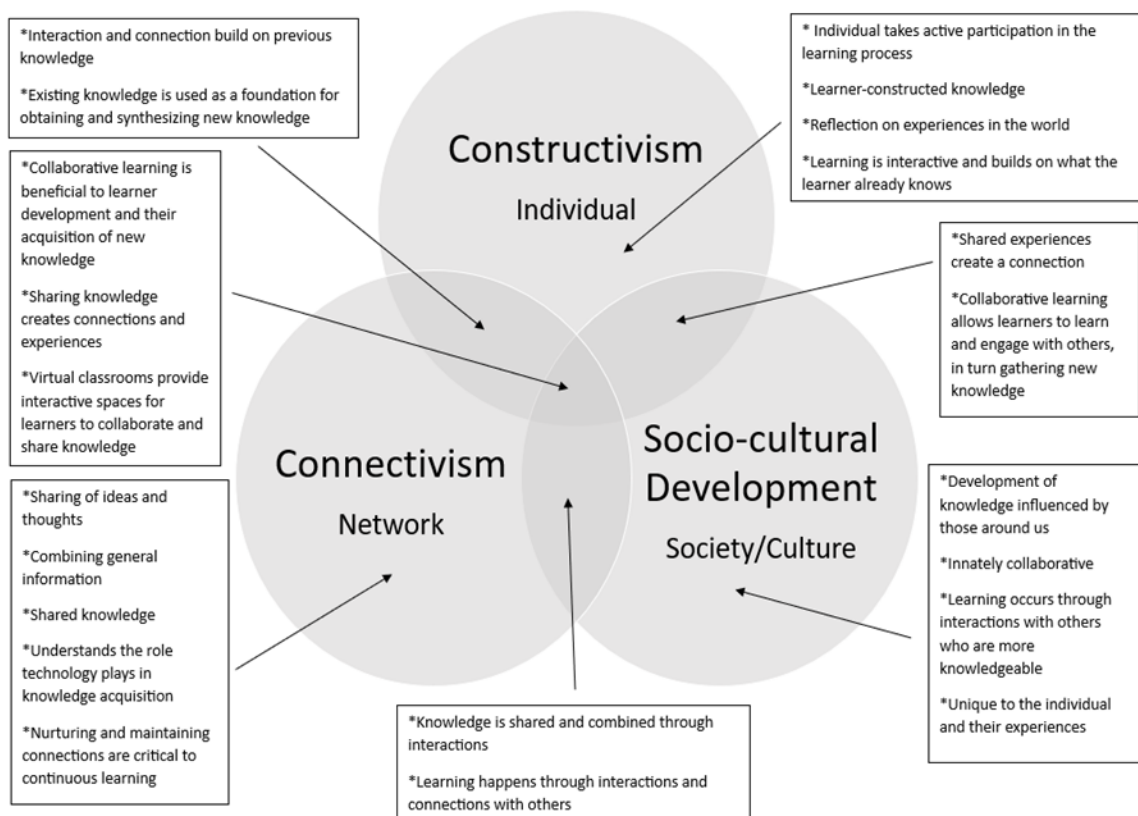
This conceptual framework relates to the study's key components as the theory of connectivism (Siemens, 2005) supports the technology aspect of virtual teaching and learning, while the sociocultural theory of cognitive development (Vygotsky, 1978) supports the need for collaboration and collective learning, an essential component of concert band ensemble learning. The conceptual framework synthesizes Siemens's (2005) theory of connectivism and Vygotsky's (1978) theory of sociocultural

development. The conceptual framework allowed me to use interviews to understand the connection between the participants' perspectives, the challenges and successes faced in the virtual music classroom, and the impact those challenges and successes had on participants' views of using virtual technology for music ensemble instruction. Both Siemens's and Vygotsky's theories play an intricate part in understanding the teaching and learning of virtual concert band ensembles, which Chapter 2 addresses in further detail.

Nature of the Study

The nature of this study focused on constructivism as an approach to understanding the perspectives of secondary music teachers on using virtual platforms to teach concert bands. The critical concept investigated through this study was the perspectives of secondary music teachers on using virtual technology for concert band instruction. The secondary ideas I explored were the challenges and successes of teaching secondary concert bands in a virtual setting and whether these challenges and successes impacted the music teachers' views of virtual teaching and learning of secondary concert bands.

The specific research design used guidelines and protocols set forth by Ravitch and Carl (2021) to create a set of semistructured interview questions that center around the use of technology by secondary music teachers to teach concert band ensembles. I developed the interview questions based on emergent themes from current literature and addressed the research question. Upon Institutional Review Board (IRB) approval (08-18-23-1044009), I conducted audio-recorded, semistructured interviews with nine

participants who currently taught or had previously taught secondary concert band ensembles within the past 5 years and had used virtual platforms to teach. Through the local music educators' association, I invited secondary music teacher participants from statewide and charter school districts to participate. The association used its platform to send announcements via email, newsletters, and social media to attract participants for the study. I analyzed the data to identify codes, categories, and themes within the participant's responses using the guidelines and protocols set forth by Saldaña (2021).

Definitions

Educator/Teacher: These terms are used synonymously in this paper and refer to anyone who provides instruction or education (Rodari Meiser & McKenzie, 2023).

Exceptional needs: In this paper, this phrase indicates those students who qualify under the Individuals With Disabilities Education Action (IDEA, 2004) who receive physical, cognitive, behavioral, and social services, as well as those who fall within the category of gifted and talented (Birnbaum et al., 2022).

K–12: Refers to kindergarten through Grade 12 in a public-school setting (Parkes et al., 2021).

Secondary: Refers to Grades 6–12 in the public-school setting (Bucura, 2022).

Assumptions

Assumptions in qualitative research allow the researcher to understand that there are multiple realities and truths based on the experiences of the participants and the researcher (Ravitch & Carl, 2021). In my research, I assumed that all participants were honest about their experiences in teaching secondary concert bands virtually. I assumed

all participants were honest and forthright with their responses to the interview questions. I assumed that all experiences shared during the interview were the participant's experiences, not those of another teacher. I assumed that all challenges and successes expressed by the participants were authentic and of their own experiences. During the COVID-19 pandemic, all districts in the state moved to virtual teaching and learning. I assumed that if any participants worked as secondary concert band directors during that time, they would have been teaching in a virtual setting.

Because I looked at the perspectives of secondary music teachers in teaching concert band ensembles virtually, these assumptions were the most relevant to the study. These assumptions allowed me to keep in mind that although the experiences of participants might be similar to the experiences of others, the way the participant perceived these experiences centered on their reality and how they interpreted their experiences. These assumptions were necessary in the context of the study as there was no way of knowing or demonstrating their truth.

Scope and Delimitations

The scope of this qualitative study involved understanding secondary music teachers' perspectives on teaching concert bands in a virtual setting. This scope was the chosen focus as currently available research surrounding the use of virtual platforms to teach music education has centered on teaching K–12 general music, elementary and middle band, choral ensembles, and individual instrument and vocal virtual lessons, with several focusing on the perspectives of those music teachers and their students on teaching and learning virtually.

This study's delimitations included only those K–12 music teachers who taught or had taught secondary concert bands in a virtual setting. Not included in this study were those K–12 music teachers who had not taught secondary concert bands virtually or any K–12 secondary music teachers who had virtually taught concert bands that were community bands, collegiate bands, or individual instrumental students. Also not included in this study were K–12 music teachers who virtually taught or had taught concert bands at the elementary and college levels; K–12 music teachers who had virtually taught general music, vocal music ensembles, or individual vocal students; and any K–12 instrumental music teacher who had not taught in a virtual setting.

The results of this study may be transferable to virtual teaching and learning vocal music ensembles in any K–12 music education setting, which includes elementary, middle, or high school, as vocal music ensembles may experience similar challenges and successes when teaching and learning virtually. Additionally, the results of this study may be transferable to virtual teaching and learning of concert bands at the K–12 elementary and middle school levels or with other instrumental ensembles, such as a string ensemble.

<div align="center">

Limitations

</div>

The limitations of this study included acquiring access to participants outside of my current school district and state and maintaining an objective stance when conducting interviews and analyzing the data collected. Limitations surrounding the transferability of the results of this research will remain in the scope of music education as the study

focused on the use of virtual technology for the instruction of secondary concert band ensembles, limiting how it may transfer to another research study.

The biases that potentially influenced the study derived from my experience as a middle school concert band and choral director who had taught both types of ensembles in a virtual setting. I found teaching middle school ensembles in a virtual environment problematic for numerous reasons, including but not limited to student participation, technology issues, inadequate technology, and inadequate internet connection. I needed to maintain an objective perspective and not allow my personal experiences to sway or alter the participants' responses. Also, I interviewed secondary music teachers, including middle and high school music teachers, and I was a middle school music teacher. I only asked the prewritten main and the prewritten follow-up questions. I required no additional information after the initial interview, so no follow-up or clarifying questions were necessary.

Significance

The significance of this study is that no current research has explored secondary music teachers' perspectives in teaching concert band ensembles virtually. Understanding secondary teachers' perspectives in teaching virtual concert bands could address the need for additional training on using technology in the music classroom and the need for access to adequate, quality technology for music teachers and their students (Gül, 2021; Sarikaya, 2022; Yoo, 2021).

The perspectives of secondary music teachers could provide a clearer understanding of the successes and challenges they face teaching a concert band

ensemble virtually (Hash, 2021; MacRitchie et al., 2022; Schmidt-Jones, 2020). This understanding could support the need for improved technology in music education classrooms and the importance of providing students access to technology in the music education classroom (Bell et al., 2020; Fick & Bulgren, 2022; Joseph, 2020; Yoo, 2021). This understanding could provide additional insight into necessary professional development for using virtual technology in the music education classroom, as well as providing additional training to assist music teachers in adjusting pedagogy to include virtual platforms as part of their regular lessons and activities for concert band instruction (Beirnes, 2022; Beirnes & Randles, 2023; Joseph & Merrick, 2021; Norris, 2020).

As such, this study might explain how best to use virtual technology to teach secondary concert band ensembles and provide a platform for adapting music education pedagogy to include regular technology use in the music education classroom. It may also provide a foundation for future research on the importance of technology in the secondary concert band classroom that supports learning and creates connections between students of different skill levels.

Summary

The subject of virtual teaching and learning has been examined in various ways through recent research, especially within the scope of music education. Understanding music teachers' perspectives on the virtual teaching of secondary concert bands is essential to creating adaptable music pedagogy that utilizes technology consistently in teaching and learning for music ensembles. Using a constructivist approach and conceptual framework supported by the theories of Siemens (2005) and Vygotsky (1978),

I explored secondary music teachers' perspectives on the virtual teaching of concert bands. Through this research, I looked to understand how the challenges and successes experienced by these teachers impacted their views of virtual teaching and learning of concert bands.

Chapter 2 provides an in-depth, exhaustive analysis of the current literature, separated into two main themes, virtual teaching and virtual learning, then divided into the six minor themes—subject-specific teaching and learning, special education, adult education, gender inclusivity, teacher and student perspectives, and music education teaching and learning—which are divided further to focus on the three aspects of music education: general music, vocal music, and instrumental music. In Chapter 2, I further explain the literature review research strategy with a more in-depth discussion of the conceptual framework used to support this study.

Chapter 2: Literature Review

Introduction

In recent years, the K–12 educational system has seen increased use of virtual platforms for the teaching and learning of various subjects, including, but not limited to, mathematics; science; language arts; and specialized areas, such as physical education and the arts (Aldhafeeri & Alotaibi, 2023; Bawaneh & Malkawi, 2023; Demir et al., 2021; Jackowicz & Sahin, 2021; Mardiana, 2020; Norris, 2020). The use of these virtual platforms for the teaching and learning of these subjects has seen many successes and struggles, specifically by the teachers and students using these platforms (Alghanmi & Nyazi, 2022; Dampson, 2020; Ferguson, 2021; Malkawi & Khayrullina, 2021). Music education has been no different in that regard. Many K–12 music teachers have moved to utilize online platforms to teach various topics within music education, including music theory, music history, and both instrumental and vocal music (Dana Rucsanda et al., 2021; Daugvilaite, 2021; Ismail et al., 2022; Lee, 2021; Rautiainen & Vesisenaho, 2022). Current literature surrounding the use of virtual platforms to teach other subjects also looked at teaching and learning from the perspectives of the teachers and the students, special education, adult learners, and gender perceptions, while the literature surrounding music education has centered on teaching K–12 general music, elementary and middle band, choral ensembles, and individual instrument and vocal virtual lessons, with several focusing on the perspectives of those music teachers and their students on teaching and learning virtually (Aldhafeeri & Alotaibi, 2023; Bawaneh & Malkawi, 2023; Demir et al., 2021; Jackowicz & Sahin, 2021; Mardiana, 2020; Özüdogru, 2022; Norris, 2020).

However, no available literature exists that looks at the perspectives of the secondary music educator in teaching concert bands virtually.

Literature Research Strategy

I used the Google Scholar search engine to create searches using key terms and combinations of the keywords that would send resources to my email as Google Scholar located the articles. I then used the Walden University library database to check the resources to ensure that they were peer reviewed and within the last 5 years. I also used the Walden University library database to search for peer-reviewed resources in the past 5 years using the same key terms and various combinations of those terms.

I used the following key terms, both individually and in combination, to find applicable articles: *accessible*, *assessment*, *audio*, *band*, *blended*, *concert band*, *digital*, *ensembles*, *experiences*, *high school*, *instrumental*, *K–12*, *learning*, *music*, *online*, *performance*, *perspective*, *remote*, *secondary*, *teaching*, *technology*, *video*, *virtual*, *Zoom*, and *21st-century skills*. I accessed the following through Walden databases: Academic Search Complete, Directory of Open Access Journals, EBSCO, Education Source, ERIC, SAGE Journals, and Taylor & Francis Online.

Obtaining enough peer-reviewed articles to exhaust the literature was an iterative process that required searching individual key terms and extensive combinations of the exact keywords. The different varieties of keywords resulted in the search obtaining different results, and sometimes, I placed keywords in varying orders to get different results. I must also note that I used reference lists of resulting articles to identify

additional potential resources if they were within the 5-year window. This was only possible if the referenced article was published within the previous year or two.

These literature searches identified no available research that would support understanding the perspectives of secondary music teachers in successfully teaching concert bands virtually. The literature was exhausted by identifying what current research provides in the realm of music education and virtual teaching and learning, which included looking at the different areas of music education, including general music; vocal music; instrumental music; music education pedagogy, specifically in the virtual classroom; the different types of music education students; and the virtual teaching and learning of other educational topics and perspectives of those teachers and students.

Conceptual Framework

The theories and concepts that grounded this study formed a conceptual framework using Siemens's (2005) theory of connectivism and Vygotsky's (1978) sociocultural theory of cognitive development. Connectivism is a framework for understanding learning in the digital age and indicates that internet-based technologies create avenues of learning when used (Siemens, 2005). The sociocultural theory of cognitive development addresses how students develop or acquire knowledge through interactions with members of society who are more knowledgeable (Vygotsky, 1978). Vygotsky proposed community-based learning, and Siemens extended Vygotsky's work to include virtual settings.

George Siemens, a professor of psychology, is best known for his theory of connectivism, which involves an effort to understand teaching and learning in the digital

age and the role that technology plays (Klevetova et al., 2021; Kotzee & Polermos, 2021; Malkawi & Khayrullina, 2021; Shearer et al., 2020). Siemens designed and taught massive online open courses (MOOCs), which entailed a push for *open teaching,* which several research articles have defined as a style of teaching that allows students to engage and learn through the exchange of ideas, resources, and artifacts within the virtual classroom setting (Barthakur et al., 2021; Corbett & Spinello, 2020; Klevetova et al., 2021; Kotzee & Polermos, 2021; Stutchbury et al., 2023; Xiong & Zuo, 2019). Siemens also developed a thesis around understanding an individual's behavior when using virtual social networks (Klevetova et al., 2021; Kotzee & Polermos, 2021; Malkawi & Khayrullina, 2021; Shearer et al., 2020). Proponents of connectivist theory also view learners as active participants and assets in their learning rather than empty vessels to fill with knowledge (Al Maawali, 2022; Omodan, 2023; Siemens, 2005).

Connectivism involves looking at learning in a digital age as a collaborative process through a networked and interconnected community whose members use technology to share ideas and learn from others (Černý, 2020; Downes, 2022; Feyzi Behnagh & Yasrebi, 2020; Than et al., 2021). The principles of connectivism include learning and knowledge resting on opinions being diverse; learning being a process of connecting specialized information sources; learning residing in nonhuman appliances; the capacity to improve knowledge being more critical than what is already known; nurturing and maintaining connections being necessary to facilitate continual learning; the ability to identify relationships between fields, ideas, and concepts being a core skill; accurate, updated knowledge being the learning intent of all connectivist activities; and

decision-making, itself, being a learning process (Klevetova et al., 2021; Kotzee & Polermos, 2021; Malkawi & Khayrullina, 2021; Shearer et al., 2020).

Lev Vygotsky, a psychologist, is best known for his work on the psychological development of children and for identifying the relationship between learning and human development. In his theory of the zone of proximal development, Vygotsky proposed that problem-solving determines a child's actual developmental level and that a child's problem-solving under adult guidance or in collaboration with more capable peers determines their level of potential development (Brieger et al., 2020; de Bruin, 2021; Dennis, 2020; Eun, 2021; Haez & Delfani, 2022; Idin, 2020). Vygotsky's sociocultural theory of development branches off the zone of proximal development and indicates that a child's higher psychological functions emerge through the unification of interpersonal connections and actions taken within a given sociocultural environment based on language, culture, society, and tool use (Dampson, 2021; Eun, 2021; Haez & Delfani, 2022; Idin, 2020; "Study of Six Online Learning Theories," 2021; Tobbell et al., 2021). The principles of the sociocultural theory include a culture's significance to learning, the root of culture being the language, and an individual's role in their community dictating how they learn and develop (Haez & Delfani, 2022; Jamali Kivi et al., 2021; Hamayouni, 2022).

The logical connections between the framework presented and the nature of my study include secondary instrumental music teachers having the ability to control factors within the virtual classroom that will ensure the success of the concert band ensemble (see Vygotsky, 1978) and technology use having the potential to strengthen and create

new avenues of learning and instruction that will enhance music pedagogy and learning for a secondary concert band ensemble (see Siemens, 2005).

Literature Review

Virtual Teaching

Virtual classroom settings provide teachers with opportunities to connect with students at any time and on a global scale and create an extension of the face-to-face classroom (Davidoivitch & Dorot, 2022; Du et al., 2022; Durnali et al., 2022; Ekici, 2020; Faez & Delfani, 2022; Özüdogru, 2022). Virtual classrooms provide teachers with the freedom to adapt their pedagogy through various forms of virtual teaching, including prerecorded lesson videos, synchronous and asynchronous lessons, and a variety of online tools and curricula to reach and support many different types of learners (Dana Rucsanda et al., 2021; Gibson, 2021; Hamid et al., 2021; Rodari Meisner & McKenzie, 2023; Yadigaroglu, 2021). These variations in teaching create more diverse means of student learning and increase the likelihood of student participation within a virtual classroom setting and retention (Abou-Khalil et al., 2021; Beirnes, 2020; Beirnes & Randles, 2023; Idin, 2020; Stutchbury et al., 2023. However, many teachers are reluctant to teach in a virtual classroom setting due to anxiety surrounding their skills in using technology efficiently and their uncertainty about technology being as effective as face-to-face instruction for student learning (Adams, 2021; Birnbaum et al., 2022; Mardiana, 2020; Rodari Meisner & McKenzie, 2023).

There are disadvantages to using virtual technology to teach. Inadequate technology, inability to immediately address or correct technology issues, and teaching

loss due to technology issues can have a significant impact on a teacher's ability to successfully teach in a virtual setting (Daugvilaite, 2021; Demir et al., 2021; Jackowicz & Sahin, 2021; Jefferson, 2021; Kabilan & Annamalai, 2022; Malkawi & Khayrullina, 2021; Matee et al., 2023). The additional preparation and planning that are needed to create engaging and appealing lessons and activities can have a severe impact on a teacher's overall stress level, impacting their mental health (Ali, 2020; Alshwiah, 2021; Beirnes, 2022; de Bruin, 2021; Norris, 2020; Rolando et al., 2022). Additionally, low student participation in the virtual classroom and lack of personal interaction between students, peers, and teachers can negatively impact a teacher's success with virtual teaching (Alghanmi & Nyazi, 2022; Alshwiah, 2021; Barbetta & Morales, 2022; Du et al., 2022; Rolando et al., 2022).

Subject-Specific Virtual Instruction

Educators of every subject in the educational field, from elementary to postgraduate studies, redefined their approaches to teaching and learned, through trial and error, how to adapt technology to their areas of expertise to teach their students in a virtual setting during the COVID-19 pandemic (Aldhafeeri & Alotaibi, 2023; Akarsu, 2021; Ali, 2020; Birnbaum et al., 2022; Hash, 2021; Rolando et al., 2022). In the virtual classroom setting, many educators struggled to maintain student engagement and participation, which often led to students falling behind, not completing assignments, and failing to meet lesson goals as they were struggling to understand the materials (Barthakur et al., 2021; Brieger et al., 2020; Ferguson, 2021; Norris, 2020). Many educators altered their approaches to identifying struggling students, but this often did not

happen until assessments were administered (Aldhafeeri & Alotaibi, 2023; Beirnes, 2022; Kotzee & Polermos, 2021; Norris, 2020; Rolando et al., 2022). Educators in subjects such as mathematics and physical education struggled the most with teaching in virtual classrooms; however, educators in other subjects such as reading and science, technology, engineering, and mathematics (STEM) found success in the virtual environment due to the availability of technology and applications geared toward their specific subjects (Beirnes, 2022; Idin, 2020; Jackowicz & Sahin, 2021; Ferguson, 2021; Norris, 2020).

Educators of all subjects spend hours planning lessons and activities that will engage and encourage student participation in the virtual classroom environment (Aldhafeeri & Alotaibi, 2023; Barthakur et al., 2021; Birnbaum et al., 2022; Brieger et al., 2020; Jackowicz & Sahin, 2021). However, in preparing for virtual teaching, many educators struggle with creating lessons that include synchronous, asynchronous, and blended learning opportunities for students (Barthakur et al., 2021; Birnbaum et al., 2022; Brieger et al., 2020; Jackowicz & Sahin, 2021; Stutchbury et al., 2023). Educators of many subjects often struggle with providing lessons, materials, and activities that suit each student's level of learning and often choose the lower tiered activities and learning applications while providing minimal or no challenging activities for advanced learners, which can lead to adverse effects for those students (Aldhafeeri & Alotaibi, 2023; Barthakur et al., 2021; Birnbaum et al., 2022; Brieger et al., 2020; Jackowicz & Sahin, 2021; Stutchbury et al., 2023). In addition to planning and developing lessons and activities, many educators are also learning how to use new technologies and applications in their virtual classroom, which can add a level of stress to an already stressful situation

(Aldhafeeri & Alotaibi, 2023; Beirnes, 2022; Birnbaum et al., 2022; Brieger et al., 2020; Ferguson, 2021; Rolando et al., 2022). This stress impacts not only the educator, but also the students they are teaching.

The growth and availability of new technologies and applications allowed educators of all subjects to provide unique learning opportunities to students and opportunities to test new teaching methods and apply more innovative approaches to their teaching (Aldhafeeri & Alotaibi, 2023; Beirnes, 2022; Birnbaum et al., 2022; Brieger et al., 2020; Ferguson, 2021; Rolando et al., 2022). Educators teaching elementary and middle school reading found success using programs such as iReady, also available in Spanish, and created opportunities for students to improve their read-aloud skills with Zoom and Google Meet meetings. Educators of STEM classes found success in teaching in a virtual classroom due to technological improvements which encouraged more participation in the areas of science, technology, engineering, and mathematics (Aldhafeeri & Alotaibi, 2023; Barthakur et al., 2021; Beirnes, 2022; Birnbaum et al., 2022; Norris, 2020; Rolando et al., 2022). However, for subjects such as mathematics and science to be successful in the virtual environment, educators of these subjects have found it helpful to implement strategies that are based on student learning styles and incorporate the achievement of learning lesson objectives (Aldhafeeri & Alotaibi, 2023; Barthakur et al., 2021; Beirnes, 2022; Brieger et al., 2020; Stutchbury et al., 2023).

Special Education and Virtual Instruction

As stated earlier, for this paper, the phrase "exceptional needs" will be used to indicate those students who qualify under IDEA (2004) who receive physical, cognitive,

behavioral, and social services, as well as those students who fall within the category of gifted and talented. Educators of students with exceptional needs have a responsibility to ensure that these students have the proper accommodations and teaching approaches for the virtual classroom setting (Barbetta & Morales, 2022; Bell et al., 2020; Clipper & Lee, 2021; Ismail et al., 2022; Jackowicz & Sahin, 2021; Quigley & MacDonald, 2022). The use of proper and effective teaching and pedagogical approaches for students with exceptional needs is essential to ensuring their success with learning subjects taught in virtual classrooms (Barbetta & Morales, 2022; Bell et al., 2020; Clipper & Lee, 2021; Ismail et al., 2022; Jackowicz & Sahin, 2021; Quigley & MacDonald, 2022). The use of proper and effective teaching and pedagogical approaches for exceptional students is especially appropriate for music education, which has long been seen only as a hands-on and face-to-face subject (Bell et al., 2020; Clipper & Lee, 2021; Ismail et al., 2022; Jackowicz & Sahin, 2021; Quigley & MacDonald, 2022). Educators must develop and provide supportive environments for students with exceptional needs to encourage them to connect with others and to develop self-efficacy skills in the virtual classroom (Barbetta & Morales, 2022; Birnbaum et al., 2022; Idin, 2020; Jackowicz & Sahin, 2021; Quigley & MacDonald, 2022).

Educators who provide students with modified answering techniques in the virtual classroom setting can help improve participation for those students with exceptional needs (Barbetta & Morales, 2022; Birnbaum et al., 2022; Idin, 2020; Quigley & MacDonald, 2022). These answering techniques could include, but are not limited to, choral responding, body movements for self-expression, response cards, and guided

notes, all of which can improve student learning of the subject and online participation (Barbetta & Morales, 2022; Birnbaum et al., 2022; Idin, 2020; Quigley & MacDonald, 2022). In music education, the use of free, music-based software and applications in the virtual classroom can improve participation by students with exceptional needs by offering a modified means of interacting (Bell et al., 2020; Birnbaum et al., 2022; Clipper & Lee, 2021; Ismail et al., 2022; Quigley & MacDonald, 2022). Additionally, for all subjects taught within the virtual setting, providing students with exceptional needs with opportunities for small group learning and differentiated instruction will ensure their success and assist in empowering those students in the virtual classroom (Barbetta & Morales, 2022; Bell et al., 2020; Idin, 2020; Quigley & MacDonald, 2022).

Adult Education and Virtual Instruction

Educators of adult learners must understand the learning habits and motivations of adults so they can create a virtual learning environment that is compatible with the learning habits of their adult students (Bayley & Waldron, 2020; Brieger et al., 2020; Schmidt-Jones, 2020; Talbert & Edelman, 2021; Xiong & Zuo, 2019). By understanding the motivations and learning habits of adult students, educators can provide learning opportunities tailored to adult learners that ensure their success and personal satisfaction in the virtual classroom setting (Bayley & Waldron, 2020; Brieger et al., 2020; Schmidt-Jones, 2020; Talbert & Edelman, 2021; Xiong & Zuo, 2019). Massive Open Online Courses (MOOCs) provide several means of teaching course or subject content in a way that is more suited and appropriate to the needs of adult learners (Barthakur et al., 2021; Hamid et al., 2021; Klevetova et al., 2021; Kotzee & Polermos, 2021; Stutchbury et al.,

2023; Xiong & Zuo, 2019). MOOCs provide several different approaches to teaching adult students, including weekly lecture videos or webcasts, online assessments, discussion forums, live video chat sessions with peers, and help sessions to assist in learning and understanding new technology and materials (Barthakur et al., 2021; Hamid et al., 2021; Klevetova et al., 2021; Kotzee & Polermos, 2021; Stutchbury et al., 2023; Xiong & Zuo, 2019).

Additionally, educators of adult students must also understand and identify any learning or technology gaps that adult learners often face when learning in a virtual classroom environment (Bayley & Waldron, 2020; Brieger et al., 2020; Talbert & Edelman, 2021; Tsugawa, 2023). These gaps include, but are not limited to, gaps in knowledge, access barriers, and difficulties with continuing and preserving any previous learning (Bayley & Waldron, 2020; Brieger et al., 2020; Talbert & Edelman, 2021; Schmidt-Jones, 2021; Tsugawa, 2023). Therefore, to ensure the success of the adult learner, educators must then create a virtual classroom environment that is easily navigated and provides additional opportunities and time for adult learners to learn and understand new technology and applications when presented (Bayley & Waldron, 2020; Brieger et al., 2020; Schmidt-Jones, 2021; Talbert & Edelman, 2021; Tsugawa, 2023; Xiong & Zuo, 2019). These opportunities are essential for adult students in the virtual music education classroom as new technology for music learning can be overwhelming and could discourage participation when adult students face a technology barrier (Bayley & Waldron, 2020; MacRitchie et al., 2022; Schmidt-Jones, 2021; Tsugawa, 2023).

Gender Inclusivity and Virtual Instruction

Gender plays a significant role in education and impacts how a student learns in the virtual classroom (Ajlouni et al., 2022; AL Thnayan & Husain, 2021; Cromer et al., 2022; Nsibirano et al., 2022; Sezgin. 2022). Teachers of all subjects need to recognize the role that gender plays in education and how it impacts the students' virtual learning experience through variables like motivation, habits and behavioral communication, self-efficacy, and achievement (Ajlouni et al., 2022; AL Thnayan & Husain, 2021; Cromer et al., 2022; Nsibirano et al., 2022; Park & Kim, 2020; Sezgin, 2022). Teachers should adopt and develop teaching strategies that are gender inclusive and do not reinforce gender stereotypes (Cromer et al., 2022; Culp & Robison, 2022; Park & Kim, 2020; Robison & Culp, 2021). Gender constructs, influences, and misrepresentation can impact student experiences and learning outcomes, participation, and satisfaction with their virtual learning experience (Cromer et al., 2022; Culp & Robison, 2022; Robison & Culp. 2021; Rodríguez-Ardura & Meseguer-Artola, 2021). Teachers should create virtual learning environments that provide students of all genders with autonomy, competence, and relatedness and one that uses differentiated vocabulary and interactive tools that enhance the feeling of social presence and connection (Ajlouni et al., 2022; Cromer et al., 2022; Culp & Robison, 2022; Robison & Culp, 2021).

Since gender plays a part in student behavior and interaction in virtual classrooms, teachers should use effective, flexible, and convenient technology that will positively impact student perceptions and learning in the virtual environment (Ajlouni et al., 2022; AL Thnayan & Husain, 2021; Cromer et al., 2022; Culp & Robison, 2022; Park & Kim,

2020). The use of technology in the music classroom allows teachers to promote gender inclusivity through a variety of music-based activities (Culp & Robison, 2022; Habe et al., 2021; Robison & Culp, 2021; Sarikaya, 2022). These activities foster improved student learning through continued, diversified music listening activities encompassing various musical genres (Culp & Robison, 2022; Habe et al., 2021; Robison & Culp, 2021; Sarikaya, 2022). Teachers can use the virtual classroom to create and implement gender-inclusive music experiences that support all genders and do not enforce gender stereotypes or misconceptions (Culp & Robison, 2022; Habe et al., 2021; Robison & Culp, 2021; Sarikaya, 2022). When music teachers understand all students as individuals, it helps students to feel valued in the music education classroom (AL Thnayan & Husain, 2021; Culp & Robison, 2022; Habe et al., 2021; Robison & Culp, 2021; Sarikaya, 2022).

Teacher Perspectives on Virtual Teaching

Educators are an integral part of the success of virtual teaching and learning (Bawaneh & Malkawi, 2023; Demir et al., 2021; Parkes et al., 2021). Teaching in a virtual classroom environment presents many challenges for educators of various subjects (de Bruin, 2019; Gül, 2021; Kabilan & Annamalai, 2022; Madigan & Kim, 2021; Mardiana, 2020). However, when addressing challenges and adapting teaching for virtual classrooms, many educators have found success teaching in the virtual setting (Beirnes & Randles, 2023; Ekici, 2022; Gül, 2021; Kabilan & Annamalai, 2022; Parkes et al., 2021). Educator attitudes toward teaching virtually, especially negative ones, have a significant impact on an educator's success with virtual teaching (Bawaneh & Malkawi, 2023; Demir et al., 2021; Kanibolotska et al., 2022; Mardiana, 2020; Yadigaroglu, 2021; Yildiz et al.,

2021). Many educators have expressed the need for additional training and preparation to learn and understand new technology and applications to prepare them best to successfully teach in a virtual classroom (de Bruin, 2021; Demir et al., 2021; Gül, 2021; Joseph & Merrick, 2021; Kabilan & Annamalai, 2022).

It is crucial that educators are properly trained and thoroughly prepared to teach in a virtual setting (de Bruin, 2021; Demir et al., 2021; Gül, 2021; Joseph & Merrick, 2021; Kabilan & Annamalai, 2022). However, many educators feel unprepared and overwhelmed with teaching in a virtual environment (Akarsu, 2021; Kanibolotska et al., 2022; Madigan & Kim, 2021; Mardiana, 2020; Pozo et al., 2022; Rodari Meisner & McKenzie, 2023). These feelings of unpreparedness and overwhelm leave educators doubting their self-efficacy (Gül, 2021; Kuebel & Haskett, 2023; Madigan & Kim, 2021; Nsairat et al., 2022; Rodari Meisner & McKenzie, 2023). Many educators in virtual classroom settings perceive self-efficacy as a critical factor to their success in teaching online, and educators who experience failure in any capacity while teaching virtually often feel nonefficacious overall, which can negatively impact how they approach virtual teaching situations in the future (Gül, 2021; Kuebel & Haskett, 2023; Madigan & Kim, 2021; Nsairat et al., 2022; Rodari Meisner & McKenzie, 2023).

Educators experience added stress, anxiety, and frustration with the amount of preparation and planning they face with virtual teaching, and these overwhelming emotions can harm the educator's ability to successfully execute an online course (Demir et al., 2021; Kanibolotska et al., 2022; Madigan & Kim, 2021; Mardiana, 2020; Parkes et al., 2021). Additionally, educators struggle to build relationships with their students in a

virtual classroom environment and find it challenging to motivate students and to keep them participating and engaged throughout lessons, and this is especially true for those in music education (Beirnes & Randles, 2023; de Bruin, 2021; Gül, 2021; Rodari Meisner & McKenzie, 2023; Yildiz et al., 2021). However, even when facing difficulties, educators of all subjects believe that technology-based teaching provides students with a wide variety of learning resources and experiences and has the potential to be enjoyable for teachers and students (Bawaneh & Malkawi, 2023; Beirnes & Randles, 2023; de Bruin, 2021; Demir et al., 2021; Kanibolotska et al., 2022; Yildiz et al., 2021).

Music Education and Virtual Teaching

In recent years, K–12 music educators have begun to teach more and more in virtual classrooms, and although using technology in the music education classroom is not a new endeavor for these educators, virtually teaching any aspect of music education is a more recent concept with many music educators having started utilizing their virtual classrooms during the height of the COVID-19 pandemic (Beirnes & Randles, 2023; Biasutti et al., 2022; Calderón-Garrido & Gustems-Carnicer, 2021; Joseph, 2020; Martin & Büchert, 2020). Teaching in a virtual environment allows music educators to reach students wherever they are and provides opportunities for adaptations to music pedagogy (Blackwell et al., 2020; Fick & Bulgren, 2022; Mao & He, 2021; Norman, 2021; Sarikaya. 2022). Teaching music education in the virtual setting also allows music teachers to easily incorporate student learning of 21st-century skills in addition to learning various music skills (Joseph & Merrick, 2021; Schmidt-Jones, 2020; Wan et al., 2023; Wieser & Müller, 2022).

Teaching any aspect of music education using a variety of lessons, activities, and materials through a mixed means of synchronous and asynchronous instruction has proved most successful in the virtual music education classroom (Barbetta & Morales, 2022; Dana Rucsanda et al., 2021; Gibson, 2021; Norman, 2022; Rodari Meisner & McKenzie, 2023; Yadigaroglu, 2021). Music theory and music history have found success in the virtual classroom, as the pedagogical approaches and available materials transfer easily to the virtual classroom setting (Bucura, 2019; Bucura, 2022; Fick & Bulgren, 2022; Kuebel & Haskett, 2023; Mao & He, 2021; Norman, 2022). However, since music education is a multi-sensory subject that requires immediate feedback and adjustments to students, many music teachers find the virtual classroom setting not suitable or ineffective for performance-based music subjects like concert band or chamber ensembles (Cheng & Lam, 2021; Gibson, 2021; Nunes-Silva et al., 2021; Saetre & Zhukov, 2021; Yoo, 2021).

General Music. Teaching general music in the virtual classroom has been successful in both transition and adaptation because music theory and music history are the foundations of general music education and have comfortably transitioned to a virtual setting (Akarsu, 2021; Calderón-Garrido & Gustems-Carnicer, 2021; Dana Rucsanda et al., 2021; Gaugvilaite, 2021; MacRitchie et al., 2022; Shaw & Mayo, 2022). General music education materials are readily available and quickly transitioned to the virtual environment, while music teacher pedagogy used to teach this area of music education is adaptable to virtual teaching and learning (Calderón-Garrido & Gustems-Carnicer, 2021; Dana Rucsanda et al., 2021; Gaugvilaite, 2021; MacRitchie et al., 2022; Shaw & Mayo, 2022; Yoo, 2021).

Although the subject of general music has seen teaching success in the virtual environment, music teachers still feel there is a lack of connection and engagement with students, and they struggle to create and maintain relationships with their music students in the virtual classroom setting (Akarsu, 2021; Habe et al., 2021; MacRitchie et al., 2022; Shaw & Mayo, 2022; Yildiz et al., 2021). Additionally, the amount of planning and preparation needed for a successful general music classroom in a virtual setting creates anxiety and stress for the music teacher, which could negatively impact student engagement, participation, and student-teacher relationship, making it feel unbalanced and uncomfortable (Gibson, 2021; Gun, 2021; Joseph, 2020; Joseph & Merrick, 2021; Kuebel & Haskett, 2023; Norman, 2021; Vaizman, 2022).

Vocal Music. Vocal music is a performance-based area of music education that requires student participation, student-student interaction, and student-teacher interaction to be successful (Bucura, 2019; Bucura, 2022; Cheng & Lam, 2021; Ekici, 2022; Gun, 2021; Nunes-Silva et al., 2021). Music teacher pedagogy and student learning techniques for vocal music do not easily transfer to the virtual classroom; however, some success is possible using prerecorded teaching videos and video recordings of individual student vocal performances (Biasutti et al., 2022; Bucura, 2019; Bucura, 2022; Ekici, 2022; Gun, 2021; Nunes-Silva et al., 2021). Success in virtual vocal music teaching and learning is minimal and limited to video-recorded student performance feedback, as immediate correction and feedback for performance-based techniques and skills by the teacher are almost impossible in a live virtual setting as inadequate audio and visual technology limit what the teacher can see and hear in real-time virtual environments (Bucura, 2019; Ekici,

2022; Habe et al., 2021; Nunes-Silva et al., 2021; Shaw & Mayo, 2022; Yildiz et al., 2021).

Teaching vocal music in a virtual environment has additional technological disadvantages that include audio deficiency and latency issues for ensembles and individual lessons, and these difficulties with technology can create additional stress and anxiety for both the music teacher and the students, which negatively impacts student participation and their success in vocal music (Biasutti et al., 2022; Bucura, 2022; Cheng & Lam, 2021; Gibson, 2021; Gun, 2021; Joseph & Merrick, 2021). These technology issues extend and amplify when teaching vocal music as a group or ensemble, as poor internet quality, insufficient audio and visual technology, and other technological problems prevent collective participation, creating frustration and angst among the music teachers and their vocal students as inadequate technology limits student-student and student-teacher real-time interaction which is a necessary part of a successful vocal ensemble practice and performance (Biasutti et al., 2022; Bucura, 2022; Cheng & Lam, 2021; Gibson, 2021; Gun, 2021; Joseph & Merrick, 2021).

Instrumental Music. Instrumental music is another performance-based area of music education that also requires student participation, student-student interaction, and student-teacher interaction to be successful (Bucura, 2019; Bucura, 2022; Cheng & Lam, 2021; Ekici, 2022; Gun, 2021; Nunes-Silva et al., 2021). Like vocal music, teacher pedagogy and student learning techniques for instrumental music do not easily transfer to the virtual classroom, but success in using prerecorded teaching videos and video recordings of individual student instrumental performances is possible (de Bruin, 2021;

Hash, 2021; MacRitchie et al., 2022; Pozo et al., 2022; Vaizman, 2022; Wieser & Müller, 2022). Like vocal music education, success in virtual instrumental music teaching and learning is also minimal and limited to video-recorded student performance feedback, as immediate correction and feedback for performance-based techniques and skills by the teacher are almost impossible in a live virtual setting as inadequate audio and visual technology limit what the teacher can see and hear in real-time virtual environments (Biasutti et al., 2022; Blanco & Ramirez, 2019; de Bruin, 2019; Saetre & Zhukov, 2021; Wan et al., 2023).

Like vocal music education, teaching instrumental music in a virtual environment also has additional technological disadvantages that include audio deficiency and latency issues for ensembles and individual lessons, in addition to the stress and anxiety for both the music teacher and the students using inadequate technology can create, it can also negatively impact student participation and their success in instrumental music (Biasutti et al., 2022; Bucura, 2022; Hash, 2021; Parkes et al., 2021; Pozo et al., 2022; Vaizman, 2022). These technology issues are more evident and amplified when teaching instrumental music as a group or ensemble, as poor internet quality, insufficient audio and visual technology, and other technological issues prevent collective participation and interaction, leaving music teachers frustrated and their instrumental students unwilling to participate, and like vocal music education, inadequate technology limits student-student and student-teacher real-time interaction which is a necessary part of a successful instrumental ensemble practice and performance. (Biasutti et al., 2022; Bucura, 2022; Hash, 2021; Parkes et al., 2021; Pozo et al., 2022; Vaizman, 2022).

Virtual Learning

Virtual classroom settings offer students the flexibility to learn whenever and wherever they would like and provide them with more opportunities for learning with the integration of technology, virtual environments provide students with access to newer ways of approaching learning and interactions (Davidoivitch & Dorot, 2022; Du et al., 2022; Klevetova et al., 2021; Nazari et al., 2022; Özüdogru, 2022). Through virtual classroom settings and the integration of technology, teachers can provide students with a range of pedagogical options from which to learn and collaborate with their peers (Adams, 2021; Davidoivitch & Dorot, 2022; Du et al., 2022; Homayouni, 2022; Klevetova et al., 2021; Nazari et al., 2022). Virtual meeting platforms, such as Zoom and Google Meet, have provided students with a means for face-to-face interaction that assists them in creating the connections needed to combat negative feelings of isolation brought on by social distance and their perceived lack of interaction when learning virtually (Ali, 2020; Abou-Khalil et al., 2021; Frikha et al., 2022; Haez & Delfani, 2022; Özüdogru, 2022; Wan et al., 2023). Students often use these platforms to connect and learn from their peers and, when provided as a pedagogical aspect within the virtual classroom setting, allow students to develop a more positive attitude and overall satisfaction with their virtual classrooms and the subjects they are learning (Ali, 2022; Chatterjee & Correia, 2020; Durnali et al., 2022; Haez & Delfani, 2022; Nazari et al., 2022; Özaydin Özkara & Ibili, 2021; Ünlü, 2022).

Virtual learning, for some students, creates a perceived lack of interaction and social distance that can harm student performance and impact their overall satisfaction

with their online learning experience (Abou-Khalil et al., 2021; Alshwiah, 2021; Malkawi & Khayrullina, 2021; Matee et al., 2023; Özaydin Özkara & Ibili, 2021; Özüdogru, 2022). Learning in a virtual classroom setting also presents students with many barriers including, but not limited to, situational, content suitability, technology, instructional, learning styles, organizational, and personal (Durnali et al., 2022; Erdogmus et al., 2022; Matee et al., 2023; Rautiainen & Vesisenaho, 2022; Shearer et al., 2020; Vaillancourt et al., 2022). Many students often struggle with the teaching styles of their teachers not being compatible with their learning style, thus inhibiting the student from understanding lessons and materials provided during virtual instruction; however, other students struggle with learning and understanding new technology presented in addition to adjusting to new routines and developing self-discipline needed for successful learning in the virtual classroom (Adams, 2021; Ali, 2020; Alshwiah, 2021; Goodrich, 2021; Homayouni, 2022; Malkawi & Khayrullina, 2021). However, when teachers give students the opportunity and time to grasp and understand the new technology and routines presented, they are more likely to participate in virtual classroom lessons and activities, and they will develop a more positive outlook on their success in their virtual learning experience regardless of the subject taught (Ali, 2020; Chatterjee & Correia, 2020; Durnali et al., 2022; Nazari et al., 2022; Özaydin Özkara & Ibili, 2021).

Subject-Specific Virtual Learning

During the COVID-19 pandemic, students transitioned to virtual learning and faced numerous challenges and experienced many successes that accompanied learning with technology across various subjects and throughout all grade levels from elementary

to postgraduate studies (Alshwiah, 2021; Davidoivitch & Dorot, 2022; Du et al., 2022; Haez & Delfani, 2022; Nazari et al., 2022). Moving education to the virtual classroom setting significantly impacted student engagement and motivation (Alghanmi & Nyazi, 2022; Chatterjee & Correia, 2020; Du et al., 2022; Durnali et al., 2022; Özaydin Özkara & Ibili, 2021). Many students found this transition overwhelming and challenging to maintain as the added steps to completing activities and participating in lessons added to their stress levels of learning new material for subjects they may or may not have struggled with in the face-to-face classroom environment (Adams, 2021; Ali, 2020; Alshwiah, 2021; Baker & Moyer, 2019; Malkawi & Khayrullina, 2021; Vaillancourt et al., 2022).

With this transition, many students found themselves struggling because they had limited or no access to adequate technology and applications used in their virtual classrooms, while others struggled to understand how to use the new applications and technology and how to navigate virtual learning classroom settings (Ali, 2020; Dana Rucsanda et al., 2021; Daugvilaite, 2021; Goodrich, 2021; Nazari et al., 2022; Nsairat et al., 2022). Several research studies determined that in receiving new materials in science, mathematics, and reading, students had difficulty adapting and understanding the latest materials in the virtual classroom setting (Alshwiah, 2021; Erdogmus et al., 2022; Jamali Kivi et al., 2021; Özüdogru, 2022; Rautiainen & Vesisenaho, 2022; Shearer et al., 2020).

For elementary students, this transition to virtual learning was challenging regardless of the subject being taught and, in most subjects, elementary students struggled with using technology as there were often many steps required to complete and submit

assignments (Beirnes, 2022; Fick & Bulgren, 2022; Hash, 2021; Jackowicz & Sahin, 2021; Norman, 2022; Vaillancourt et al., 2022). Additionally, elementary students struggled with extended sitting that comes with virtual learning, often causing them to become restless and frustrated (Beirnes, 2022; Fick & Bulgren, 2022; Hash, 2021; Jackowicz & Sahin, 2021; Norman, 2022; Vaillancourt et al., 2022). For students in middle and high school virtual classrooms, many students found the applications used for activities in various subjects to be often too easy or too challenging as educators of many subjects were not diversifying their teaching to accommodate the multiple types of learners within their virtual classrooms (Akarsu, 2021; Hash, 2021; Jackowicz & Sahin, 2021; Joseph, 2020; Özüdogru, 2022; Vaillancourt et al., 2022).

However, there were many subjects, such as mathematics and STEM, that were able to provide opportunities for student-centered learning through the technology and applications they used, which improved student participation and the student's overall success in their virtual classroom and many subjects, such as reading and physical education, understood the need for and positive benefit of student socialization and provided opportunities for students to socialize during learning activities using technology such as break-out rooms and monitored chat boxes (Durnali et al., 2022; Mardiana, 2020; Matee et al., 2023; Sarikaya, 2022; Yadigaroglu, 2021). By providing these opportunities, those teachers improved students' positive perceptions and attitudes toward learning various subjects in the virtual classrooms, thus increasing their students' overall participation and success (Chatterjee & Correia, 2020; Davidoivitch & Dorot, 2022; Jackowicz & Sahin, 2021; Özkara & Ibili, 2021; Ünlü, 2022).

Special Education and Virtual Learning

As previously mentioned, for this paper, the phrase "exceptional needs" will be used to indicate those students who qualify under the Individuals with Disabilities Education Act or IDEA (2004) who receive physical, cognitive, behavioral, and social services, as well as those students who fall within the category of gifted and talented. The use of virtual classrooms for students with exceptional needs can often discourage those students and lead them to withdraw from participation without the proper learning approaches (Barbetta & Morales, 2022; Bell et al., 2020; Idin, 2020; Quigley & MacDonald, 2022). Students with exceptional needs who participate often are more likely to have success in the virtual classroom setting regardless of the subject taught (Birnbaum et al., 2022; Clipper & Lee, 2021; Ismail et al., 2022; Jackowicz & Sahin, 2021).

For many students with exceptional needs, taking ownership of their learning is beneficial to their success, and this is especially true for learning in the virtual classroom. One of the ways students with exceptional needs can take ownership of their learning is to use modified answering techniques to participate in virtual lessons, which will improve their chances of learning and understanding subject matter in a virtual classroom setting (Birnbaum et al., 2022; Barbetta & Morales, 2022; Idin, 2020; Jackowicz & Sahin, 2021). Teachers in the music education classroom often overlook students with exceptional needs, so music teachers need to provide encouragement and allow students with exceptional needs to tap into their creativity through music composition can remove barriers, develop confidence, develop connections with peers, and inspire creativity in

group settings (Bell et al., 2020; Clipper & Less, 2021; Ismail et al., 2022; Jackowicz & Sahin, 2021; Quigley & MacDonald, 2022).

Adult Education and Virtual Learning

The move to virtual learning during the COVID-19 pandemic revealed a reliance on technology to participate in activities that most adult learners had not previously experienced and, for many adult learners, navigating virtual classrooms can be daunting and frustrating, especially if the technology they are using is outdated or inadequate (Brieger et al., 2020; MacRitchie et al., 2022; Tsugawa, 2023; Xiong & Zuo, 2019). Learning in a virtual setting can be difficult for adult learners due to barriers and knowledge gaps they face surrounding technology, and those identified gaps centered on overall knowledge of the subjects, obstacles in accessing technology and learning materials, and the continuation and preservation of previous knowledge, which can be especially difficult for adult students learning music (Brieger et al., 2020; MacRitchie et al., 2022; Talbert & Edelman, 2021; Tsugawa, 2023; Xiong & Zuo, 2019).

Research has found that many adult learners feel that they spend more time learning the new technology than they do learning or engaging in the virtual classroom (Brieger et al., 2020; MacRitchie et al., 2022; Talbert & Edelman, 2021; Tsugawa, 2023; Xiong & Zuo, 2019). Massive Open Online Courses (MOOCs) provide adult learners with multiple means of learning new and previously-learned subjects through access to lecture videos or webcasts, online assessments, discussion forums, live video chat discussions, and help sessions to assist adult students with technology (Barthakur et al., 2021; Klevetova et al., 2021; Kotzee & Polermos, 2021; Stutchbury et al., 2023; Xiong &

Zuo, 2019). Participation in a virtual learning environment can increase an adult learner's satisfaction and overall quality of life. Music education is essential to adult learners as it provides opportunities for connecting with peers through group interactions and, benefits them mentally by improving self-esteem, and provides adult students with a means of self-expression (Bayley & Waldron, 2020; Brieger et al., 2020; Rautiainen & Vesisenaho, 2022; Schmidt-Jones, 2021; Talbert & Edelman, 2021; Xiong & Zuo, 2019).

Gender Inclusivity and Virtual Learning

In the virtual music classroom, students of all genders need to feel included and honored, as many students, especially those in elementary and middle school settings, enjoy sharing about themselves, their interests, and their families as they will use these opportunities to connect with their peers and teacher (Ajlouni et al., 2022; Cromer et al., 2022; Culp & Robison, 2022; Nsibirano et al., 2022; Park & Kim, 2020; Robison & Culp, 2021). Technology use in the music education classroom can assist in promoting a more gender-inclusive environment where students can feel free to share their experiences and interests with those around them. In the virtual classroom setting, students need to develop self-regulation skills to be successful (de Bruin, 2021; Culp & Robison, 2022; Habe et al., 2021; Parkes et al., 2021; Robison & Culp, 2021; Yoo, 2021). In the virtual classroom setting, self-motivated female students tend to be more autonomous and self-determined than male students, leading to their success and positive views about virtual learning (Ajlouni et al., 2022; Du et al., 2022; Durnali et al., 2022; Frikha et al., 2022; Habe et al., 2021).

In a virtual classroom setting, opportunities to share experiences and interests are less likely to happen than when students are face-to-face as research has shown that students often feel disconnected from others when learning in a virtual classroom, and female students perceive this lack of social presence more often than males posing a negative impact on their experience with virtual learning, which is why females tend to be more socially engaged than males in the virtual environment (Alghanmi & Nyazi, 2022; Ajlouni et al., 2022; Cromer et al., 2022; Park & Kim, 2020; Rodríguez-Ardura & Meseguer-Artola, 2021). However, females tend to feel more satisfied with the virtual learning environment than their male counterparts because they feel more connected with their teacher peers in the virtual environment, which improves the feeling of social presence (Alghanmi & Nyazi, 2022; Ajlouni et al., 2022; Cromer et al., 2022; Frikha et al., 2022; Habe et al., 2021; Rodríguez-Ardura & Meseguer-Artola, 2021). In the virtual environment, positive and frequent interactions between students, their peers, virtual classroom materials, and their teacher proved to be more effective at improving student participation and enhanced student success and overall positive view on learning in the virtual classroom setting regardless of gender (Bucura, 2022; Chatterjee & Correia, 2020; de Bruin, 2021; Jefferson, 2021; Nazari et al., 2022; Norris, 2020).

Student Perspectives on Virtual Learning

Students experience challenges when learning in a virtual environment that include technology issues or limited access, negative views of self-efficacy, and a perceived lack of social interaction; however, students can experience success in the virtual environment when educators help students to address these challenges (Ajlouni et

al., 2022; Nsairat et al., 2022; Özaydin Özkara & Ibili, 2021; Özüdogru, 2022; Rautiainen & Vesisenaho, 2022). With virtual learning, students often feel a sense of disconnect with their educators, peers, and the material taught, and as stated before, positive and frequent interactions between students, their peers, virtual classroom materials, and their teacher improve student participation, student success, and their overall view on learning in the virtual classroom setting (Abou-Khalil et al., 2021; Baker & Moyer, 2019; Chatterjee & Correia, 2020; Erdogmus et al., 2022; Joseph, 2020; Norris, 2020).

Student success in a virtual classroom setting requires a sense of community and connection, and social presence, real or perceived, has a significant impact on a student's perception of virtual learning and taking online courses, regardless of the subject taught (Abou-Khalil et al., 2021; Adams, 2021; Alghanmi & Nyazi, 2022; Baker & Moyer, 2019; de Bruin, 2021; Park & Kim, 2020). Interactions between students, course materials, their peers, and their teachers can have a positive or negative impact on student participation and their overall success in the virtual classroom environment, with many studies showing students who have frequent and positive interactions with teachers, peers, and classroom materials in the virtual classroom environment have a more positive view of and felt more successful with virtual learning (Chatterjee & Correia, 2020; de Bruin, 2021; Nazari et al., 2022; Norris, 2020; Özüdogru, 2022; Tobbell et al., 2021). Students whose connections created a sense of community improved student participation and engagement in collaborative learning and their attitudes toward virtual learning communities (Adams, 2021; Corbett & Spinello, 2020; Erdogmus et al., 2022; Hamid et al., 2021; MacRitchie et al., 2022; Yoo, 2021).

Students in any form of music education have had challenges and successes in learning music in a virtual setting; however, these challenges are not always easily overcome, and students of vocal and instrumental music education view virtual music classrooms as ineffective, especially where ensembles are concerned (Daugvilaite, 2021; Ferguson, 2021; Nsairat et al., 2022; Rautiainen & Vesisenaho, 2022; Ünlü, 2022; Yildiz et al., 2021). Students in vocal and instrumental ensembles struggle with audio and video latency and often do not receive adequate feedback during virtual ensemble performances, which negatively affects student views of music education in the virtual setting (MacRitchie et al., 2022; Martin & Büchert, 2020; Norman, 2022; Nsairat et al., 2022; Vaizman, 2022; Yildiz et al., 2021). Furthermore, technology challenges that limit group participation and collective student performances inhibit ensemble students from interacting and learning from each other, which is a performance-based skill necessary for success in music ensembles (Dana Rucsanda et al., 2021; de Bruin, 2021; Ferguson, 2021; Gibson, 2021; Habe et al., 2021; Saetre & Zhukov, 2021).

Music Education and Virtual Learning

For many K–12 music education students, learning music in a virtual classroom setting is a newer endeavor, having only increased in recent years due to the COVID-19 pandemic (Bucura, 2022; Calderón-Garrido & Gustems-Carnicer, 2021; Hash, 2021; Mao & He, 2021; Norman, 2021; Shaw & Mayo, 2022). However, the use of technology for learning in the K–12 music education classroom is not a new endeavor and continues to increase as music technology improves through software, platforms, and applications (Adams, 2021; Barton & Riddle, 2022; Calderón-Garrido & Gustems-Carnicer, 2021;

Goodrich, 2021; Norman, 2021). Learning any aspect of music education, from general music to instrumental and vocal, requires more opportunities for student-directed learning and collaborative learning for students to be successful, and this is especially true for those students who are learning music in a virtual classroom setting (Daugvilaite, 2021; Feyzi Bhnagh & Yasrebi, 2020; Pozo et al., 2022; Rautiainen & Vesisenaho, 2022; Saetre & Zhukov, 2021; Yoo, 2021).

Music education learning through all aspects of technology, like virtual platforms, applications, and software, has its own set of challenges and successes, and many students using music education virtual technology for learning face connectivity issues, audio and video quality, and latency challenges, and other technology issues not previously mentioned (AL Thnayan & Husain, 2021; Culp & Robison, 2022; Hash, 2021; Jefferson, 2021; Parkes et al., 2021; Talbert & Edelman, 2021). These challenges pose a significant impact on student success in the virtual music classroom, especially for collaborative learning opportunities such as instrumental and vocal ensembles, as most virtual platforms are not conducive to collaborative musical learning (Akarsu, 2021; Cheng & Lam, 2021; Daugvilaite, 2021; Schmidt-Jones, 2020; Ünlü, 2022; Vaizman, 2022). However, music education students whose teachers provided them with a variety of lessons, activities, and materials through a mixed means of synchronous and asynchronous instruction proved to be more successful in the virtual music education classroom (Barbetta & Morales, 2022; Dana Rucsanda et al., 2021; Gibson, 2021; Norman, 2022; Rodari Meisner & McKenzie, 2023; Yadigaroglu, 2021).

Students learning virtual music education need a virtual classroom environment that provides autonomy, competence, and relatedness for them to experience success (Frikha et al., 2022; Joseph & Merrick, 2021; Sarikaya, 2022; Wan et al., 2023; Wieser & Müller, 2022). Students need to feel connected to peers, teachers, and materials within the virtual music classroom as it provides students with a sense of self-efficacy and self-determination (Ajlouni et al., 2022; Özüdogru, 2022; Ünlü, 2022; Rautiainen & Vesisenaho, 2022; Wan et al., 2023). Additionally, students require virtual music education curriculums that are student-centered and tailored to address their specific educational needs and provide quality peer and teacher feedback to improve student participation and engagement and to increase collaborative learning (Al Maawali, 2022; Bucura, 2019; Fick & Bulgren, 2022; Sarikaya, 2022; Yoo, 2021).

General Music. Students of general music education classes are often more successful with virtual learning than those students in vocal and instrumental music education (Bucura, 2019; Ferguson, 2021; Kuebel & Haskett, 2023; Saetre & Zhukov, 2021; Yildiz et al., 2021). General music education, which encompasses learning both music theory and music history, has been successful in virtual platforms as the technology issues faced by vocal and instrumental music education do not often have an impact on general music education because it is not solely performance-based (Bucura, 2019; Hash, 2021; Norman, 2022; Vaizman, 2022). Additionally, many of the materials available for general music education are easily transferred to the digital platform, allowing students to access them (Bucura, 2022; Calderón-Garrido & Gustems-Carnicer, 2021; Goodrich, 2021; Yadigaroglu, 2021; Yildiz et al., 2021).

Students are more engaged and motivated to learn general music when their virtual classroom setting is easily navigable and provides relatable material (Baker & Moyer, 2019; Beirnes & Randles, 2023; Matee et al., 2023; Norman, 2022; Schmidt-Jones, 2021). Inaccessibility of music technology and materials hinders student learning success in general music, and inequities or inequalities limit a student's chance to be successful and creative in the virtual general music classroom and should be addressed (Kuebel & Haskett, 2023; Matee et al., 2023; Park & Kim, 2020; Rolando et al., 2022; Ünlü, 2022). General music lessons that provide student-centered learning and build autonomy and self-efficacy through collaboration with peers will improve student success in a virtual music environment (Bucura, 2022; Daugvilaite, 2021; Nsairat et al., 2022; Rautiainen & Vesisenaho, 2022; Wan et al., 2023).

Vocal Music. Students of vocal music require substantial interaction between themselves and other students, as well as themselves and their teacher, to be successful in vocal music (Bucura, 2022; Dana Rucsanda et al., 2021; Demir et al., 2021; MacRitchie et al., 2022; Nunes-Silva et al., 2021; Yildiz et al., 2021). Music technology often limits the vocal students' interactions with others, negatively impacting their overall experience with vocal music (de Bruin, 2021; Ferguson, 2021; Hash, 2021; Joseph, 2020; Saetre & Zhukov, 2021). Additionally, students learning techniques for vocal music do not easily transfer to the virtual classroom environment as much of vocal music education is performance-based and requires immediate, adequate feedback to the student to correct vocal skill and performance mistakes (Biasutti et al., 2022; Blanco & Ramirez, 2019; Bucura, 2019; Dana Rucsanda et al., 2021; Nunes-Silva et al., 2021; Wan et al., 2023).

Audio and video technology quality and latency issues inhibit vocal ensemble collaboration, making vocal ensemble practice and performance not feasible for the virtual music classroom (Cheng & Lam, 2021; Dana Rucsanda et al., 2021; de Bruin, 2021; Ferguson, 2021; Nunes-Silva et al., 2021; Ünlü, 2022). Student learning in vocal music education classrooms is skill-based, focused on performance, and requires collaborative vocal music making for student success and these aspects of vocal music education are not conducive to virtual learning and can negatively impact student participation, engagement, and collaborative learning opportunities (Ekici, 2022; Gun, 2021; Kuebel & Haskett, 2023; Rautiainen & Vesisenaho, 2022; Tobbell et al., 2021). Furthermore, collective participation and collaboration are necessary 21st-century skills for vocal ensemble students, and inadequate technology limits the practice and performance of vocal ensembles in the virtual setting (Ali, 2020; de Bruin, 2019; Joseph & Merrick, 2021; Matee et al., 2023; Yoo, 2021).

Instrumental Music. Students of instrumental music education also require substantial interaction between themselves and other students, as well as themselves and their teacher, to be successful in instrumental music (Bucura, 2022; Dana Rucsanda et al., 2021; Demir et al., 2021; MacRitchie et al., 2022; Nunes-Silva et al., 2021; Yildiz et al., 2021). Students of instrumental music education require immediate correction of instrumental skills and performance techniques to have success in learning musical instruments (Biasutti et al., 2022; Blanco & Ramirez, 2019; Bucura, 2019; Dana Rucsanda et al., 2021; Nunes-Silva et al., 2021; Wan et al., 2023). Like vocal music education, instrumental music education is performance-based, and inadequate

technology can limit the instrumental students' experiences with learning a musical instrument and inhibit their participation in collaborative learning, negatively impacting student engagement, participation, and views of virtual learning platforms for music education (de Bruin, 2021; Ferguson, 2021; Hash, 2021; Joseph, 2020; Saetre & Zhukov, 2021).

As with students in vocal music education, the learning techniques of instrumental music students do not easily transfer to the virtual classroom environment (Ajlouni et al., 2022; Biasutti et al., 2022; Davidoivitch & Dorot, 2022; de Bruin, 2019; Nsairat et al., 2022). Audio and video technology quality and latency issues inhibit instrumental ensemble collaboration in the virtual music classroom, making group instrumental ensemble practices and performances not feasible (Cheng & Lam, 2021; Dana Rucsanda et al., 2021; de Bruin, 2021; Ferguson, 2021; Nunes-Silva et al., 2021; Ünlü, 2022). Learning in an instrumental music education classroom, like vocal music education, is skill-based, focused on performance, and requires collaborative instrumental music-making for student success (Barton & Riddle, 2022; Cheng & Lam, 2021; Daugvilaite, 2021; Ünlü, 2022; Yoo, 2022). Student collaboration and ensemble participation are necessary 21st-century skills, and these aspects of instrumental music education are not conducive to a virtual learning environment (Ali, 2020; de Bruin, 2019; Joseph & Merrick, 2021; Matee et al., 2023; Yoo, 2021).

Summary

Although teacher and student use of music-based technology to teach and learn music education is not new, using virtual platforms is an endeavor only recently explored

for teaching and learning any aspect of music education (Bucura. 2022; Ismail et al., 2022; Nsairat et al., 2022; Yadigaroglu, 2021; Yildiz et al., 2021). With this newer means of teaching and learning music education comes different challenges and successes not experienced in the face-to-face music education classroom, and research shows the most substantial challenge experienced by both teachers and students centered around the inadequacies and inequities of technologies in teaching and learning music education virtually (Daugvilaite, 2021; Ismail et al., 2022; Kuebel & Haskett, 2023; Parkes et al., 2021; Talbert & Edelman, 2021; Ünlü, 2022). Technology challenges negatively impacted music teachers' pedagogy, lessons, activities, and materials and students' abilities to collectively interact and collaborate, with the most significant negative impact being the inability to practice and perform in a vocal or instrumental ensemble collectively or allowing music teachers to provide immediate feedback or correction to performance-based ensemble skills (Akarsu, 2021; Barton & Riddle, 2022; Cheng & Lam, 2021; Daugvilaite, 2021; Schmidt-Jones, 2020; Ünlü, 2022; Vaizman, 2022).

Other aspects explored that impact teacher and student success in a virtual music education classroom were adulthood, gender, special education, learning, teaching, and student and teacher perspectives, all of which had their own set of challenges (Alghanmi & Nyazi, 2022; Barton & Riddle, 2022; Birnbaum et al., 2022; Nsibirano et al., 2022; Rautiainen & Vesisenaho, 2022; Tsugawa, 2023; Wan et al., 2023). Although challenges exist in the virtual music education classroom, teachers and students also experience many successes in teaching and learning music education in a virtual environment (de Bruin, 2019; Gül, 2021; Mardiana, 2020; Parkes et al., 2021; Ünlü, 2022). Virtual music

education environments allow teachers to move their instruction from teacher-centered to student-centered, increasing students' self-efficacy, motivation, and autonomy by addressing students' learning styles and providing them with a variety of synchronous and asynchronous learning opportunities, as well as increasing opportunities for collaborative interaction and improving overall attitudes and views of virtual music education in both teachers and students (Biasutti et al., 2022; Durnali et al., 2022; Sarikaya, 2022; Ünlü, 2022; Yadigaroglu, 2021).

Conclusion

Music education teaching and learning in a virtual environment can create challenges and successes not generally encountered by teachers or students in a face-to-face music education setting (Daugvilaite, 2021; de Bruin, 2019; Jefferson, 2021; Parkes et al., 2021; Talbert & Edelman, 2021). The challenge that most impacts music teachers and students is teaching and learning music ensembles in a virtual education setting. Audio and video technology latency and quality can negatively impact sound and inhibit collective interaction between music students, their peers, and their teachers (Akarsu, 2021; Daugvilaite, 2021; Cheng & Lam, 2021; Schmidt-Jones, 2020; Ünlü, 2022; Vaizman, 2022). These technology challenges, which impact vocal music education in the same way, are most prevalent and negatively impactful to teachers and students of instrumental music education (Calderón-Garrido & Gustems-Carnicer, 2021; Ferguson, 2021; Nsairat, 2022; Schmidt-Jones, 2020; Vaizman, 2022). These challenges can create negative views and attitudes about virtual learning in music education for both teachers and students (Alshwiah, 2021; Demir et al., 2021; Malkawi & Khayrullina, 2021; Ünlü,

2022). Although research has looked at teacher and student views, attitudes, and

perspectives around virtual music education in general, vocal, and instrumental music,

and has looked at music education from K–12 to higher education, no research has

looked at the secondary music teachers' perspective on teaching concert bands virtually.

Chapter 3: Research Method

Introduction

Through this qualitative study, I explored secondary music teachers' perspectives on using virtual technology to instruct concert band ensembles. I also explored music teachers' perspectives on the challenges and successes of teaching secondary concert bands in a virtual setting and whether they impacted their view of virtual teaching and learning for secondary concert bands. This qualitative study addressed the gap in the current literature surrounding the lack of research on the perspectives of K–12 music teachers and the use of virtual platforms to teach secondary concert bands.

In Chapter 3, I explain the research design and rationale; look at my role as the researcher; explain in detail the methodology for this research study, including the data collection and analysis plan; and address issues surrounding the ethics and trustworthiness of this study.

Research Design and Rationale

Through this qualitative study, I explored the main research question—What are secondary music teachers' perspectives on using virtual technology for concert band instruction?—and the sub-research question—How do the challenges and successes experienced by secondary music teachers impact their view of using virtual technology for concert band instruction? Although researchers have investigated the issue of teaching and learning music education in a virtual setting, the views of secondary music teachers using virtual technology to instruct concert band ensembles have not been explored. In qualitative research, researchers use interviews to collect data to understand the

participants' experiences, feelings, and emotions (Ravitch & Carl, 2021). Because I looked to understand the perspectives of secondary music teachers, using interviews allowed me to understand better the participants' views on using virtual platforms to teach concert bands. The logical connections between the framework presented and the nature of my study include secondary instrumental music teachers having the ability to control factors within the virtual classroom that will ensure the success of the concert band ensemble (see Vygotsky, 1978) and using technology to strengthen and create new avenues of learning and instruction that will enhance music pedagogy and learning for a secondary concert band ensemble (Siemens, 2005).

The specific research design used guidelines and protocols set forth by Ravitch and Carl (2021) to create a set of semistructured interview questions derived from the emergent themes within the current literature that centered around the use of technology by secondary music teachers to teach concert band ensembles and would address the research question in this qualitative study. I conducted audio-recorded interviews with nine participants who currently taught secondary concert band ensembles and had used virtual platforms. With assistance from the local music educators' association, I invited secondary music teacher participants from all local districts and charter schools to participate once I received IRB approval and acquired a few participants. I acquired additional participants through snowball sampling. I used a semistructured interview process because it was a proven effective method for collecting qualitative data, it looked at the perspectives and experiences of the participants, and it allowed me to ask

additional questions, deepening the understanding of the perspectives and experiences of the participants.

Role of the Researcher

In my role as the researcher, my duties included recruitment of participants, interviewing, data collection, data analysis, data coding, transcribing, and ensuring participant confidentiality. Reflexivity was utilized throughout the research process to ensure that I maintained an objective viewpoint throughout the research process, ensuring that any researcher biases I might have, including, but not limited to, previous experiences with teaching concert bands virtually, assumptions regarding the virtual teaching and learning of concert bands, and those beliefs that might significantly impact the research, were continuously checked for subjectivity (Ravitch & Carl, 2021).

Some participants may have been colleagues, as the local music educators' association included all districts when recruiting participants. I needed to interview them to meet the requirement of the number of participants for my study. Because I am a music teacher like them, I was not a supervisor for any of the participants, and my current position as a music teacher in a K–12 public school setting did not place me in a supervisory role in which I could have power over participants. I bracketed out my experiences and maintained an objective stance when asking prewritten main and follow-up questions. I recorded all interviews for proper transcription and coding of answers. I did not speak to the participants about my experiences teaching concert bands or engaging in virtual instruction.

Maintaining an objective view of the responses from the participants was critical to ensuring that my own experiences did not alter or influence the participants' responses. Although being a current music teacher and having taught concert band ensembles in a virtual setting could have been a conflict of interest, my virtual teaching experience was in middle school, which is Grades 6–8, while the majority of participants were from high school positions (Grades 9–12), with only two participants from the middle school level. I do not believe my previous experiences were an issue in maintaining objectivity while conducting the semistructured interviews. I strictly adhered to the prewritten interview questions and ensured that I recorded all interactions for transcription of the exact responses. All interviews were audio recorded only, and participants were not seen or able to see me, thus eliminating the chance for facial expressions or body language to influence the participants' answers.

Methodology

Participant Selection Logic

Most participants for this study were K–12 music teachers working in a public-school setting from the middle to lower East Coast states. I used snowball sampling to recruit the remaining participants. There were nine participants, as sampling requirements for this research were eight to 10 participants within the targeted population, and the sample size met the requirements for this study's completion. The participants were those K–12 music teachers who had previously taught or were currently teaching a secondary concert band ensemble in a virtual setting in a K–12 public school system.

Using a prescreening survey tool, the participants stated that they had worked in a K–12 public secondary setting teaching concert bands within the past 5 years using a virtual platform. Many districts from states in the middle to lower East Coast went to virtual teaching and learning during the COVID-19 pandemic that began in 2020. I assumed that they would have been teaching in a virtual setting if they were working as a secondary concert band director during that time.

I contacted the local music educators' association in August 2023 to assist in recruiting participants, as they could send a statewide email to all music educators, provide an announcement within their monthly newsletter, and post a flyer to their social media outlets in September 2023. This contact produced a few participants as the state has many school districts and charter schools. Had only one teacher from each district participated, it would have provided more than enough participants for a proper sample size. However, snowball sampling was necessary to acquire enough participants for this study. Because many teachers often move positions throughout their careers, there are likely many who may have previously taught secondary concert band ensembles virtually but have since changed jobs.

Data saturation happens when no new codes, categories, or themes can be identified in the collected data (Ravitch & Carl, 2021). Ensuring an adequate sample size is essential to produce saturation of the interview responses. The proper sample size of eight to 10 participants ensures that no new information emerges. With the likelihood that each educational level of each school district has a music teacher, this creates an assumption that there are more than 100 music teachers in the states in the middle to

lower east coast, and if at least half of them teach or have taught secondary concert band, a sample size of eight to 10 would be sufficient to produce saturation of the interview responses.

Instrumentation

I recorded participant responses for transcription through audio-recorded telephone calls using Zoom. I collected handwritten memos of responses as additional data points. Interview questions were created by me and derived from emergent themes from current literature. I conducted the interviews individually using this list of questions, which had been reviewed for accuracy by professionals in the field of music education. These questions were semistructured; some were yes-or-no questions, but the questions were primarily open ended and were not leading in any way. All interview questions centered around the topic of the teaching and learning of virtual music education in all aspects, such as general, vocal, and instrumental; the majority focused on the virtual teaching of secondary concert bands and did not, in any way, require the participants to give information that might compromise confidentiality.

I took memos during each interview and created audio-only recordings of each participant's interviews using Zoom. I transcribed the audio recording verbatim. Data were analyzed for codes using the guidelines and protocols set forth by Saldaña (2021). The interview questions, created using current literature and reviewed for accuracy and integrity by professionals in the field of music education, provided an in-depth understanding of the participants' perspectives regarding the use of virtual technology to teach concert bands. The interview questions covered various aspects of music education

regarding virtual technology and teaching concert bands, as well as other parts of music pedagogy, curriculum, and administrative or peer support. The follow-up questions asked of participants were used to improve the understanding of their experiences and perspectives surrounding the topic. No additional clarification was necessary after the interviews, so no further contact with participants was necessary until member-checking. In addition to the memos I took, the number of questions created, and their thoroughness should have been sufficient to collect enough data to answer the research question effectively.

Researcher-Developed Instruments

I developed a list of primary interview questions derived from current literature and based on the research question. The interview questions were peer-reviewed by other music educators not participating in the study to ensure their validity and reliability to answer the main research question and to ensure that the questions were not biased towards me and did not place the participants in a position that would compromise their confidentiality and privacy. I established the validity and reliability of the interview through peer reviewing, which provides a researcher with feedback that helps to develop and refine interview questions (Ravitch & Carl, 2021). I gave the primary interview questions to other professionals in the music education field, who provided feedback regarding the content and validity of the interview questions to answer the research question. Once I received peer feedback, I used it to develop and refine the interview questions to ensure that they were valid and reliable qualitative data collection instruments.

The interview questions, created using current literature, provided an in-depth understanding of the participants' perspectives regarding using virtual technology to teach concert bands. The interview questions covered various aspects of music education regarding virtual technology and teaching concert bands, as well as other parts of music pedagogy, curriculum, and administrative or peer support. The amount and quality of the questions created were sufficient to collect enough data to answer the research question.

Procedures for Recruitment, Participation, and Data Collection

Upon IRB approval (08-18-23-1044009), I began recruiting participants with the assistance of the local music educators' association, whose leaders agreed to assist using email, newsletter flyers, and social media in August 2023. I collected data using semistructured interview questions. I derived the interview questions from emergent themes within the current literature. I collected the data using audio-recorded, semistructured interviews with interview questions. During the interviews, I collected additional data using handwritten memos.

Potential participants reached out via email, and once they were determined to meet the criteria, I sent them the informed consent form in September 2023, which they responded to with the phrase, "I consent." I conducted interviews on an individual basis and once per participant. I scheduled interviews at regular intervals as determined by the participants and me through an agreed-upon date and time to ensure an adequate and timely data collection period necessary for the completion of the study. Each interview lasted no more than 60 minutes, and I recorded the interviews using an audio-only Zoom call. All interviews were conducted during the month of September 2023.

Participants were informed when the interview had concluded, and I thanked them for participating. I asked the participants to present any additional questions or concerns they had at that time. I also informed them that I would send a follow-up email that they could respond to with further questions or problems later. Should the need for additional questions or clarifications arise after the initial interview, follow-up questions and discussions would have happened via email correspondence.

Because the initial recruitment plan did not yield enough participants to meet the study requirements, I implemented a preestablished secondary recruitment plan of snowball sampling during the interview process, which began with the first interview in September 2023. After each interview, I asked the participants if they knew anyone who met the criteria for the research study who would want to participate; they then requested that those potential participants contact me for an interview.

Data Analysis Plan

The data collected from the audio-recorded interviews and handwritten researcher memos helped to answer the study's main research question—What are the perspectives of secondary music teachers on using virtual technology for concert band instruction?—and the sub-research question—How do the challenges and successes experienced by secondary music teachers impact their view of using virtual technology for concert band instruction? Throughout the audio-recorded interviews, I also collected handwritten memos. I used the handwritten memos I created with the audio-recorded interviews to collect data that were later hand-coded for categories and themes using the guidelines and protocols set forth by Saldaña (2021).

I transcribed the raw interview data collected through the audio-only Zoom recordings. I analyzed the data I had gathered from the interview's audio-recording and handwritten memos to identify categories and themes that would answer the research question surrounding music teachers' perspectives on using virtual platforms to teach secondary concert bands. I hand-coded the raw data collected to identify categories and themes. I transcribed and hand-coded the data collected via audio-recorded interviews. I coded the audio-recorded collected data using the guidelines and protocols set forth by Saldaña (2021).

In qualitative research, a discrepant case motivates the researcher to rethink or reconsider the categories and themes derived from the coded data (Saldaña, 2021). I analyzed and accounted for discrepant cases within the research data. I used them to prove that there was no interference or researcher bias regarding the data collected and the results of the coded data.

Figure 2

Recruitment, Participation, and Data Analysis Flow Chart
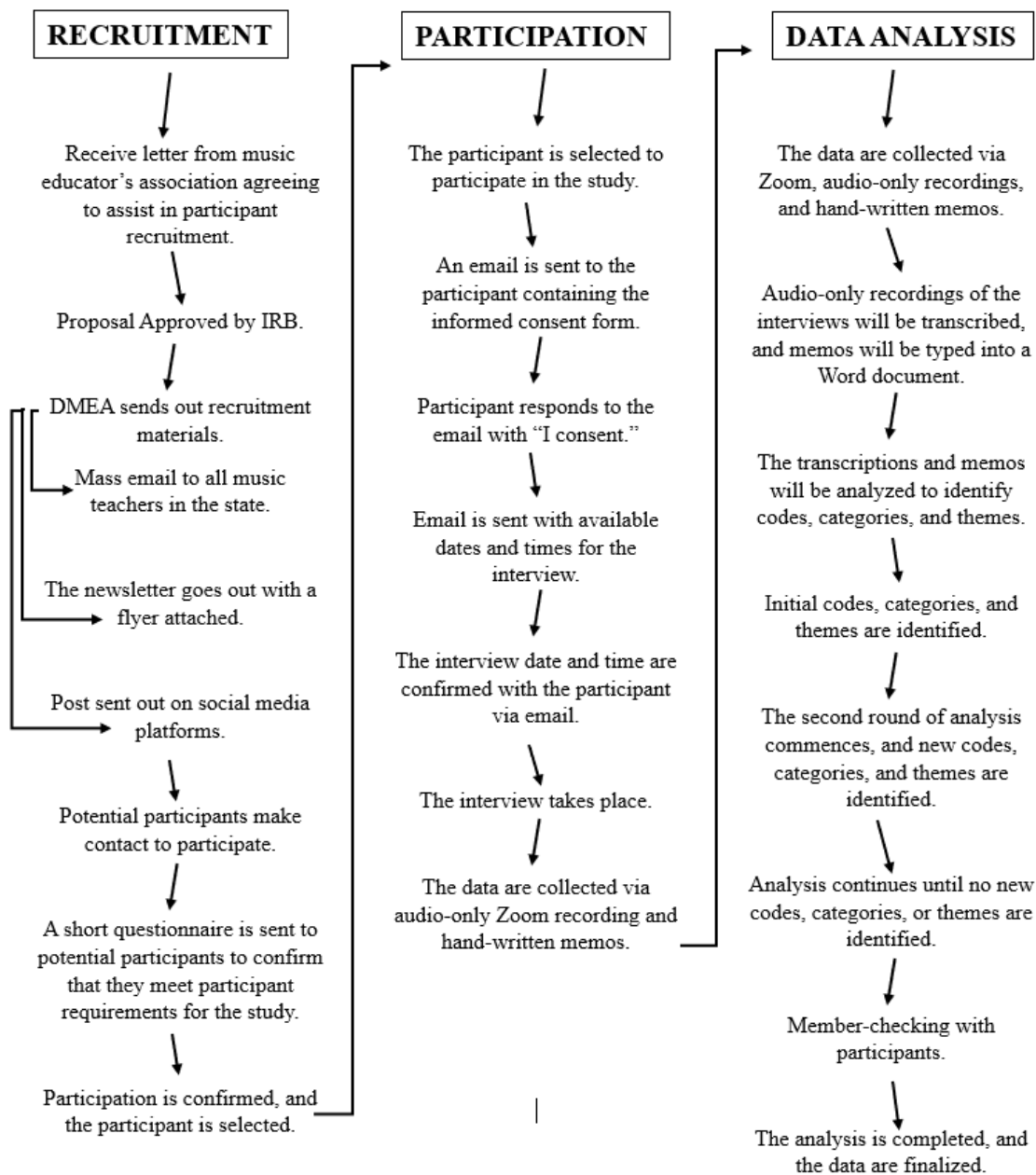
Issues of Trustworthiness

The validity of qualitative research relies on the study's credibility, transferability, dependability, and confirmability and the researcher's ability to use reflexivity to ensure these areas establish validity and rigor (Ravitch & Carl, 2021). I confirmed content validity and reliability through several means, including member checking, peer debriefing through other music educators not participating in the study, and using and maintaining an audit trail. Member checking allowed the participants to preview the research findings of the analyzed data, including categories and themes (Saldaña, 2021). Peer debriefing with peers not participating in the study allowed them to review the research findings of the analyzed data and provide feedback. I participated in opportunities to present and discuss the research at various stages, and obtaining peer feedback assisted in reducing researcher bias. Additionally, using an audit trail, keeping records, and monitoring all research-related activities and data-related materials, such as raw interviews and journal data, audio recordings, and coding materials, likely minimized potential threats to the research's validity and reliability (Ravitch & Carl, 2021).

Although the criteria for this study were specific and surrounded the virtual teaching of concert bands, due to the nature in which music educators are certified in each state, requiring them to be highly certified in K–12 music education, many of the participants also had experiences in teaching other aspects of music education, including general music and vocal music in addition to instrumental music, and their experiences also spanned outside of the secondary teaching setting to include experience teaching in the elementary and college settings. The results of this study could be transferrable to

other areas of K–12 music education that use virtual platforms for teaching and learning, specifically vocal ensemble music. Other areas of music education that could benefit from the findings of this study include elementary, middle, or high school vocal music ensembles, as well as those elementary and college concert bands teaching and learning in a virtual setting, as they may experience the same or similar challenges and successes when teaching and learning virtually.

Audit trails are necessary to establish dependability in a qualitative study and provide adequate support for the research's reliability in the study and the data collected (Ravitch & Carl, 2021). The dependability of this study requires the monitoring and tracking all aspects of the research process, including, but not limited to, research-related activities and data-related materials. Audit trails also provide evidence of procedures and methods used during the different stages of the research study to support the dependability through detailed accounts of the research activities and materials used (Ravitch & Carl, 2021). Throughout the research process, I kept detailed documentation containing dates, times, and activities on the research, including, but not limited to, data collection, participant contacts, interview dates and times, and raw data—the keeping and monitoring of all research-related activities assisted in establishing and supporting the dependability of this study.

Reflexivity in qualitative data collection can assist in establishing and maintaining confirmability throughout the research process (Ravitch & Carl., 2021). As part of the criteria for qualitative research validity, reflexivity ensures that the researcher is aware of and addresses their personal biases, views, assumptions, and beliefs based on their own

experiences and requires frequent self-assessment to provide the researcher's aspects do not influence any part of the research study (Ravitch & Carl, 2021). I completed a self-assessment on my views regarding all aspects of this research study, including, but not limited to, virtual teaching and learning, concert band virtual instruction, personal experiences with the virtual teaching and learning of concert bands, and the challenges and successes faced while teaching concert bands virtually. I collected the data from the self-assessment in a document. I referred to this document at each step of the research process to ensure that all personal views, beliefs, experiences, and assumptions were not influencing any part of this research study. This reflexive process assisted in establishing and maintaining the confirmability of this research study.

Ethical Procedures

The local music educators' association agreed to use its platform to assist in the participant recruiting portion of this study. The association used emails, social media, and a monthly newsletter to invite music teachers who fit the criteria to participate in the interview study. Additionally, I asked interview participants if they knew of anyone willing to participate and asked them to have that person reach out for an interview. Throughout the data collection process, participants' identities remained confidential, and pseudonyms were given to each participant and used throughout the study to maintain privacy. During the audio-recorded interviews via Zoom, I asked participants to change their names to pseudonyms within the platform. Using pseudonyms also maintained participant privacy and allowed me to keep track of the collected data and interviews for the study.

Ethical concerns centered around recruiting participants fall under recruitment materials, the manner of recruitment, and the participant's rights. I reviewed the recruitment material to ensure that the information in the emails, flyers, and social media posts was not misleading and followed ethical guidelines. Participants were recruited indirectly through emails, flyers, and social media posts, ensuring that potential participants felt no pressure or coercion to join the study. Additionally, I made every effort to ensure the participants understood their role in the research study and their rights as voluntary participants. The study participants consented to participate in the interviews via an emailed participant consent form. They were required to read the entire informed consent email thoroughly and reply to said email with the words. "I consent."

As with any research, a potential risk could always impact the participants and the researcher. However, I have made every effort to minimize risk to the participants and myself for this study. The participants received a pseudonym to which they will be referred throughout the process to ensure confidentiality and privacy. Using pseudonyms reduced the risk of audiences deducing the participants' identities. Although this study looked at the participants' perspectives, there is no identifiable psychological risk to the participants. Although I am currently a music teacher in my state's K–12 public school setting, I do not work directly with any other music teachers who may have chosen to participate, as I am the only music teacher for my school. Being an individual music teacher for a singular school ensures minimal effects on any potential professional relationships I may have with the participants. There are no identifiable legal or economic risks to the participant. However, there is minimal professional risk to the participant as

the study revolves around the participant's perspectives regarding using virtual

technology to teach concert bands. These perspectives included personal and professional

views around the topic, which may have also included personal and professional views

regarding the inner workings of the public-school systems, including, but not limited to,

district and building administration, teachers, music education curriculum, accessibility

and adequacy of technology, and teacher preparation and training. I made every effort to

ensure the identity of the participants and where they work or have worked was kept

confidential and their privacy maintained.

The ethics around qualitative data include how it is collected and analyzed, how it

will be protected and stored, and how it will be used or distributed (Ravitch & Carl,

2021). I maintained all participant information and data for this study in a secure

computer file on my hard drive that is password-protected and encrypted. All participants

have a pseudonym to identify them. I kept them inside a master document containing

their names, emails, and corresponding pseudonyms in a password-protected, encrypted

file to ensure that participant identities remained confidential and secure. This file is only

accessible by me and kept on a password-protected personal computer hard drive. All

research information and data collected and analyzed, including, but not limited to, the

participant's informed consent, hand-written memos, audio recordings of the interviews,

and any email correspondence for follow-up questions, are kept in a computer file on my

hard drive that is password-protected and encrypted. The email correspondence to and

from the participants was also placed in a Microsoft Word document and kept within the

password-protected, encrypted file. I then deleted mail from the email server

permanently.

Analyzed data is only presented and available within the context of this research

paper, and only I have access to the data unless it is necessary to provide the data to

Walden University faculty for the required fulfillment purposes of my Ph.D. If someone

other than me requires access to the data, I will give them a password-protected file that

they can only read. I will keep all files containing information for this study in a

password-protected, encrypted file on the hard drive of my personal computer, which I

will keep for a minimum period of 5 years from the date of the published study. If

deemed necessary, I will permanently delete all files at that time.

Summary

In Chapter 3, I addressed the research design and rationale. I provided insight into

using interviews to answer the research question: *What are the perspectives of secondary*

music teachers on using virtual technology for concert band instruction? and the sub-

research question: *How do the challenges and successes experienced by secondary music*

teachers impact their view of using virtual technology for concert band instruction?

Additionally, in Chapter 3, I addressed the role of the researcher and the importance of

maintaining an objective view and stance throughout every step of the research process

using reflexivity to ensure the confirmability of the research study.

In Chapter 3, I also addressed the methodology for the study, including the

instrumentation, how they were developed and used, procedures for recruitment

participation, and the data collection and analysis plans. In the final part of Chapter 3, I

addressed issues of trustworthiness and ethical practices, which also addressed the procedures for establishing credibility, transferability, dependability, and confirmability, as well as the procedures for handling and storing all research data for this study, including password protection and encryption.

In Chapter 4, I take an in-depth look into the study's setting, the participants' demographics, data collection, and analysis, and provide additional evidence of the trustworthiness of this study. Additionally, in Chapter 4, I give a detailed view of the results of this research study.

Chapter 4: Results

Introduction

The purpose of this study was to understand instrumental music teachers'
perspectives on using virtual settings to teach secondary concert bands. I explored the
instrumental music teachers' views on using virtual environments to teach secondary
concert bands by conducting semistructured interviews to accomplish this purpose. I used
a basic qualitative research design and interviewed music teachers using interview
questions aligned with my main research question and sub-research question.

Main RQ: What are secondary music teachers' perspectives on using virtual
technology for concert band instruction?

Sub-RQ: How do the challenges and successes experienced by secondary music
teachers impact their view of using virtual technology for concert band instruction?

In this chapter, I will report the results of this qualitative study. I will provide a
description of the study's setting and the demographics of the interview participants.
Additionally, I will discuss the procedures for data collection and data analysis. I will
discuss evidence of trustworthiness and provide a thorough description of the results of
the study. I will summarize the findings of this qualitative study at the close of Chapter 4.

Setting

The research site for this qualitative study was a virtual Zoom setting, and I did
not collect data from any single district or organization. Although the local music
educators' association assisted in recruiting participants, this did not yield enough
participants for the study. I recruited the remainder of the participants through snowball

sampling and flyers posted on social media. The additional recruitment effort yielded participants from various states across the United States and provided the necessary number of participants for this study. All participants were music educators who taught secondary concert bands virtually. This study had no district or organizational influences, as I did not partner with any individual district or organization.

Demographics

The participants for this study were nine secondary music education teachers, with three teaching at the middle school level and six teaching at the high school level. All participants held a bachelor's degree in music education, with six holding master's degrees in music education, the science of teaching, and digital teaching and learning. Participants' overall teaching experiences ranged from 4 to 38 years, with their virtual teaching experiences ranging from 6 months to 2 years. Subjects taught by participants included marching band, guitar, concert band, orchestra, and jazz band. All participants had taught secondary concert bands in a virtual setting and had utilized both synchronous and asynchronous instruction throughout their virtual teaching experience. Participants used either a blended or hybrid environment during their virtual teaching experience, and all had used some form of technology in their music education classrooms before their virtual teaching experience. Table 1 displays participant demographics on teaching experience, teaching position during virtual instruction, and highest degree attained. Table 2 provides the participants' demographics on virtual teaching experience, type of virtual experience, synchronous and asynchronous instruction use, and previous experience with music education technology.

Table 1

Participant Demographics of Experience, Position During Virtual Instruction, and

Highest Degree Attained

Participant pseudonym	Teaching experience in years	Position during virtual instruction	Highest degree attained
P1	7	High school concert band/marching band	BA
P2	21	High school concert band/guitar	MA
P3	7	High school concert band/orchestra	MA
P4	9	Middle school concert band	MA
P5	4	High school concert band/marching band	BA
P6	26	Middle school concert band	MA
P7	5	High school concert band	BA
P8	19	High school concert band	MA
P9	38	Middle school concert band	MA

Table 2

Participant Demographics of Virtual Teaching Experience Including Length, Type,

Synchronous or Asynchronous, and Previous Music Education Technology Experience

Participant pseudonym	Length of virtual teaching experience in years	Type of virtual teaching experience	Synchronous or asynchronous	Previous music education technology experience
P1	1.5	Hybrid	Both	Yes
P2	1	Hybrid	Both	Yes
P3	1.5	Hybrid	Both	Yes
P4	1.5	Hybrid	Both	Yes
P5	1	Hybrid	Both	Yes
P6	.5	Hybrid	Both	Yes
P7	1	Blended/Hybrid	Both	Yes
P8	1.5	Blended/Hybrid	Both	Yes
P9	2	Hybrid	Both	Yes

Data Collection

I received IRB approval on August 18, 2023, and I immediately began recruitment for participants. Once I procured participants, I started collecting data soon afterward. For this qualitative study, I collected data from current and former music teachers who taught secondary concert bands in a virtual setting. I conducted a total of nine interviews in Zoom using the interview protocol described in Chapter 3. I audio-recorded the interviews using the embedded record feature within Zoom. I conducted the interviews over 2 weeks, with the first interview commencing on September 7, 2023 and the final interview concluding on September 21, 2023. The interview times ranged between 21 and 71 minutes. I also collected data during the interviews using handwritten memos.

Unless noted, data were collected as described in Chapter 3. However, due to the lack of available participants who had taught high school concert bands virtually, it was necessary to expand the participant criteria to include those middle school music teachers who had taught concert bands in a virtual setting. There have been many uses of the word *secondary* to refer to both middle and high school. Therefore, the wording of the study itself, as well as the research questions, is still accurate. Also, through snowball sampling, I was presented with opportunities to connect with participants in other states, and it was necessary to expand the participant area to include those states outside of the states in the middle to lower east coast. In consultation with my committee, I made the necessary changes to the participant criteria, including participants who had taught middle school and those from other states.

Additionally, there were only two unusual circumstances during data collection. First, the Zoom platform randomly cut out during the second interview and immediately returned. This did not interfere with the recording, which was continuous; however, a listener can hear the sound cut out and return. Because this happened during the interview introduction and not during the interview questions or responses, I only needed to finish the last part of the introduction and did not lose any data collected. In the second unusual circumstance, Interview 7 was interrupted by an overhead call. This did not interfere with the recording, which was continuous; however, I paused and apologized to the participant for the disruption. The interruption happened twice during the interview but did not impact the data collected. There were a few instances when my or the participant's microphone did not pick up all of a question or an answer, and I or the participant asked for a repeat of said answer or question. These instances were recorded during those interviews but did not impact the data collected. The dates when I conducted the participant interviews and the lengths of each interview are shown in Table 3.

Table 3

Participant Interview Dates and Interview Lengths

Participant pseudonym	Interview date	Interview length	
		Minutes	Seconds
P1	09/07/2023	27	37
P2	09/08/2023	21	28
P3	09/11/2023	44	04
P4	09/11/2023	71	00
P5	09/13/2023	57	40
P6	09/20/2023	36	30
P7	09/13/2023	23	23
P8	09/20/2023	35	47
P9	09/21/2023	39	51

To prepare interview data for the data analysis phase, I downloaded the audio from Zoom, saved the audio into a secure file on my personal computer, and labeled the files using participant numbers. I then uploaded those files into Otter AI software to be digitally transcribed. Once the software completed the transcriptions, I hand-corrected transcripts while listening to the recording to ensure that the transcript was verbatim and confirmed the removal of all identifying information. I converted the downloaded transcripts to Word documents to prepare them for hand coding, which I stored in a secure file on my computer. The handwritten memos created during the interviews were scanned and uploaded as PDF documents and saved alongside the interview transcripts in the same secure file on my computer.

Data Analysis

To analyze the data, I used hand coding, recommended by Saldaña (2021) for qualitative research. I wanted to understand my data thoroughly and felt that the software would hinder the iterative nature of my coding processes because I did not feel comfortable using them. I used a thematic analysis with an inductive approach (Ravitch & Carl, 2021) to identify codes, categories, and themes within the interview data. I began my data analysis as Saldaña recommended using preliminary coding during the interview process using handwritten memos where I would jot down participant answers that I deemed significant or essential and any initial thoughts that came to mind during the interviews.

I then began analyzing the data by identifying initial codes within the interview transcripts. Having already transferred my transcripts from Otter AI into Word

documents, I utilized the comment feature while conducting my analysis to create a comment for the code and to highlight the text from which the code emerged. I then took the initial codes from the first interview transcript and applied them to each additional transcript. As I applied the initial codes to each interview, I also identified additional codes by analyzing each transcript. I then began the iterative process of coding and recoding until there was a final set of codes. From those codes, I developed categories, and from those categories, I developed themes.

Through the iterative data analysis process, I ended up with a total of 54 codes, which I then organized into 18 categories, and from those categories emerged five themes. Table 4 provides an in-depth summary of the final categories and themes developed from the codes. Table 5 includes participant quotes from the interview transcripts encompassing the data coded within each theme.

Table 4

Final Themes, Categories, and Codes From the Interview Data

Theme	Categories	Codes
Virtual technology	Learning new technology	Teachers and students having to learn new technology to use it Learning new or using technology to learn Learning new or using technology to teach
	Incorporating technology	Technology has become a staple in the ensemble classroom Spending lots of time editing videos for a "concert" Incorporating technology use
	Technology quality	Technology quality
Concert band instruction	Shift of learning focus	Shift to teaching and learning of other music aspects—from performance-based ensemble aspects to theory, history, and appreciation Watching students play without sound due to poor-quality microphones
	Creating connections	Teacher created other ways for concert band students to interact or connect Concert band ensemble experience is important to those students who do not connect well with others Community
	Technology use	Incorporating technology into the concert band classroom No live playing—students played to a prerecorded track
Teacher view of virtual technology	Preparation/Planning	Teacher felt tech-savvy and prepared for virtual learning Music teachers continue to use materials and resources used for virtual learning Money spent on software Time spent creating videos Stress and frustration
	Comfortability learning, incorporating, and using technology	Comfortability learning new and using technology to teach Teachers used technology, but not to the extent when teaching virtually Virtual teaching/learning best suited for the individual instrumentalist or other aspects of music education—theory, history, appreciation
	Assessing and teaching performance-based standards	Not being able to give immediate feedback on student performance Inability to assess performance-based standards Inability to adequately teach performance-based standards

Theme	Categories	Codes
	Success of virtual concerts	Providing student motivation through the virtual concert
	Adjusting pedagogy	Lesson/activity flow—wait time extended, creating lag Adjusted pedagogy
	Student impacts	Keeping students engaged and participating Virtual concerts were a huge hit and provided students with a sense of purpose Focus on music reading helped students increase their rhythm understanding and made them stronger readers Student distraction when learning in a virtual environment
Successes	Virtual concerts	Successfully creating a collective virtual concert video
	Improved skills	Students improving their reading skills Students' continued success in other musical endeavors—state/county bands—despite being virtual
	Meaningful experiences	Teachers continued to create meaningful music experiences for their concert band students
Challenges	Technology challenges	Poor quality technology Poor computer microphone quality Poor internet quality Poor audio/visual technology Districts not wanting to purchase new technology or software Inadequate technology for concert band ensembles No live playing
	Teacher challenges	Teacher learning new software and technology No support from the administration Teacher stress and frustration due to virtual teaching Inability to provide immediate performance-based feedback to students Held to the same standard, although not the same environment Trying to motivate students Creating connections
	Student challenges	Losing interest in the band due to not performing—no sense of purpose Student engagement and participation Student retention Student access to adequate internet No concerts

Table 5

Participant Quotes That Encompass Each Theme

Theme	Participant	Quote
Virtual technology	P4	"But even still, a lot of their internet connection was very poor. And so, there was so much lag, where I couldn't communicate with them, they probably had so much lag that they weren't really truly able to hear the lesson or be part of the lesson."
Concert band instruction	P9	"We finished that year—fairly heavy emphasis on music history and theory."
	P1	"So, it's more focusing on fundamentals with students and less of that ensemble stuff that you're learning together as a group."
Teacher view of virtual technology	P6	"Well, I didn't help it. It, it definitely slowed me down. As far as my pace of delivery. And the kind of my, my desire to have every rehearsal have kind of an arc and a really good ending point. There were a lot of them that I just said, "Hey, I think I missed on this one. We'll try it again in 2 days," you know.
	P7	"I guess by the end of it, I felt that teaching concert band virtually is really not a viable possibility."
Successes	P2	"The virtual concerts that we had; I think that was big. We still had, I had students that still made the all-district band that they still had, like all district and all state."
	P1	"I definitely think the little successes and like the community building that still happened did encourage me a lot."
Challenges	P8	"Well, it definitely affected it. Like I said before. We could not, could not perform together."
	P3	"We are a performance-based course. So, the fact that we didn't have the concerts to prepare for because I had to find different ways to make things interesting. So opposed to, like, we're working towards this concert, I had to make it appealing."

I created the theme of virtual technology that included seven codes. Virtual technology applied to data that discussed technology used in the virtual instruction of secondary concert bands, which included learning and incorporating technology and technology quality. It excluded data not referencing the technology used in the virtual setting. I created the theme of concert band instruction that included seven codes. Concert band instruction applied to data that discussed the teaching of concert bands within the virtual classroom setting. It excluded data that applied to concert band instruction in a face-to-face classroom setting.

I created the theme of teacher view of virtual technology that included 18 codes. Teacher view of virtual technology applied to data that discussed the teacher's view of using virtual technology to instruct concert bands, which included data surrounding planning and preparation, comfortability with using virtual technology, and adjustments to pedagogy. It excluded data that applied to the teacher's view of face-to-face instruction of secondary concert bands or any aspect outside the virtual classroom setting.

I created the theme of successes that included three codes. Successes applied to data that included any successes surrounding concert band instruction within a virtual classroom setting. I excluded data that applied to successes in concert band instruction in a face-to-face classroom setting and those who expressed successes not directly connected to virtual technology. I created the theme of challenges that included 18 codes. Challenges applied only to data that included challenges in a virtual setting, challenges with using virtual technology for secondary concert band instruction, teacher and student challenges with virtual technology, and the inadequacies of virtual technology for

secondary concert band instruction. I excluded data that did not include virtual technology as part of the challenge and challenges faced by teachers and students when they returned face-to-face due to using virtual technology for secondary concert band instruction.

Discrepant data motivates the researcher to look more closely at their findings and to rethink or reconsider the categories and themes derived from the data's content, allowing the research to develop more trustworthy results (Saldaña, 2021). For this qualitative study, as recommended by Saldaña (2021), I included and utilized the discrepant data throughout my analysis to ensure that my analysis was free from researcher bias or interference. Discrepant data emerged in the responses of P2 and P4 surrounding their comfortability in using technology and the stress and frustration experienced during virtual instruction. While the remaining seven participants expressed some difficulty with implementing and using technology, both P2 and P4 expressed that they felt comfortable with implementing and using technology as they had been using it consistently in their music education classrooms. Additionally, both P2 and P4 did not express that they experienced stress of frustration teaching secondary concert bands virtually, while the remaining participants did express stress or frustration to some degree.

Evidence of Trustworthiness

I upheld issues of trustworthiness in several ways throughout this study. In this section, I will describe how I ensured this qualitative research study's credibility, dependability, transferability, and confirmability. To establish trustworthiness, I began by

creating a Word document wherein I placed my views, beliefs, judgments, and practices surrounding the different aspects of the research study. The use of reflexivity throughout the research study is essential to ensuring no researcher bias (Ravitch & Carl, 2021).

I ensured the credibility of my qualitative research study by utilizing reflexivity and maintaining an audit trail throughout the study. Creating and using the reflexive Word document allowed me to revisit and check for personal biases throughout the research process (Ravitch & Carl, 2021). Furthermore, it allowed me to maintain an unbiased analysis of the collected data. I created an audit trail in a Word document. I updated it regularly to include dates and the research study processes, including participant recruitment, participant interviews, and my thought processes throughout each research study step (Burkholder et al., 2020; Ravitch & Carl, 2021).

I ensured dependability in my research by aligning my data collection methods with the research questions to allow richness within the data collected (Ravitch & Carl, 2021). I ensured the data collected was accurate by thoroughly checking each interview transcript against their respective audio recordings to ensure the transcriptions were verbatim. Additionally, I collected data during the interviews using hand-written memos, which I used in conjunction with the interview transcriptions during the iterative data analysis process. These hand-written memos provided preliminary coding established during the interview process wherein I wrote down participant answers deemed significant or essential in addition to any initial thoughts on participant responses during the interviews (Saldaña, 2021).

As Ravitch and Carl (2021) described, transferability applies context-specific qualitative findings to broader contexts. For this research study, I used purposeful sampling, and participants were selected based on specific criteria surrounding their experience with teaching secondary concert bands using virtual technology. Although I chose participants for their experiences particular to the research questions, there could be some transferability of the findings to other types of instrumental ensembles and different levels within music education, such as collegiate or elementary.

Finally, I established the confirmability of this research study through peer debriefing and member checking of the analyzed data. Peer debriefing allows a peer or colleague who is not involved in the research to review analyzed data and emergent themes to provide feedback, while member checking will enable participants to review and validate the themes that emerged from the analyzed data (Burkholder et al., 2020; Ravitch & Carl, 2021). Both strategies provided a means for authenticating the data and its findings. These strategies for confirmability, coupled with reflexivity and bias checking, allowed me to maintain an unbiased view when analyzing the data.

Results

In this section, I will provide the results of the data analysis. I have organized the results of this qualitative study first by theme and then by the main research and sub-research questions.

Virtual Technology

The first theme was *virtual technology*. This theme had three categories: *learning new technology*, *incorporating technology*, and *technology quality*. The categories of

learning new technology and incorporating technology had three codes, while the

technology quality category had one. Table 6 shows the categories and codes for this

theme.

Table 6

Categories and Codes for the Theme of Virtual Technology

Theme	Categories	Codes
Virtual technology	Learning new technology	Teachers and students having to learn new technology to use it Learning new or using technology to learn Learning new or using technology to teach
	Incorporating technology	Technology has become a staple in the ensemble classroom Spending lots of time editing videos for a "concert" Incorporating technology use
	Technology quality	Technology quality

Learning New Technology

The first category of the theme of *virtual technology* was *learning new*

technology. Learning new technology refers to teachers and students having to learn any

form of technology to teach or learn in a virtual setting. The codes under this category are

teachers and students having to learn new technology to use it, learning new or using

technology to learn, and learning new or using technology to teach. Participants

expressed both themselves and their students having to learn new technology to use it.

All participants responded with a variation of learning new technology. P1 stated," My

biggest success was being able to use and learn how to use Logic Pro and Final Cut. I had

no idea how to use any of that. And I spent a lot of time learning it. And I think it was

really cool. Because now I can incorporate it in my classroom. And my kids can use it too. And it's kind of cool."

Incorporating Technology

The second category of the theme of *virtual technology* was *incorporating technology*. Incorporating technology refers to teachers and students using technology to teach or learn all or part of an activity or lesson in the music education classroom. The codes under this category are that technology has become a staple in the ensemble classroom, spending lots of time editing videos for a "concert" and incorporating technology. Participants expressed their incorporation and use of technology in the secondary concert band classroom. All participants answered with variations on integrating technology. However, only six of the nine participants indicated that their incorporation included editing videos for a virtual concert. P2 stated, "I mean, I learned more with my technical stuff, the technology stuff, so it didn't really affect, affect me. If anything, it was a positive thing. And I was able to find things that I could incorporate when I got back into the face-to-face classroom."

Technology Quality

The third category of the theme of *virtual technology* was *technology quality*. Technology quality refers to the quality of the technology used by teachers and students and whether it promotes or inhibits teaching or learning secondary concert band in a virtual setting. The code under this category was technology quality. Participants expressed concern regarding the quality of the technology used by themselves or their students. All participants answered with various responses surrounding technology

quality, including internet quality, software quality, and the quality of computer hardware such as microphones and cameras. P4 stated, "And so, the audio and the visual then would not be as good a quality as other people that might have their own device, or even their own external microphone or external camera."

Concert Band Instruction

The second theme was *concert band instruction*. This theme had three categories: *shift of learning focus*, *creating connections*, and *technology use*. The categories of shift of learning focus and technology use had two codes, while the category of creating connections had three. Table 7 shows the categories and codes for this theme.

Table 7

Categories and Codes for the Theme of Concert Band Instruction

Theme	Categories	Codes
Concert band instruction	Shift of learning focus	Shift to teaching and learning of other music aspects—from performance-based ensemble aspects to theory, history, and appreciation Watching students play without sound due to poor-quality microphones
	Creating connections	Teacher created other ways for concert band students to interact or connect Concert band ensemble experience is important to those students who do not connect well with others Community
	Technology use	Incorporating technology into the concert band classroom No live playing—any playing was done to a prerecorded track

Shift of Learning Focus

The first category of the theme of *concert band instruction* was *shift of learning focus*. The shift of focus refers to any changes made to the concert band curriculum to continue to teach and support secondary concert band students in a virtual setting where

performance-based skills could not be adequately taught or assessed due to technology constraints. The codes under this category shift to teaching and learning other music aspects – from aspects of the performance-based ensemble to theory, history, and appreciation, and watching students play without sound due to poor-quality microphones. Participants expressed that secondary concert band instruction in a virtual setting shifted to focus on other aspects of music education, like history, theory, and appreciation, and performance-based instruction focused on what the teacher could see in the camera versus what they could hear due to the poor quality of computer microphones. All teachers responded that they shifted to learning other aspects of music education, while seven of the nine participants indicated they watched students perform via a virtual platform without sound. P8 stated, "But I had to take a step back. I had to focus a lot on the basics, basic fundamentals of music, rather than moving on into more advanced studies and especially, you know, playing in an ensemble is pretty advanced, if you think about it, and not having that as an option."

Creating Connections

The second category of the theme of *concert band instruction* was *creating connections*. Creating connections refers to activities and lessons taught virtually to encourage and develop connections between secondary concert band students, their peers, and their teachers. The codes under this category are teacher-created other ways for concert band students to interact or connect; concert band ensemble experience is important to those students who do not connect well with others and the community. Participants expressed that playing together in a concert band was important to their

students and their success in an ensemble setting. All participants agree on the importance of the concert band ensemble experience for their students as a means to connect. However, only seven of the nine participants likened the band to a community, and eight created other ways for their secondary concert band students to interact and connect. P5 stated, "So, every Friday night for pretty much from the 2021 school year, the marching band kids would get together, I would have them play like Jackbox games and like code names and like different online games together that we did a couple of times. So that was really good for their, like, social aspect."

Technology Use

The third category of the theme of *concert band instruction* was *technology use.* Technology use is any technology used to teach or learn in the secondary concert band classroom. The codes under this category incorporate technology into the concert band classroom and no live playing – students played to a prerecorded track. All participants expressed in some way that they incorporated technology into the secondary concert band classroom. All participants agree that there was no live playing during the virtual instruction of secondary concert bands and that much of the playing students experienced was with prerecorded tracks. P9 stated, "And so, what they were able to do is if I played a recording of a piece, they could play along with the recording, but I could not assess them."

Teacher View of Virtual Technology

The third theme was *teacher view of virtual technology*. This theme had six categories: *preparation/planning*, *comfortability learning, incorporating and using*

technology, assessing and teaching performance-based standards, success of virtual concerts, adjusting pedagogy, and *student impacts*. The category of preparation/planning had five codes, while the categories of comfortability learning, incorporating and using technology, and assessing and teaching performance-based standards had three codes. The category of success of virtual concerts had one code, while the categories of adjusting pedagogy and student impacts had two and four codes, respectively. Table 8 shows the categories and codes for this theme.

Table 8

Categories and Codes for the Theme of Teacher View of Virtual Technology

Theme	Categories	Codes
Teacher view of virtual technology	Preparation/Planning	Teacher felt tech-savvy and prepared for virtual learning Music teachers continue to use materials and resources used for virtual learning Money spent on software Time spent creating videos Stress and frustration
	Comfortability learning, incorporating, and using technology	Comfortability in learning new and using technology to teach Teachers used technology, but not to the extent when teaching virtually Virtual teaching/learning best suited for the individual instrumentalist or other aspects of music education—theory, history, appreciation
	Assessing and teaching performance-based standards	Not being able to give immediate feedback on student performance Inability to assess performance-based standards Inability to adequately teach performance-based standards
	Success of virtual concerts	Providing student motivation through the virtual concert
	Adjusting pedagogy	Lesson/activity flow—wait time extended, creating lag Adjusted pedagogy
	Student impacts	Keeping students engaged and participating Virtual concerts were a huge hit and provided students with a sense of purpose Focus on music reading helped students increase their rhythm understanding and made them stronger readers Student distraction when learning in a virtual environment

Preparation and Planning

The first category of the theme of *teacher view of virtual technology* was *preparation and planning*. Preparation and planning refer to acquiring and preparing materials and resources for virtual instruction, lessons and activities for virtual teaching, and the time spent planning and preparing to instruct a secondary concert band virtually. The codes under this category are teachers who felt tech-savvy and prepared for virtual learning, music teachers who continue using materials and resources from virtual learning, money spent on software, and time spent creating videos, and stress and frustration. Participants expressed the importance of planning and preparation for a virtual setting and the stress and frustration they experienced during this time. Only two of the nine participants felt comfortable and prepared for virtual learning, while all participants expressed continued use of materials and resources acquired during virtual education. Only three of the nine participants mentioned spending personal money on software for teaching, while six of the nine participants expressed concern over the amount of time spent using software to create and edit videos. Still, seven of the nine participants expressed some level of stress and frustration while planning, preparing, and teaching secondary concert bands in a virtual setting. P6 stated, "So we had huge plans, and we had, you know, very elaborate workstations with keyboards and dual monitors. And, you know, I had all my instruments around me. And I think what I found was, as the school year went on, really simple was better. And just, it became to me very clear, within probably about the second month of doing that, that the students were getting more out of the experience, from a relationship-building standpoint, then from a music

standpoint, so it was, it was more, the planning then kind of shifted more into how to get every, every kid to engage how to get every kid to participate, rather than, "Oh, this song is going to work really well, for this group."

Comfortability Learning, Incorporating, and Using Technology

The second category of *teacher view of virtual technology* theme was *comfortability learning, incorporating, and using technology*. Comfortability learning, integrating, and using technology refers to the level of preparedness and how comfortable teachers are with using and integrating technology into the secondary concert band classroom, specifically in the virtual setting. The codes under this category are comfortability in learning new and using technology to teach; teachers used technology, but not to the extent when teaching virtually, virtual teaching and learning best suited for the individual instrumentalist or other aspects of music education – theory, history, and appreciation. Participants expressed previous use of technology and, in some variation, their level of comfort and overall view on learning and using technology to teach secondary concert bands. Seven of the nine participants had used technology before teaching virtually. However, all participants expressed comfortability with using technology to teach and agreed that virtual platforms are best suited to the teaching and learning of the individual instrumentalist or for other aspects of music education, such as theory, history, and appreciation. P7 stated, "Yeah, so it was definitely a very big learning curve. I had used some tech stuff before. But there were a lot of new things that I was trying out. And especially at the beginning of the year, I was kind of just throwing a

lot of stuff at the wall to see what sticks. And then, as the months went by, I kind of

found what was working well for us."

Assessing and Teaching Performance-Based Standards

The third category of the theme of *teacher view of virtual technology* was

assessing and teaching performance-based standards. The codes under this category are

not being able to give immediate feedback on student performance, the inability to

evaluate performance-based standards, and *the inability to adequately teach*

performance-based standards. Participants expressed that virtual technology did not

allow teachers to teach performance-based standards or provide students with real-time

feedback on performance-based standards essential to a student's success in an ensemble.

All participants expressed that virtual technology did not allow them to assess or teach

performance-based standards to their secondary concert band students, nor did it enable

teachers to provide immediate feedback on student performance. P9 stated, "So suddenly,

we lost articulation. And we lost the performance standards, we lost the capacity to, you

know, have group instruction, added the ability level."

Success of Virtual Concerts

The fourth category of the theme of *teacher view of virtual technology* was the

success of virtual concerts. The code under this category is *providing student motivation*

through the virtual concert. All participants expressed in some variation the difficulty in

keeping students motivated to continue to participate and practice in concert band when

there would not be a face-to-face performance or concert. Six of the nine participants

expressed that they utilized creating a virtual concert as motivation and providing their

secondary concert band students with a sense of purpose. P3 stated, "So what I told them to do was I gave them a project at the beginning of that nine weeks where I told them to find a song from, from a movie they like and tell me why they like it, and pick it based off of something you would not mind playing. And I would arrange it based to that student's skill level. And I wrote it for them. They played and recorded it, and I put together a playlist of all their recordings and sent it out to all the parents. And they were able to have a concert, which wasn't really a concert, but it still felt like something."

Adjusting Pedagogy

The fifth category of the theme of *teacher view of virtual technology* was *adjusting pedagogy*. The codes under this category are *lesson and activity flow – wait time extended, creating lag,* and *adjusted pedagogy*. Participants expressed changing or adjusting their pedagogical styles to teach secondary concert band students virtually, including adjusting the lesson or activity flow to allow for extended wait times. All participants expressed that they adapted their pedagogical style to suit teaching in a virtual setting. However, only five of the nine participants expressed lesson or activity flow disruption due to extending the wait time for students, as it created lag and did not allow for an organic flow of the lesson or activity. P6 stated, "Well, I didn't help it. It, it definitely slowed me down. As far as my pace of delivery. And the kind of my, my desire to have every rehearsal have kind of an arc and a really good ending point."

Student Impacts

The sixth category of the theme of *teacher view of virtual technology* was *student impacts*. The codes under this category are *keeping students engaged and participating,*

virtual concerts were a huge hit and provided students with a sense of purpose, the focus on music reading helped students increase their rhythm understanding and made them stronger readers, and *student distraction when learning in a virtual environment.* Participants expressed those distractions within the students' learning environments made keeping concert band students engaged and participating difficult. Participants also stated that adjusting what to teach in the virtual setting, including creating a virtual concert, was necessary to give concert band students an overall sense of purpose. All participants expressed to some degree the difficulty in keeping their concert band students engaged and participating during virtual instruction, with six of the nine participants discussing distractions within the students' learning environments as a contributing factor. However, only six of the nine participants created virtual concerts to encourage participation.

In comparison, seven of the nine participants adjusted their concert band learning to focus on the reading aspect of music to increase students' rhythm understanding and strengthen their music reading skills. P6 stated, "Yeah, I think the big one is just not being able to make music simultaneously with each other. I don't know very many students who sign up for band who signed up because they like to make recordings."

Successes

The fourth theme was *successes*. This theme had three categories: *virtual concerts*, *improved skills*, and *meaningful experiences*. The categories of virtual concerts and meaningful experiences had one code, while the category of improved skills had two codes. Table 9 shows the categories and codes for this theme.

Table 9

Categories and Codes for the Theme of Successes

Theme	Categories	Codes
Successes	Virtual concerts	Successfully creating a collective virtual concert video
	Improved skills	Students improving their reading skills
		Students' continued success in other musical endeavors—state/county bands—despite being virtual
	Meaningful experiences	Teachers continued to create meaningful music experiences for their concert band students

Virtual Concerts

The first category of the theme of *successes* was *virtual concerts*. The code under this category is *successfully creating a collective virtual concert video*. Participants expressed some variation of creating videos as a success for themselves and their students. Teachers and students alike created videos for various reasons. However, only six of the nine participants expressed that they successfully made a collective virtual concert video with videos provided by their students. P1 stated, "It's the fact that I could tell them that you're playing this piece by yourself isn't like the fun part. But when you get to actually hear it all put together and that you guys can still come together somehow. And create a piece of music and a video of that really motivated some of them to make those videos."

Improved Skills

The second category of the theme of *successes* was *improved skills*. The codes under this category are *students improving their reading skills* and *students' continued success in other musical endeavors – state/county bands – despite being virtual.*

Participants expressed the achievements of their secondary concert band students in their improvement of different musical skills outside of the performance-based ensemble skills and the student's continued success in other musical endeavors outside of concert band despite being in a virtual setting. All participants expressed that their students continued to be successful in other areas of music, such as state and county band participation and music creation. However, only eight of the nine participants expressed, with some variation, that their students had improved their rhythm reading skills due to the change in focus for the concert band. P2 stated, "The virtual concerts that we had, I think that was big. We still had, I had students that still made the all-district band. That they still had, like all district and all state."

Meaningful Experiences

The third category of the theme of *successes* was *meaningful experiences*. The code under this category is *teachers continue to create meaningful music experiences for their concert band students*. Participants expressed the importance of creating meaningful experiences for their secondary concert band students in a virtual setting. All participants expressed in various answers that, although they were teaching in a virtual environment, teachers continued to create meaningful experiences for their concert band students. P5 stated, "And I also was very hyper-aware of the kind of social-emotional learning part of it, especially for the band kids because so much of their social life is in band anyway. So, I made sure to, like, build in time to like, do like about us activities and pet show and tell and that kind of stuff. And I actually ran like a Friday night game night for all of my marching band kids."

Challenges

The fifth and final theme was *challenges*. This theme had three categories: *technology challenges*, *teacher challenges*, and *student challenges*. The categories of technology challenges and teacher challenges had seven codes, while the category of student challenges had four codes. Table 10 shows the categories and codes for this theme.

Table 10

Categories and Codes for the Theme of Challenges

Theme	Categories	Codes
Challenges	Technology challenges	Poor quality technology
		Poor computer microphone quality
		Poor internet quality
		Poor audio/visual technology
		Districts not wanting to purchase new technology or software
		Inadequate technology for concert band ensembles
		No live playing
	Teacher challenges	Teacher learning new software and technology
		No support from the administration
		Teacher stress and frustration due to virtual teaching
		Inability to provide immediate performance-based feedback to students
		Held to the same standard although not the same environment
		Trying to motivate students
		Creating connections
	Student challenges	Losing interest in the band due to not performing—no sense of purpose
		Student engagement and participation
		Student retention
		Student access to adequate internet
		No concerts

Technology Challenges

The first category of the theme of *challenges* was *technology challenges*. The codes under this category are *poor quality technology, poor computer microphone quality, poor internet quality, poor audio/visual technology, districts not wanting to purchase new technology or software, inadequate technology for concert band ensembles,* and *no live playing.* Participants expressed experiencing challenges due to the quality and inadequacy of the technology they and their students were using for secondary concert band virtual instruction and how it inhibited them from playing collectively as an ensemble. All participants viewed the quality of the technology used as poor, specifically the audio and video technology, with the microphone quality being the most challenging as it impacted live playing. All teachers expressed that they found the virtual technology to be inadequate for use with concert band ensembles.

Additionally, eight of the nine participants expressed having experienced challenges with poor internet quality. In contrast, only four of the nine expressed that their district did not want to purchase new technology or software to assist in addressing these challenges. P4 stated, "And many students didn't have their own internet or their own device in which to access the internet. So, the district did their best to provide everyone with a Chromebook and everybody with internet access. But even still, a lot of their internet connection was very poor. And so, there was so much lag, where I couldn't communicate with them, they probably had so much lag that they weren't really truly able to hear the lesson or be part of the lesson."

Teacher Challenges

The second category of the theme of *challenges* was *teacher challenges*. The codes under this category are *teacher learning new software and technology, no support from the administration, teacher stress and frustration due to virtual teaching, inability to provide immediate performance-based feedback to students, held to the same standard although not the same environment, trying to motivate students,* and *creating connections.* Participants expressed that the challenges they experienced centered the most around their stress and frustration with technology, connecting and motivating students, having no administrative support, and holding teachers to the exact expectations despite the change in teaching environment. All participants expressed challenges with learning to use new technology and software, motivating students, and technology not allowing them to provide immediate performance-based feedback to their students. Eight of the nine participants expressed stress and frustration due to virtual teaching. They found it challenging to connect with students, while six of the nine participants expressed not having support from their administration and being held to the exact expectations and standards as they would in a face-to-face classroom setting. P6 stated, "And again, I'm surprised that we kept as many of them on as we have, but I think that their engagement definitely suffered because they couldn't get real-time feedback and differentiation of the lesson from me that I could do in person."

Student Challenges

The third category of the theme of *challenges* was *student challenges*. The codes under this category are *losing interest in the band due to not performing – no student*

engagement and participation, student retention, student access to adequate internet, having a sense of purpose, and *no concerts.* Participants expressed the challenges they experienced regarding students as centering around retention, engagement, and participation. All participants expressed challenges with students' engagement, participation, and retention, with a contributing factor being no live performances or concerts. Additionally, eight of the nine participants expressed in some variation a challenge of students losing interest in the concert band as no performances provided students with a sense of purpose. At the same time, teachers expressed that adequate internet access is another challenge for students. P7 stated, "I guess mainly, I just wasn't able to get a hold of everybody in my class. I had maybe probably about half that were actively participating every week. And then the other half, either I never heard from at all or heard from only every once in a while. So, from my end, I just only had maybe about half the kids able to teach them and the other half just kind of got a year off with nothing."

Main Research Question

The main research question is: *What are secondary music teachers' perspectives on using virtual technology for concert band instruction?* Data that helped answer this question included the codes and categories within the themes of *virtual technology*, *concert band instruction*, and *teacher view of virtual technology*.

The music teachers' perceptions of using virtual technology have developed through a mixture of positive and negative experiences, specifically with using virtual technology for secondary concert band instruction. Participants felt comfortable learning

and incorporating new technology into their concert band classrooms. However, participants expressed a negative view of the available technology used for virtual concert band instruction and the challenges they faced due to the inadequacies and quality of the technology used by them and their students. These challenges impacted their ability to teach and assess performance-based ensemble standards, creating a negative view of virtual technology used for concert band instruction.

Participants also expressed how virtual technology impacted their lessons in the concert band classroom. Technology challenges made it impossible for music teachers to teach ensemble music, and participants found themselves trying to teach and assess individual concert band student performances without sound. Since music teachers could not focus on teaching performance-based standards and aspects of ensemble performance due to the technological challenges, they had to adjust to teaching other factors of music education, such as theory, history, and appreciation. Participants found this shift to be beneficial for students since many were able to improve their student's music reading skills during that time. Additionally, the technological challenges added to the stress and frustration experienced by many of the participants and thus added to the music teachers' negative view of virtual technology use for concert band instruction.

Many music teachers interviewed expressed positive and negative views of using virtual technology for secondary band instruction. While participants had positive and negative experiences with virtual technology, all participants negatively perceived using it for secondary concert band instruction due to the technological challenges that impacted their ability to teach and assess ensemble-based music education. Participants

expressed that virtual technology can be valuable for teaching concert bands. However, music teachers should use it with face-to-face instruction, not as the sole means for teaching secondary concert bands. P7 stated, "I do like using virtual technology to teach secondary concert bands. If it's, if it supports what's happening in person, and if it's something you know, I think I mentioned, asynchronous work that either helps students accelerate or remediate things that they need to work on. Or often just another way for students to demonstrate their learning." Participants believe that, until technology creates the ability for students to play collectively, music teachers should not use virtual technology for secondary concert band instruction because it does not allow students to perform together as an ensemble as they would in a face-to-face setting. Table 11 shows the themes, categories, and codes that support the main research question.

Table 11

Themes, Categories, and Codes Supporting the Main Research Question

Theme	Categories	Codes	Number of participants	Sample quotes
Virtual technology	Learning new technology	Teachers and students having to learn new technology to use it	9 of 9	P1 – "My biggest success was being able to use and learn how to use Logic Pro and Final Cut. I had no idea how to use any of that. And I spent a lot of time learning it."
		Learning new or using technology to learn	9 of 9	
		Learning new or using technology to teach	9 of 9	
	Incorporating technology	Technology has become a staple in the ensemble classroom	9 of 9	P2 – "If anything, it was a positive thing. And I was able to find things that I could incorporate when I got back into the face-to-face classroom."
		Spending lots of time editing videos for a "concert"	6 of 9	
		Incorporating technology use	9 of 9	
	Technology quality	Technology quality	9 of 9	P4 – "But even still, a lot of their internet connection was very poor. And so, there was so much lag, where I couldn't communicate with them, they probably had so much lag that they weren't really truly able to hear the lesson or be part of the lesson."
Concert band instruction	Shift of learning focus	Shift to teaching and learning of other music aspects—from performance-based ensemble aspects to theory, history, and appreciation	9 of 9	P7 – "So, your focus being more detailed about individual tone quality, individual air control, dynamic control, things like that. So much more like, a more, more private lesson kind of things that we would go over in less ensemble work."
		Watching students play without sound due to poor-quality microphones	7 of 9	
	Creating connections	Teacher created other ways for concert band students to interact or connect	8 of 9	P5 – " So, I made sure to, like, build in time to like, do like about us activities and pet show and tell and that kind of stuff. And I actually ran like a Friday night game
		Concert band ensemble experience is important	9 of 9	

Theme	Categories	Codes	Number of participants	Sample quotes
		to those students who do not connect well with others		night for all of my marching band kids."
		Community	7 of 9	
	Technology use	Incorporating technology into the concert band classroom	9 of 9	P3 – "I am an advocate of virtual technology and musical technology in the classroom, especially in a virtual classroom setting, but just make sure you use it correctly."
		No live playing—students played to a prerecorded track	9 of 9	
Teacher view of virtual technology	Preparation/ Planning	Teacher felt tech-savvy and prepared for virtual learning	2 of 9	P8 – "Some remain challenges, you know, which that was part of that was part of our educators' stress level, not being able to fully engage and address the challenges that we've had."
		Music teachers continue to use materials and resources used for virtual learning	9 of 9	
		Money spent on software	3 of 9	
		Time spent creating videos	6 of 9	
		Stress and frustration	7 of 9	
	Comfortability learning, incorporating, and using technology	Comfortability learning new and using technology to teach	9 of 9	P7 – "I guess by the end of it, I felt that teaching concert band virtually is really not a viable possibility. I think it's great for one-on-one work, private lessons, things like that. But in a concert band setting. From my experience, I haven't found a good way to have an equal experience to just being here together."
		Teachers used technology, but not to the extent when teaching virtually	7 of 9	
		Virtual teaching/learning best suited for the individual instrumentalist or other aspects of music education—theory, history, appreciation	9 of 9	
	Assessing and teaching performance-based standards	Not being able to give immediate feedback on student performance	9 of 9	P9 – "And so, what they were able to do is if I played a recording of a piece, they could play along with the recording, but I could not assess them."
		Inability to assess performance-based standards	9 of 9	
		Inability to adequately teach performance-based standards	9 of 9	

Theme	Categories	Codes	Number of participants	Sample quotes
	Success of virtual concerts	Providing student motivation through the virtual concert	6 of 9	P4 – "So, I required my students to, for the quote, unquote, concert, they would; I created a click track. And they would play along with the click track with headphones so that the click track wasn't included in the audio. And then I would compile all of their performances together using Adobe Premiere Pro."
	Adjusting pedagogy	Lesson/activity flow— wait time extended, creating lag	5 of 9	P6 – "It, it definitely slowed me down. As far as my pace of delivery. And the kind of my, my desire to have every rehearsal have kind of an arc and a really good ending point."
		Adjusted pedagogy	9 of 9	
	Student Impacts	Keeping students engaged and participating	9 of 9	P1 – "So a lot of kids checked out during that time. And it was a challenge to keep them engaged and keep up with their love of music and playing."
		Virtual concerts were a huge hit and provided students with a sense of purpose	6 of 9	
		Focus on music reading helped students increase their rhythm understanding and made them stronger readers	7 of 9	
		Student distraction when learning in a virtual environment	6 of 9	
	Teacher challenges	Teacher learning new software and technology	9 of 9	P8 – "Just because of the virtual world, and not being able to overcome those challenges were causes of that stress."
		No support from the administration	6 of 9	
		Teacher stress and frustration due to virtual teaching	8 of 9	
		Inability to provide immediate performance-based feedback to students	9 of 9	
			6 of 9	

Theme	Categories	Codes	Number of participants	Sample quotes
		Held to the same standard although not the same environment	9 of 9	
		Trying to motivate students	8 of 9	
		Creating connections		
	Student Challenges	Losing interest in the band due to not performing – no sense of purpose	8 of 9	P7 – "And again, I'm surprised that we kept as many of them on as we have, but I think that their engagement definitely suffered because they couldn't get real-time feedback and differentiation of the lesson from me that I could do in person."
		Student engagement and participation	9 of 9	
		Student retention	9 of 9	
		Student access to adequate internet	8 of 9	
		No concerts	9 of 9	

Sub-Research Question

The sub-research question is: *How do the challenges and successes experienced by secondary music teachers impact their view of using virtual technology for concert band instruction?* Data that helped answer this question included the codes and categories within the themes of *successes* and *challenges*.

The music teachers in this study expressed many challenges and successes while using virtual technology to instruct secondary concert bands. However, in some variation, most participants expressed having experienced more challenges using virtual technology than successes. Although a few of the participants said that their negative or positive experiences had little impact on their overall view of using virtual technology to teach secondary concert bands, for most participants, these experiences had a significant impact on their current overall perspective of virtual technology and its use for secondary concert band instruction.

Based on the participants' responses, there were fewer successes with using virtual technology than challenges experienced. Although the successes experienced impacted both teachers and students, they did not significantly affect the participants' perceptions of virtual technology use in the ensemble classroom. Although most participants experienced at least one success, these successes did not merit the challenges experienced due to technological inadequacies. The successes did not alter or significantly impact the participants' negative perspectives on using virtual technology for secondary concert band instruction.

Participants expressed a negative perspective of virtual technology for secondary concert band instruction. Based on the participant's responses, the challenges faced during the virtual teaching of secondary concert bands significantly and negatively impacted the music teachers' views of virtual technology. Participants expressed that, while they believe technology to be essential for music education and can be a resource for teaching music, virtual technology is best suited for the instruction of individual instrumentalists or for teaching other aspects of music education, such as theory, history, and appreciation. Additionally, participants expressed that, until technology improves to allow collective ensemble performances, music teachers should only use it in the concert band classroom as a supplemental resource to face-to-face secondary concert band instruction. Table 12 shows the themes, categories, and codes that support the sub-research question.

Table 12

Themes, Categories, and Codes Supporting the Sub-Research Question

Theme	Categories	Codes	Number of participants	Sample quotes
Successes	Virtual concerts	Successfully creating a collective virtual concert video	6 of 9	P2 – "The virtual concerts that we had; I think that was big. We still had I had students that still made the all-district band that they still had, like all district and all state."
	Improved skills	Students improving their reading skills	8 of 9	P2 – "I guess just kind of let them know that they could still do things, you know, it wasn't a hurdle, it was a hurdle to get over, but it didn't stop them from doing what they would have done in person. So, it was just an achievement of, okay, even though we're virtual, we're still able to come out successful in terms of, you know, being able to make these honor bands."
		Students' continued success in other musical endeavors – state/county bands – despite being virtual	9 of 9	
	Meaningful experiences	Teachers continued to create meaningful music experiences for their concert band students	9 of 9	P5 – "So, every Friday night for pretty much from the 2021 school year, the marching band kids would get together, I would have them play like Jackbox games and like code names and like different online games together that we did a couple of times. So that was really good for their, like, social aspect."
Challenges	Technology challenges	Poor quality technology	9 of 9	P9 – "So suddenly, I'm having to, in addition to any musical understanding, get nuts and bolts gritty with technology, and, you know, cameras that don't work."
		Poor computer microphone quality	9 of 9	
		Poor internet quality	8 of 9	
		Poor audio/visual technology	9 of 9	
		Districts not wanting to purchase new technology or software	4 of 9	

Theme	Categories	Codes	Number of participants	Sample quotes
		Inadequate technology for concert band ensembles	9 of 9	
		No live playing	9 of 9	
	Teacher challenges	Teacher learning new software and technology	9 of 9	P1 – "But knowing that there was an outcome for what you're doing, and you're producing, and there's a reason for it, always motivate kids to do something. But if I was just saying play this playing test for me, there's really no for some of those kids; they don't really care like it's just a playing test. But when you know that it can turn into something really cool, then it motivates them to do something."
		No support from the administration	6 of 9	
		Teacher stress and frustration due to virtual teaching	8 of 9	
		Inability to provide immediate performance-based feedback to students		
		Held to the same standard although not the same environment	6 of 9	
		Trying to motivate students	9 of 9	
		Creating connections	8 of 9	
	Student challenges	Losing interest in the band due to not performing—no sense of purpose	8 of 9	P3 – "We are a performance-based course. So, the fact that we didn't have the concerts to prepare for because I had to find different ways to make things interesting. So, opposed to, like, we're working towards this concert, I had to make it appealing."
		Student engagement and participation	9 of 9	
		Student retention	9 of 9	
		Student access to adequate internet	8 of 9	
		No concerts	9 of 9	

Summary

I could sufficiently answer this qualitative research study's main and sub-research questions based on the data analysis. The main research question examined music teachers' perceptions of using virtual technology to teach secondary concert bands. The key findings showed that, while music teachers believed technology in the music

classroom to be beneficial, they opposed using virtual technology for performance-based instruction and perceived it unsuitable to instruct secondary concert band ensembles. The music teachers developed this negative perception due to the challenges they experienced using current available virtual platforms. However, participants in this study perceived virtual technology as suitable for instruction of other nonperformance-based aspects of music education, such as history, theory, and appreciation.

The key findings for the sub-question of this qualitative research study showed that the successes and challenges did impact the participants' views of virtual technology for secondary concert band instruction. The challenges experienced by the music teachers impacted their overall view of using virtual technology to teach secondary concert bands more than the successes they experienced. Although the successes experienced by the music teachers while using virtual technology led them to view it as a benefit, the overwhelming number of challenges they experienced overshadowed those successes, creating more of a negative perception towards the use of virtual technology to instruct secondary concert band ensembles. However, although the participants held a negative perception of virtual technology for teaching secondary concert bands, many agreed that virtual technology could be used as a resource within the concert band classroom but not as the sole means for instruction.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this basic qualitative study was to understand instrumental music teachers' perspectives on using virtual settings to teach secondary concert bands. The nature of this study focused on constructivism as an approach to understanding the perspectives of secondary music teachers on using virtual platforms to teach concert bands. A study of the views of secondary music teachers on the virtual teaching of concert bands was necessary to understand further how secondary music education teachers perceived the effectiveness of virtual teaching for secondary concert band instruction. It was also essential to know how the challenges and successes of teaching concert bands virtually affected the secondary music teachers' perception of using virtual technology to instruct secondary concert bands.

I recruited nine music teachers from various states nationwide through snowball sampling and social media posts. This study centered around one research question and one sub-research question. I interviewed participants on an audio-recorded Zoom call, after which I transcribed the interviews verbatim to prepare them for coding. During the interviews, I took handwritten memos and precoded and collected initial thoughts on specific answers from participants. I conducted a detailed, hand-coded analysis of the transcriptions and handwritten memos. I identified themes from the categories and codes within the raw data through iteration.

The key findings for the main research question showed that, while music teachers believed technology in the music classroom beneficial, they opposed using

virtual technology for performance-based instruction and perceived it as unsuitable to instruct secondary concert band ensembles. The music teachers developed this negative perception due to the challenges they experienced using current available virtual platforms. However, participants in this study perceived virtual technology as suitable for instruction of other nonperformance-based aspects of music education, such as history, theory, and appreciation.

The key findings for the subquestion of this qualitative research study showed that the successes and challenges did impact the participants' views of virtual technology for concert band instruction. The challenges experienced by the music teachers impacted their overall view of using virtual technology to teach secondary concert bands more than the successes they experienced. Although the successes experienced by the music teachers while using virtual technology led them to view it as a benefit, the overwhelming number of challenges they experienced overshadowed those successes, creating more of a negative perception towards the use of virtual technology to instruct secondary concert band ensembles. However, although the participants held a negative perception of virtual technology for teaching secondary concert bands, many agreed that virtual technology could be used as a resource within the concert band classroom but not as the sole means for instruction.

In Chapter 5, I reintroduce the study's purpose and the data collection and analysis process. Through the remainder of Chapter 5, I discuss the study's findings and their relation to the literature review and conceptual framework. I also discuss the limitations of this study, its implications for social change, and the recommendations for future

research. Finally, I conclude Chapter 5 with a discussion on the necessary changes to improve the virtual technology experience for music teachers and students in secondary concert band education.

Interpretation of the Findings

Throughout this qualitative research study, I used a conceptual framework to view music teachers' perceptions of using virtual technology for concert band instruction. This framework included Vygotsky's (1978) sociocultural theory of cognitive development and Siemens's (2005) connectivism theory. As I stated in Chapters 1 and 2, Vygotsky proposed community-based learning, and Siemens extended Vygotsky's work to include virtual settings. The works of both assist in understanding secondary music teachers' perspectives on using virtual technology for concert band instruction.

According to Patton (2014), it is essential to avoid creating generalized statements about the data collected in qualitative research. Generalizations are best suited to quantitative analysis rather than qualitative, and generalizations about the data from qualitative research do not withstand the test of time as social phenomena contain too many variables to make a broad generalization from qualitative findings (Patton, 2014). Some of this qualitative study's findings extend the current literature's findings. I interpreted these results through the conceptual framework lens and then organized the research and sub-research questions and the key findings for each.

Conceptual Framework

Looking at the findings through the lens of the sociocultural theory of cognitive development (Vygotsky, 1978), which focuses on community-based learning, helps in

understanding why the participants held a negative view towards the use of virtual technology for secondary concert band instruction. Vygotsky (1978) proposed community-based learning, which is an essential part of ensemble instruction. However, due to challenges with virtual technology, community-based education and learning were unachievable as the technology prohibited students from playing collectively in a virtual setting.

Looking at the findings through the lens of connectivism theory (Siemens, 2005), which focuses on learning in the digital age, helps in understanding how virtual technology can impact secondary concert band instruction. Siemens (2005) proposed that students will create avenues of learning when teachers use internet-based technology for teaching. However, the participants' perspectives in this study show that inadequate technology inhibits the creation of these learning avenues for students in secondary concert bands, specifically surrounding collective ensemble instruction and aspects of performance-based learning.

Main Research Question

In a review of the literature on the perspectives of music teachers on teaching secondary concert bands in a virtual setting, current research shows that music teachers find the virtual classroom to be unsuitable and ineffective for performance-based music subjects such as chorus or chamber ensembles, as most virtual platforms are not conducive to collaborative learning (Akarsu, 2021; Cheng & Lam, 2021; Daugvilaite, 2021; Schmidt-Jones, 2020; Ünlü, 2022; Vaizman, 2022). The findings of this study both confirm and extend the current literature because this study's participants also perceived

virtual technology to be unsuitable for concert band instruction, a performance-based music subject. Participants indicated that virtual technology made collaborative ensemble learning impossible due to the quality and inadequacies of the technology used. These findings may suggest that current virtual technologies are not adequate to sufficiently support any virtual instruction of performance-based music subjects such as concert bands.

The current literature also found that music education students whose teachers provided them with a variety of lessons, activities, and materials through a mixed means of synchronous and asynchronous instruction proved to be more successful in the virtual music education classroom (Barbetta & Morales, 2022; Dana Rucsanda et al., 2021; Gibson, 2021; Norman, 2022; Rodari Meisner & McKenzie, 2023; Yadigaroglu, 2021). The findings of this study both confirm and extend the current literature because the participants expressed the successes of their concert band students in improving other nonperformance music skills. Teachers in this study found it beneficial to shift the learning focus with their concert band students to incorporate different aspects of music education, such as theory, history, and appreciation. Additionally, participants in this study expressed value in virtual technology when used with face-to-face concert band instruction. These findings may mean that, for virtual technology to be used successfully in the concert band classroom, teachers must incorporate it as a resource for asynchronous instruction.

Sub-Research Question

In a review of the literature on the perspectives of music teachers on teaching secondary concert bands in a virtual setting, I found that current research had addressed the technological challenges faced by music teachers in performance-based ensemble instruction (AL Thnayan & Husain, 2021; Culp & Robison, 2022; Hash, 2021; Jefferson, 2021; Parkes et al., 2021; Talbert & Edelman, 2021). These challenges included audio and video latency, the inability to allow collaborative instruction, and the inability to enable teachers to provide real-time feedback to ensemble students (MacRitchie et al., 2022; Martin & Büchert, 2020; Norman, 2022; Nsairat et al., 2022; Vaizman, 2022; Yildiz et al., 2021). The findings of this study both confirm and extend the current literature because the participants expressed many technological challenges they faced with virtual concert band instruction, including adequacy and poor quality. Participants said that current virtual technology neither allowed concert band students to play collectively nor enabled teachers to provide students with real-time feedback. These findings may indicate that the current virtual technology may not be sufficient to handle performance-based instruction or that school districts need to upgrade the technology used by music teachers and their students.

As stated before, current literature found that music education students whom music teachers provided with a variety of synchronous and asynchronous lessons, activities, and materials proved to be more successful in the virtual music education classroom (Barbetta & Morales, 2022; Dana Rucsanda et al., 2021; Gibson, 2021; Norman, 2022; Rodari Meisner & McKenzie, 2023; Yadigaroglu, 2021). The findings of

this study both confirm and extend the current literature as participants expressed that the virtual concerts they created with their students were successful and gave their students a purpose for continuing to participate in concert bands. The teachers produced these virtual concerts asynchronously and edited them to make it appear that the students were playing synchronously. These findings may mean that music teachers could successfully use virtual technology to instruct secondary concert bands if music teachers were to provide concert band students with synchronous and asynchronous means of learning and participating.

Limitations of the Study

The limitations of this qualitative research study included the number of participants acquired, the location of the participants, and the focus on secondary concert band instruction. Because this research study only required a small sample size of participants, with the final number being nine, findings could be different should the number of participants increase, as the discrepant responses from P2 and P4 surrounding support and comfortability with using technology prove that more participants could alter the current findings and make it more difficult to generalize the results to all secondary music teachers having virtually taught concert bands (Burkholder et al., 2020).

Additionally, I acquired participants from several different states through snowball sampling. Because I did not acquire participants from one specific region or state, findings may not transfer to research where the participants are obtained from one particular state or area as they may hold similar or identical experiences. Finally, this qualitative research study focused solely on concert band instruction using virtual

technology. The findings may not transfer to studies surrounding other instrumental ensembles, such as a stringed or vocal ensemble.

Recommendations

I based recommendations for further research on the results and limitations of the study. The first recommendation relates to the finding that virtual technology limits what secondary music teachers can teach and assess regarding performance-based music standards. All participants for this qualitative study expressed the inadequacy of the virtual technology used for concert band instruction and the need to shift instructional focus to other aspects of music education that did not include performance-based standards. These standards are essential to student success with ensemble performance, specifically in concert bands. Therefore, future studies should address virtual technology in music education to teach and assess performance-based music standards. Understanding how to incorporate technology best to teach and evaluate performance-based standards could provide districts with an understanding of the need for adequate technology for secondary concert band instruction and provide music teachers with a means for advocating for improved technology in the music education classroom.

The second recommendation relates to the students' perspectives on using virtual technology for concert band instruction. All participants in this study were secondary music teachers who shared their experiences using virtual technology for secondary concert band instruction. Participants in this study expressed issues with student participation, engagement, and accountability. Some participants also expressed that many students used the band as an escape and that inadequate technology impacted

student retention rates and concert band students' abilities to connect with others in their ensemble. Therefore, future research should address virtual technology for concert band instruction from the perspective of the concert band student. Understanding the concert band students' perceptions of virtual technology and its use for concert band instruction could provide a more in-depth understanding of the impact of inadequate virtual technology for secondary concert band instruction and how it affects the success of the instrumental music student.

The last recommendation is related to the limitations of this study. It is to focus on a centralized location to acquire participants, whether that location is specific to a state, a region, or an individual school district. Localizing the participant pool could provide a more in-depth understanding of the experiences of music teachers within a specific area and assist in understanding whether those findings are similar to the results of this study. Creating a localized participant pool could also provide findings particular to that location or district or contradict this study's findings. Understanding the experiences of a collective of participants from the same area could provide a better understanding of how to best use virtual technology for specific student demographics and provide those music teachers with a means for advocating for improved access and quality of technology for their music education students.

Implications

This study will contribute to positive social change in several ways. First, as the educational system becomes more technologically forward, specifically in music education, music teachers and their students need access to adequate, quality technology

through incorporation. Though not a new endeavor, incorporating technology into the music education classroom has increased since the COVID-19 pandemic (Bucura, 2022; Calderón-Garrido & Gustems-Carnicer, 2021; Hash, 2021; Mao & He, 2021; Norman, 2021; Shaw & Mayo, 2022), but not consistently. Music educators must continue integrating technology into the music education classroom, precisely where ensembles are concerned. Expanding technology usage in their music education classrooms could provide music teachers with a means for advocating for additional or more improved technology when it becomes available.

Second, technology quality plays a massive role in the success of virtual secondary concert band instruction. The quality of technology applies to, but is not limited to, several aspects of technology, such as software, hardware, and the internet. With an in-depth look into the experiences of secondary music teachers using virtual technology to teach concert bands, the challenges and successes could be understood where the technology needs to be improved to ensure student success in secondary concert bands in a virtual setting. It is essential for teachers and students of secondary concert bands in a virtual environment to have access to the highest quality technology available to ensure teacher and student success with virtual concert band instruction. Understanding how access to quality technology positively and negatively impacts teachers and students of secondary concert bands in a virtual setting could provide a means for those teachers to advocate for improved technology for themselves and their students.

Finally, technology accessibility is vital for music teachers and their students to be successful when learning secondary concert bands in a virtual setting. This accessibility applies to many areas of technology, including, but not limited to, software, hardware, and the Internet. By providing an in-depth look into the experiences of secondary music teachers using virtual technology to teach concert bands, both the challenges and successes could give an understanding of how to improve technology accessibility to ensure all teachers and students have access to it. It is essential for teachers and students of secondary concert bands in a virtual setting to have access to the technology available to ensure their success with virtual concert band instruction. Understanding how accessibility to available technology positively and negatively impacts teachers and students of secondary concert bands in a virtual setting could provide a means for those teachers to advocate for equitable access to available technology for themselves and their students.

Conclusion

As technology improves and becomes more prevalent in education, music teachers need to ensure the incorporation of technology into music education classrooms. The perspectives of secondary music teachers' on using virtual technology for concert band instruction provide a better understanding of how technology is used in the music classroom and is critical to addressing technological challenges and helping to meet the technical needs of those teachers and students of secondary concert bands.

The results of this study identified through the interview answers of the nine participants that they perceive current virtual technology to be inadequate and unsuitable

for secondary concert band instruction. Participants expressed various technological challenges while teaching secondary concert bands virtually. Although they also experienced successes during this time, numerous challenges overshadowed these successes. These challenges, including technology, students, and preparation and planning, significantly impacted the participants' overall views of virtual technology for secondary concert band instruction.

Vygotsky's (1978) sociocultural theory and Siemens's (2005) theory of connectivism provided lenses to view the participants' responses. Participants expressed that virtual technology did not allow for collective ensemble playing. Performance-based experiences are essential to student success in an ensemble as instrumental students must learn from others, which supports Vygotsky's sociocultural theory of learning from others more experienced, while the inability for students to play in a virtual setting supports Siemens's theory of connectivism wherein students learn using internet-based platforms. Students' inability to collectively play as an ensemble using virtual technology platforms impacts their ability to learn from those around them.

Technology significantly influenced the perceptions the music teachers interviewed for this study expressed. Many participants in this study felt comfortable learning and incorporating new technology into their music education classrooms. However, challenges faced when using virtual technology to teach secondary concert bands left all music teachers expressing their dislike for using virtual technology for performance-based instruction. Participants said that the poor quality and inadequacies of the current technology used for concert band instruction did not allow students to play

collectively as an ensemble, nor did it enable the music teachers to provide their concert band students with real-time, performance-based feedback.

Though the challenges experienced significantly and negatively impacted the participants' perceptions of virtual technology for secondary concert band instruction, several successes also impacted their perceptions. Most participants created a virtual concert video to motivate students to continue participating and believed it was successful. Additionally, music teachers shifting what they taught using virtual platforms for secondary concert bands allowed students to improve other music skills outside of their performance-based skills, and most teachers found this beneficial.

Although the music teachers within this study agree that virtual platforms are not conducive to the teaching and learning of performance-based ensembles, such as secondary concert bands, they do agree that virtual platforms can be beneficial to the teaching and learning of other aspects of music education, including theory, history, and appreciation. Participants expressed that it will not be possible to effectively teach secondary concert bands in a virtual platform until the technology improves to allow for collective ensemble performance. Participants also agree that virtual technology may work well for individual instrumental students and could be a supplemental resource in the secondary concert band classroom. The findings from this study could assist music teachers in advocating for improved technology and equitable access to technology for themselves and their secondary concert band students.

References

Abou-Khalil, V., Helou, S., Khalifé, E., Chen, M. A., Majumdar, R., & Ogata, H. (2021). Emergency online learning in low-resource settings: Effective student engagement strategies. *Education Sciences*, *11*(1), 24–24. Education Source.

Adams, K. (2021). Research to resource: Developing a sense of community in online learning environments. *Update: Applications of Research in Music Education*, *39*(2), 5–9. https://doi.org/10.1177/8755123320943985

Ajlouni, A., Rawadieh, S., Almahaireh, A., & Awwad, F. A. (2022). Gender differences in the motivational profile of undergraduate students in light of self-determination theory: The case of online learning setting. *Journal of Social Studies Education Research*, *13*(1), 75–103. ERIC.

Akarsu, S. (2021). Investigating secondary school music teachers' views about online music lessons during the COVID-19 pandemic. *Educational Policy Analysis and Strategic Research*, *16*(2), 160–178. ERIC.

Aldhafeeri, F. M., & Alotaibi, A. A. (2023). Reimagining education for successful and sustainable digital shifting. *SAGE Open*, *13*(1), 1–20. Complementary Index.

Alghanmi, S. S., & Nyazi, A. K. (2022). Exploring students' engagement in distance learning during the pandemic of COVID-19: A correlational exploratory design. *Turkish Online Journal of Educational Technology*, *21*(3), 46–62. ERIC.

Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher Education Studies*, *10*(3), 16–25. https://doi.org/10.5539/hes.v10n3p16

Al Maawali, W. S. (2022). Experiential writing through connectivism learning theory: A

    case study of English language students in Oman higher education. *Reflective*

    Practice, *23*(3), 305–318. APA PsycInfo.

    https://doi.org/10.1080/14623943.2021.2021167

Alshwiah, A. A. (2021). Barriers to online learning: Adjusting to the "new normal" in the

    time of COVID-19. *Turkish Online Journal of Distance Education*, *22*(4), 212–

    228. ERIC.

AL Thnayan, S. A., & Husain, K. S. M. (2021). Moderating role of gender in the impact

    of e-learning quality on students' satisfaction and performance during COVID-19

    pandemic. *International Journal of Education and Practice*, *9*(4), 637–655. ERIC.

Baker, K. Q., & Moyer, D. M. (2019). The relationship between students' characteristics

    and their impressions of online courses. *American Journal of Distance Education*,

    33(1), 16–28. https://doi.org/10.1080/08923647.2019.1555301

Barbetta, P. M., & Morales, M. (2022). Three low-tech active student responding

    strategies for inclusive online teaching. *Teaching Exceptional Children*, *54*(5),

    346–353. Academic Search Complete.

Barthakur, A., Kovanovic, V., Joksimovic, S., Siemens, G., Richey, M., & Dawson, S.

    (2021). Assessing program-level learning strategies in MOOCs. *Computers in*

    Human Behavior, *117*. ScienceDirect.

Barton, G., & Riddle, S. (2022). Culturally responsive and meaningful music education:

    Multimodality, meaning-making, and communication in diverse learning contexts.

    Research Studies in Music Education, *44*(2), 345–362. ERIC.

Bawaneh, A. K., & Malkawi, E. (2023). STEM faculty members' perspectives and challenges towards distance learning and virtual classes during COVID-19 outbreak. *Turkish Online Journal of Distance Education*, *24*(1), 246–261. Education Source.

Bayley, J. G., & Waldron, J. (2020). "It's never too late": Adult students and music learning in one online and offline convergent community music school. *International Journal of Music Education*, *38*(1), 36–51. ERIC.

Beirnes, S. (2022). Learner-centered pedagogy and student engagement in a virtual elementary instrumental music program. *International Journal of Music Education*, *40*(4), 530–541. ERIC.

Beirnes, S., & Randles, C. (2023). A music teacher's blended teaching and learning experience during COVID-19: Autoethnography of resilience. *International Journal of Music Education*, *41*(1), 69–83. Education Source.

Bell, A. P., Bonin, D., Pethrick, H., Antwi-Nsiah, A., & Matterson, B. (2020). Hacking, disability, and music education. *International Journal of Music Education*, *38*(4), 657–672. ERIC.

Biasutti, M., Antonini Philippe, R., & Schiavio, A. (2022). Assessing teachers' perspectives on giving music lessons remotely during the COVID-19 lockdown period. *Musicae Scientiae*, *26*(3), 585–603. https://doi.org/10.1177/1029864921996033

Birnbaum, B. W., Wiseley, K., & Anderson, C. J. (2022). Teaching during the covid-19 pandemic: Special educators' strategies for success. *Thresholds in Education*, *45*(1), 103–112. Education Source.

Blackwell, J., Miksza, P., Evans, P., & McPherson, G. E. (2020). Student vitality, teacher engagement, and rapport in studio music instruction. *Frontiers in Psychology*, *11*, 1007. https://doi.org/10.3389/fpsyg.2020.01007

Blanco, A. D., & Ramirez, R. (2019). Evaluation of a sound quality visual feedback system for bow learning technique in violin beginners: An EEG study. *Frontiers in Psychology*, *1*, 165.https://doi.org/10.3389/fpsyg.2019.00165

Brieger, E., Arghode, V., & McLean, G. (2020). Connecting theory and practice: Reviewing six learning theories to inform online instruction. *European Journal of Training and Development*, *44*(4/5), 321–339. https://doi.org/10.1108/EJTD-07-2019-0116

Bucura, E. (2019). Fostering self-efficacy among adolescents in secondary general music. *General Music Today*, *32*(3), 5–12. https://doi.org/10.1177/1048371319834080

Bucura, E. (2022). Considerations with virtual secondary music students. *Journal of General Music Education*, *35*(2), 29–35. https://doi.org/10.1177/27527646211061504Burkholder, G. J., Cox, K. A, Crawford, L. M., & Hitchcock, J. (2020). *Research design and methods: An applied guide for the scholar-practitioner.* SAGE Publishing.

Calderón-Garrido, D., & Gustems-Carnicer, J. (2021). Adaptations of music education in primary and secondary school due to COVID-19: The experience in Spain. *Music Education Research*, *23*(2), 139–150.

https://doi.org/10.1080/14613808.2021.1902488

Černý, M. (2020). Connectivism in phenomenological-pragmatist tradition. *Konektivismus ve Fenomenologicko-Pragmatistické Tradici.*, *20*(2), 7–24. Education Source.

Chatterjee, R., & Correia, A.-P. (2020). Online students' attitudes toward collaborative learning and sense of community. *American Journal of Distance Education*, *34*(1), 53–68. https://doi.org/10.1080/08923647.2020.1703479

Cheng, L., & Lam, C. Y. (2021). The worst is yet to come: The psychological impact of COVID-19 on Hong Kong music teachers. *Music Education Research*, *23*(2), 211–224. https://doi.org/10.1080/14613808.2021.1906215

Clipper, J., & Lee, K. X. (2021). Composing music in special education. *Music Educators Journal*, *108*(1), 43–49. ERIC.

Corbett, F. & Spinello, E. (2020). Connectivism and leadership: Harnessing a learning theory for the digital age to redefine leadership in the twenty-first century. *Heliyon*, *6*(1). Directory of Open Access Journals.

https://doi.org/10.1016/j.heliyon.2020.e03250

Cromer, S. J., D'Silva, K. M., Phadke, N. A., Lord, E., Rigotti, N. A., & Baer, H. J. (2022). Gender differences in the amount and type of student participation during in-person and virtual classes in academic medicine learning environments. *JAMA Network Open*, *5*(1), e2143139. MEDLINE with Full Text. https://doi.org/10.1001/jamanetworkopen.2021.43139

Culp, M. E., & Robison, T. (2022). Promoting gender inclusivity in general music (Part 2): Considerations for using technology. *Journal of General Music Education*, *35*(3), 18–24. ERIC.

Dampson, D. G. (2021). Effectiveness of professional learning communities in Ghanaian basic schools through the lenses of sociocultural theory. *Journal of Educational Issues*, *7*(2), 338–354. ERIC.

Dana Rucsanda, M., Belibou, A., & Cazan, A.-M. (2021). Students' attitudes toward online music education during the COVID 19 lockdown. *Frontiers in Psychology*, *12*. Directory of Open Access Journals. https://doi.org/10.3389/fpsyg.2021.753785

Daugvilaite, D. (2021). Exploring perceptions and experiences of students, parents and teachers on their online instrumental lessons. *Music Education Research*, *23*(2), 179–193. https://doi.org/10.1080/14613808.2021.1898576

Davidoivitch, N., & Dorot, R. (2022). Through the "camera lens": How do students grasp the future of learning via online platforms? *International Education Studies*, *15*(2), 161–171. ERIC.

de Bruin, L. R. (2019). The use of cognitive apprenticeship in the learning and teaching of improvisation: Teacher and student perspectives. *Research Studies in Music Education*, *41*(3), 261–279. https://doi.org/10.1177/1321103X18773110

de Bruin, L. R. (2021). Instrumental music educators in a COVID landscape: A reassertion of relationality and connection in teaching practice. *Frontiers in Psychology*, *11*, 624717. https://doi.org/10.3389/fpsyg.2020.624717

Demir, B., Kaleli Yilmaz, G., & Sert Kaleli Celik, H. (2021). Teachers' attitudes and opinions on mathematics lessons conducted with distance education due to COVID-19 pandemic. *Turkish Online Journal of Distance Education (TOJDE)*, *22*(4), 147–163. Education Source.

Dennis, J. (2020). Languaging network learning: The emergence of connectivism in architectonic thought. *International Review of Research in Open & Distance Learning*, *21*(3), 304–318. Education Source.

Downes, S. (2022). Connectivism. *Asian Journal of Distance Education*, *17*(1), 58–87. Education Source.

Du, X., Zhang, M., Shelton, B. E., & Hung, J.-L. (2022). Learning anytime, anywhere: A spatio-temporal analysis for online learning. *Interactive Learning Environments*, *30*(1), 34–48. APA PsycInfo. https://doi.org/10.1080/10494820.2019.1633546

Durnali, M., Orakçi, S., & Toraman, Ç. (2022). Distance education students' acceptance of online learning systems, attitudes towards online learning and their self-directed learning skills. *Malaysian Online Journal of Educational Technology*, *10*(2), 76–94. ERIC.

Ekici, T. (2022). Opinions of music teacher candidates on determining the suitability of the distance education model for the voice education course. *Turkish Online Journal of Educational Technology - TOJET*, *21*(2), 54–68. ERIC.

Erdogmus, C., Çakir, R., & Korkmaz, Ö. (2022). Students' knowledge sharing behaviours and sense of online learning community in online learning environments. *Participatory Educational Research*, *9*(3), 46–60. ERIC.

Eun, B. (2021). Teachers learning to teach: Professional development based on sociocultural theory for linguistically and culturally diverse classroom. *Professional Development in Education*, 1–11. https://doi.org/10.1080/19415257.2021.1879224

Ferguson, J. (2021). Zoom time trials and triumphs. *Victorian Journal of Music Education*, 18–24. ERIC.

Feyzi Behnagh, R., & Yasrebi, S. (2020). An examination of constructivist educational technologies: Key affordances and conditions. *British Journal of Educational Technology*, *51*(6), 1907–1919. ERIC.

Fick, J., & Bulgren, C. (2022). Developing 21st-century musicianship: Tablet-based music production in the general music classroom. *Journal of General Music Education*, *35*(2), 4–12. ERIC.

Frikha, M., Chaâri, N., Mezghanni, N., Alhumaid, M. M., & Alibrahim, M. S. (2022). Students' perceptions in online physical education learning: comparison study of autonomy, competence, and relatedness in Saudi students during the COVID-19 lockdown. *International Journal of Environmental Research and Public Health*, *19*(22). MEDLINE with Full Text. https://doi.org/10.3390/ijerph192215288

Gibson, S.-J. (2021). Shifting from offline to online collaborative music-making, teaching and learning: Perceptions of ethno artistic mentors. *Music Education Research*, *23*(2), 151–166. https://doi.org/10.1080/14613808.2021.1904865

Goodrich, A. (2021). Online peer mentoring and remote learning. *Music Education Research*, *23*(2), 256–269. https://doi.org/10.1080/14613808.2021.1898575

Gül, G. (2021). Teachers' views on music education practices in secondary education in distance education during the COVID-19 pandemic process. *Online Submission*, *6*(2), 95–111. ERIC.

Gun, E. (2021). The opinions of the preservice music teachers regarding the teaching of orchestra and chamber music courses during distance education process. *Cypriot Journal of Educational Sciences*, *16*(3), 1088–1096. ERIC.

Habe, K., Biasutti, M., & Kajtna, T. (2021). Wellbeing and flow in sports and music students during the COVID-19 pandemic. *Thinking Skills and Creativity*, *39*, 100798. https://doi.org/10.1016/j.tsc.2021.100798

Haez, S. G., & Delfani, M. (2022). The impact of online dynamic assessment on the development of EFL students' speaking skills: A comparison of online synchronous and asynchronous DA sessions. *International TESOL Journal*, *17*(1), 4–24. ERIC.

Hamid, S. N. M., Lee, T. T., Taha, H., Rahim, N. A., & Sharif, A. M. (2021). E-content module for chemistry massive open online course (MOOC): Development and students' perceptions. *Journal of Technology and Science Education*, *11*(1), 67–92. ERIC.

Hash, P. M. (2021). Remote learning in school bands during the COVID-19 shutdown. *Journal of Research in Music Education*, *68*(4), 381–397. https://doi.org/10.1177/0022429420967008

Homayouni, M. (2022). Peer assessment in group-oriented classroom contexts: On the effectiveness of peer assessment coupled with scaffolding and group work on speaking skills and vocabulary learning. *Language Testing in Asia*, *12*(1), 1–23. Directory of Open Access Journals. https://doi.org/10.1186/s40468-022-00211-3

Idin, S. (2020). Research Highlights in Education and Science 2020. In *Online Submission*. Online Submission; ERIC.

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004). https://sites.ed.gov/idea/

Ismail, M. J., Anuar, A. F., & Loo, F. C. (2022). From physical to virtual: A new learning norm in music education for gifted students. *International Review of Research in Open and Distributed Learning*, *23*(2), 44–62. ERIC.

Jackowicz, S., & Sahin, I. (Eds.). (2021). *Online education during the COVID-19 pandemic: Issues, benefits, challenges, and strategies*. International Society for Technology, Education, and Science.

Jamali Kivi, P., Namaziandost, E., Fakhri Alamdari, E., Ryafikovna Saenko, N., Inga-Arias, M., Fuster-Guillén, D., Sirisakpanich, D., & Nasirin, C. (2021). The comparative effects of teacher versus peer-scaffolding on EFL learners' incidental vocabulary learning and reading comprehension: A sociocultural perspective. *Journal of Psycholinguistic Research*, *50*(5), 1031–1047. https://doi.org/10.1007/s10936-021-09800-4

Jefferson, G. C. (2021). Piano students' perspectives and experiences with remote piano instruction. *International Association for Development of the Information Society*. ERIC.

Joseph, A. (2020). What is the future of arts education in the midst of a pandemic? It's essential, virtual, and hybrid for now! *International Dialogues on Education: Past and Present*, *7*, 61–80. ERIC.

Joseph, D., & Merrick, B. (2021). Australian music teachers' reflections and concerns during the pandemic: Resetting the use of technologies in 21st century classroom practice. *New Zealand Journal of Teachers' Work*, *18*(2), 109–126. ERIC.

Kabilan, M. K., & Annamalai, N. (2022). Online teaching during COVID-19 pandemic: A phenomenological study of university educators' experiences and challenges. *Studies in Educational Evaluation*, *74*, 101182. https://doi.org/10.1016/j.stueduc.2022.101182

Kanibolotska, M., Dergach, M., Melnyk, A., & Fedorov, M. (2022). Peculiarities of verbalisation of emotions by the teachers in distance learning. *Romanian Journal for Multidimensional Education / Revista Romaneasca Pentru Educatie Multidimensionala*, *14*(1), 356–369. Academic Search Complete.

Klevetova, T., Komissarova, S., & Popov, K. (2021). Online learning technologies as a modern direction of learning in communities. *SHS Web of Conferences*, *98*, 05029–05029. Directory of Open Access Journals. https://doi.org/10.1051/shsconf/20219805029

Kotzee, B., & Palermos, S. O. (2021). The teacher bandwidth problem: MOOCs, connectivism, and collaborative knowledge. *Educational Theory*, *71*(4), 497–518. https://doi.org/10.1111/edth.12495

Kuebel, C. & Haskett, E. (2023). "I'm doing the best I can": Teaching general music in the time of COVID-19. *Update: Applications of Research in Music Education*, *41*(2), 28–37. ERIC.

MacRitchie, J., Chmiel, A., Radnan, M., Taylor, J. R., & Dean, R. T. (2022). Going online: Successes and challenges in delivering group music instrument and aural learning for older adult novices during the COVID-19 pandemic. *Musicae Scientiae*, 1-20. https://doi.org/10.1177/10298649221097953

Madigan, D. J., & Kim, L. E. (2021). Does teacher burnout affect students? A systematic review of its association with academic achievement and student-reported outcomes. *International Journal of Educational Research*, *105*, 101714. https://doi.org/10.1016/j.ijer.2020.101714

Malkawi, E., & Khayrullina, M. (2021). Digital learning environment in higher

    education: New global issues. *SHS Web of Conferences*, *92*, 05019.

    https://doi.org/10.1051/shsconf/20219205019

Mao, R., & He, Y. (2021). "Hypercycle" learning system based on "extension

    classroom": Take online music teaching during the COVID-19 pandemic as an

    example. *2021 3rd International Conference on Internet Technology and

    Educational Informization (ITEI)*, 78–81.

    https://doi.org/10.1109/ITEI55021.2021.00027

Mardiana, H. (2020). Lecturers' attitudes towards online teaching in the learning process.

    Register Journal, *13*(1), 77–98. https://doi.org/10.18326/rgt.v13i1.77-98

Martin, A., & Büchert, M. (2020). Strategies for facilitating creative music collaboration

    online. *Journal of Music, Technology and Education*, *13*(2), 163–179.

    https://doi.org/10.1386/jmte_00021_1

Matee, G. L., Motlohi, N., & Nkiwane, P. (2023). Emerging perspectives and challenges

    for virtual collaborative learning in an institution of higher education: A case of

    Lesotho. *Interactive Technology and Smart Education*, *20*(1), 73–88. Emerald

    Insight. https://doi.org/10.1108/ITSE-06-2021-0110

Nazari, B., Che Hussin, A. R., & Niknejad, N. (2022). E-learning systems success through video conferencing software platforms: Measurement items and validation. *2022 International Conference on Intelligent Technology, System and Service for Internet of Everything (ITSS-IoE), Intelligent Technology, System and Service for Internet of Everything (ITSS-IoE), 2022 International Conference On*, 1–6. IEEE Xplore Digital Library. https://doi.org/10.1109/ITSS-IoE56359.2022.9990928

Norman, T. D. (2021). Teaching music online: Using Microsoft PowerPoint to create prerecorded lessons. *General Music Today*, *34*(3), 45–51. Education Source.

Norman, T. D. (2022). Reflections on teaching general music online during lockdown. *Journal of General Music Education*, *35*(2), 52–55. Education Source.

Norris, T. (2020). Pandemic pedagogy: Innovative strategies for uncertain times. *Brock Education Journal*, *29*(2), 1. https://doi.org/10.26522/brocked.v29i2.856

Nsairat, N., Fakhouri, H. N., Alsawalqa, R., & Hamad, F. (2022). Music students' perception towards music distance learning education during COVID-19 pandemic: Cross-sectional study in Jordan. *International Journal of Interactive Mobile Technologies (IJIM)*, *16*(06), 135–158. https://doi.org/10.3991/ijim.v16i06.27193

Nsibirano, R., Kabonesa, C., & Nannyonga, B. (2022). Understanding the moderating role of "gender" in students' acceptance of distance learning: The case of Makerere University. *International Journal of Education & Development Using Information & Communication Technology*, *18*(1), 164–199. Education Source.

Nunes-Silva, M., Janzen, T. B., Rodrigues, R. G., & Luz, A. R. da. (2021). Sensory

feedback in music performer–instrument interactions. *Psychology of Music*, *49*(5),

1285–1302. https://doi.org/10.1177/0305735620928397

Omodan, B. I.. (2023). Analysis of connectivism as a tool for posthuman university

classrooms. *Journal of Curriculum Studies Research*, *5*(1). Directory of Open

Access Journals. https://doi.org/10.46303/jcsr.2023.2

Özaydin Özkara, B., & Ibili, E. (2021). Analysis of students' e-learning styles and their

attitudes and self-efficacy perceptions towards distance education. *International

Journal of Technology in Education and Science*, *5*(4), 550–570. ERIC.

Özüdogru, G. (2022). The effect of distance education on self-efficacy towards online

technologies and motivation for online learning. *Journal of Learning and

Teaching in Digital Age*, *7*(1), 108–115. ERIC.

Park, C., & Kim, D. (2020). Exploring the roles of social presence and gender difference

in online learning. *Decision Sciences Journal of Innovative Education*, *18*(2),

291–312. APA PsycInfo. https://doi.org/10.1111/dsji.12207

Parkes, K. A., Russell, J. A., Bauer, W. I., & Miksza, P. (2021). The well-being and

instructional experiences of K–12 music educators: Starting a new school year

during a pandemic. *Frontiers in Psychology*, *12*, 701189.

https://doi.org/10.3389/fpsyg.2021.701189

Pozo, J. I., Pérez Echeverría, M.-P., Casas-Mas, A., López-Íñiguez, G., Cabellos, B.,

Méndez, E., Torrado, J. A., & Baño, L. (2022). Teaching and learning musical

instruments through ICT: The impact of the COVID-19 pandemic lockdown. *Heliyon*, *8*(1), e08761. https://doi.org/10.1016/j.heliyon.2022.e08761

Quigley, H., & MacDonald, R. (2022). A qualitative study of an online Makaton choir for individuals with learning difficulties. *International Journal of Community Music*, *15*(1), 65–94. Complementary Index.

Quinn, P. M. (2014). Qualitative research & evaluation methods: Integrating theory and practice (4th ed.). SAGE Publications, Inc.

Rautiainen, K.-H., & Vesisenaho, M. (2022). Finnish classroom teacher students' experiences of an online music course during the COVID pandemic. *Visions of Research in Music Education*, *39*, 41–73. Education Source.

Ravitch, S. M., & Carl, N. M. (2021). *Qualitative research: Bridging the conceptual, theoretical, and methodological* (2nd ed.) Sage Publications.

Robison, T., & Culp, M. E. (2021). Promoting gender inclusivity in general music: Considerations for music listening. *Journal of General Music Education*, *35*(1), 15–22. https://doi.org/10.1177/10483713211016034

Rodari Meisner, J., & McKenzie, J. M. (2023). Teacher perceptions of self-efficacy in teaching online during the COVID-19 pandemic. *Athens Journal of Education*, *10*(1), 49–66. https://doi.org/10.30958/aje.10-1-3

Rodríguez-Ardura, I., & Meseguer-Artola, A. (2021). Flow experiences in personalised e-learning environments and the role of gender and academic performance. *Interactive Learning Environments*, *29*(1), 59–82. Education Source.

Rolando, L. F. E., Damian, C. O. N., Fuentes, T. C. L., Gonzalez, M. A. L., Rojas, J. L. P., & Alberto Garrido Schaeffer, C. J. (2022). Inequalities in connectivity and academic performance during non-face-to-face teaching due to the Covid-19 Pandemic. *2022 International Symposium on Accreditation of Engineering and Computing Education (ICACIT)*, 1–6. https://doi.org/10.1109/ICACIT56139.2022.10041703

Saetre, J. H., & Zhukov, K. (2021). Let's play together: Teacher perspectives on collaborative chamber music instruction. *Music Education Research*, *23*(5), 553–567. ERIC.

Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). Sage Publications.

Sarikaya, M. (2022). An investigation of music teachers' perceived self-efficacy for technology integration. *International Journal of Technology in Education and Science*, *6*(2), 204–217. ERIC.

Schmidt-Jones, C. A. (2020). The promise and challenge of online action research: Notes from a study of self-motivated online music learners. *Action Research*, *18*(3), 372–386. https://doi.org/10.1177/1476750317698026

Schmidt-Jones, C. (2021). Instrument-based music theory on YouTube: Entries and barriers to lifelong learning. *Journal of Music, Technology & Education*, *14*(1), 5–20. Academic Search Complete.

Sezgin, S. (2022). Footsteps of adaptive online learning: Tracing the relationships between online self-regulation, cognitive style, online interaction and gender. *Asian Journal of Distance Education*, *17*(2), 221–238. Education Source.

Shaw, R. D., & Mayo, W. (2022). Music education and distance learning during COVID-19: A survey. *Arts Education Policy Review*, *123*(3), 143–152. https://doi.org/10.1080/10632913.2021.1931597

Shearer, R. L., Aldemir, T., Hitchcock, J., Resig, J., Driver, J., & Kohler, M. (2020). What students want: A vision of a future online learning experience grounded in distance education theory. *American Journal of Distance Education*, *34*(1), 36–52. https://doi.org/10.1080/08923647.2019.1706019

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1). http://www.itdl.org/

Study of six online learning theories shows theories should be chosen to match institutional situations and learners' backgrounds. (2021). *Human Resource Management International Digest*, *29*(6), 5–7. https://doi.org/10.1108/HRMID-06-2021-0144

Stutchbury, K., Ebubedike, M., Amos, S., & Chamberlain, L. (2023). Professional development in the digital age: Supporting improvements in teacher education through MOOCs. *Open Learning: The Journal of Open, Distance and e-Learning*, 1–24. https://doi.org/10.1080/02680513.2023.2195875

Talbert, M. D., & Edelman, P. (2021). COVID-19 and community band participation: Impacts and the road forward. *International Journal of Community Music*, *14*(2/3), 191–203. Academic Search Complete.

Tobbell, J., Burton, R., Gaynor, A., Golding, B., Greenhough, K., Rhodes, C., & White, S. (2021). Inclusion in higher education: An exploration of the subjective experiences of students. *Journal of Further & Higher Education*, *45*(2), 284–295. Academic Search Complete.

Tsugawa, S. (2023). Bridging the digital divide: Distance music learning among older adult musicians. *International Journal of Music Education*, *41*(1), 52–68. Complementary Index.

Ünlü, L. (2022). A qualitative study of the perspectives of music students on distance piano education. *Education Quarterly Reviews*, *5*(1), 353–366. ERIC.

Vaillancourt, T., Brittain, H., Krygsman, A., Farrell, A. H., Pepler, D., Landon, S., Saint-Georges, Z., & Vitoroulis, I. (2022). In-person versus online learning in relation to students' perceptions of mattering during COVID-19: A brief report. *Journal of Psychoeducational Assessment*, *40*(1), 159–169. CINAHL Plus with Full Text. https://doi.org/10.1177/07342829211053668

Vaizman, T. (2022). Teaching musical instruments during COVID-19: Teachers assess struggles, relations with students, and leveraging. *Music Education Research*, *24*(2), 152–165. https://doi.org/10.1080/14613808.2022.2053512

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Wan, L., Crawford, R., & Jenkins, L. (2023). Digital listening tools to facilitate children's self-regulation of instrumental music practice. *Journal of Research in Music Education*, *71*(1), 67–90. ERIC.

Wieser, M. & Müller, F. H. (2022). Motivation in instrumental music instruction before and during the remote learning phase due to COVID-19 crisis. *Music & Science*, *5*. Directory of Open Access Journals. https://doi.org/10.1177/20592043221132938

Xiong, J., & Zuo, M. (2019). Older adults' learning motivations in massive open online courses. *Educational Gerontology*, *45*(2), 82–93. APA PsycInfo. https://doi.org/10.1080/03601277.2019.1581444

Yadigaroglu, Z. (2021). Examination of music teacher candidates' opinions regarding distance teaching practice course during the pandemic. *Shanlax International Journal of Education*, *9*(4), 419–432. ERIC.

Yildiz, Y., Karsal, E., & Bagci, H. (2021). Examining the instructors' perspectives on undergraduate distance learning music instrument education during the COVID-19 pandemic. *Journal of Pedagogical Research*, *5*(2), 184–206. ERIC.

Yoo, H. (2021). Research-to-resource: Use of technology to support 21st century skills in a performing ensemble program. *Update: Applications of Research in Music Education*, *39*(2), 10–14. https://doi.org/10.1177/8755123320953435

Appendix A: Participant Invitation for Email

Email Invitation

Subject line:
Interview Participants Needed for Music Education Study

Email message:
A new study about secondary music teachers' perspectives looks to better understand their use of virtual technology and its possibilities for the music education classroom. For this study, you are invited to describe your experiences using virtual platforms to teach secondary concert band ensembles.

About the study:
- One 60–90-minute Zoom interview that will be audio-recorded (no video recording).
- To protect your privacy, the published study will not share any names or details identifying you.

Volunteers must meet these requirements:
- 18 years old or older.
- Has taught or is currently teaching secondary concert bands virtually.
- Works or has worked in the K–12 school setting.

This interview is part of the doctoral study for a Ph.D. student at Walden University. Interviews will take place during September 2023.

Please email to let the researcher know of your interest. You are welcome to forward it to others who might be interested.

Appendix B: Participant Invitation for Social Media

Caption: A new study about secondary music teachers' perspectives looks to better understand their use of virtual technology and its possibilities for the music education classroom. For this study, you are invited to describe your experiences using virtual platforms to teach secondary concert band ensembles.

<u>About the study:</u>
- One 60–90-minute Zoom interview that will be audio-recorded (no video recording).

- To protect your privacy, the published study will not share any names or details identifying you.

<u>Volunteers must meet these requirements:</u>
- 18 years old or older.
- Has taught or is currently teaching secondary concert bands virtually.
- Works or has worked in the K–12 school setting.

This interview is part of the doctoral study for a Ph.D. student at Walden University. Interviews will take place during September 2023.

Please message the researcher privately to let them know of your interest.

Interview Study Seeks Music Educators

A new study about secondary music teachers' perspectives looks to better understand their use of virtual technology and its possibilities for the music education classroom. For this study, you are invited to describe your experiences using virtual platforms to teach secondary concert band ensembles.

<u>About the study:</u>
- One 60–90-minute phone interview that will be audio-recorded (no video recording)
- To protect your privacy, the published study will not share any names or details identifying you.

<u>Volunteers must meet these requirements:</u>

- 18 years old or older
- Has taught or is currently teaching secondary concert bands virtually.
- Works or has worked in the K–12 school setting.

This interview is part of the doctoral study for a Ph.D. student at Walden University. Interviews will take place during September 2023.

To confidentially volunteer, contact the researcher.

Appendix D: Interview Introduction, Questions, and Closing Statement

Interview Introduction

Thank you for agreeing to participate in this interview for my research study. Through this study, I will further understand the perspectives of K–12 music teachers on teaching secondary concert bands in a virtual setting and hope this understanding provides support for improved music education technology. This interview should last about 30-45 minutes and will be a series of interview questions regarding your experience using virtual technology to teach concert bands. Some follow-up questions will be used to understand your experiences further. The interview will be audio-recorded for the accuracy of data collection. Hand-written memos will also be taken as needed during the interview. If, at any time, you are not comfortable answering a question or would like to discontinue the interview, please let me know, and I will skip the question and/or stop the interview and audio recording.

Do you agree to the interview being audio-recorded?

Do you have any questions before we proceed?

Demographics Survey

1. How many years have you been teaching?
2. How many years have you taught virtually?
3. Was this virtual experience blended, hybrid, synchronous, or asynchronous?
4. Was this your first experience using technology, or have you used technology in your music classroom before this experience?
5. What is your highest degree attained?

Interview Questions

1. Describe your experience using virtual technology platforms to teach secondary concert bands.
2. Describe your planning and preparation for teaching secondary concert bands virtually.
   a. Describe your process for obtaining materials to virtually teach secondary bands.
   b. Describe how you adjusted your pedagogy to teach concert bands in a virtual setting.
3. Describe any support you receive from district administration, building administration, fellow music teachers, parents, etc.

      a. Describe how that support or lack of support impacted your ability to teach secondary concert bands virtually.

4. Describe technological challenges you experienced teaching secondary concert bands virtually.
    a. Describe how you addressed these challenges.
    b. Describe how those technological challenges impacted your ability to teach secondary concert bands virtually.
    c. Describe how those technological challenges impacted your ability to keep your students engaged and participating.

5. Describe any other challenges you experienced while teaching concert bands virtually.
    a. Describe how you addressed these other challenges.
    b. Describe how those other challenges impacted your ability to teach secondary concert bands virtually.
    c. Describe how those other challenges impact your ability to keep your students engaged and participating.

6. Describe how these challenges impacted your view of using virtual platforms to teach secondary concert bands.

7. Describe any successes you experienced while teaching concert bands virtually.
    a. Describe how these successes impacted student engagement and participation.
    b. Describe how these successes impacted your overall view of the virtual teaching of secondary concert bands.

8. Describe your overall view on using virtual technology to teach secondary concert bands.

Final Question

9. Is there anything you would like to add about teaching concert bands using virtual platforms?

Closing Statement

I thank you for participating in this interview which will assist in helping me in completing my research study. If you have any questions or concerns, you can email me.

Do you have any additional questions or concerns before we conclude?

Again, thank you for your time and for participating in this interview. It is greatly appreciated, and I hope you have a wonderful day!