

AN INVESTIGATION OF THE IMPACT OF THE COVID-19 PANDEMIC ON THE  
USE OF COMPUTER-AIDED INSTRUCTION IN MIDDLE SCHOOL CHORAL  
PROGRAMS

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BY

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## DEDICATION

I sincerely dedicate this thesis to my lovely wife, Ally, and my family for the constant support and encouragement throughout these last four years. Without them, this document would not have come to existence.

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Lastly, I would like to thank all the teachers that took the time to contribute to my survey. I have gained a priceless insight into the challenges of music education during an unprecedented time such as the COVID-19 pandemic.

## ABSTRACT

ELEAZAR HERNANDEZ

### AN INVESTIGATION OF THE IMPACT OF THE COVID-19 PANDEMIC ON THE USE OF COMPUTER-AIDED INSTRUCTION IN MIDDLE SCHOOL CHORAL PROGRAMS

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The purpose of this study was to determine how the COVID-19 pandemic impacted the use of computer-aided instruction (CAI) in Texas middle school choral classrooms.

Participants ( $n = 23$ ), Texas middle school choral directors, were asked to complete a researcher-designed survey about their demographics and their use of CAI in the classroom both pre-March 2020 and post-March 2020. Results indicated that CAI use increased after March 2020, with Flipgrid, Chrome Music Lab, Sight Reading Factory, iTunes, Garageband, and Musttheory.net being the most frequently used CAI in their respective categories. Participants considered tracking student progress as the greatest challenge to using CAI. Almost 70% of participants had less than one year's experience using CAI and 50% had been required to teach in-person, synchronously, and asynchronously simultaneously. Future studies could determine if the increased use of CAI in music classrooms extends to other areas of music and if music teachers will continue to incorporate CAI in the post-pandemic period.

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## CHAPTER I

### INTRODUCTION

The use of technology in the music classroom has grown significantly over the past 40 years (Dammers, 2009). The turn of the 21st century marked an increased inclusion of technology in classrooms across the United States. The COVID-19 pandemic spurred the creation of new computer software and educational resources as teachers had to rethink and restructure curricula almost instantaneously. Music educators were faced with the challenge of teaching a performance-based art virtually. Ensemble directors had to adjust to a hybrid of socially distanced and masked performers and virtual learners rehearsing and performing via video conferencing platforms such as Zoom, Skype, and Google Hangouts. Concerts, if permitted, were held outdoors with a limited audience or were live streamed in an empty performance hall.

Many music teachers were woefully unprepared for the transition to virtual teaching platforms. Curriculum directors, fine arts directors, and technology specialists had to quickly develop intensive training modules to equip their educators in addressing the unique needs of a music class. The lack of teacher preparation to face the challenges of virtual instruction could be attributed to deficient pre-service teacher training as well as insufficient professional development provided by school districts.

Additional challenges to music educators during the pandemic included student engagement, student online privacy, accessibility to stable internet, and computer usage at home, as well as determining effective instructional methods to ensure students were

both learning and experiencing music (Luehrsen et al., 2020). Music educators were faced with difficult decisions regarding their methodology and curricula.

The National Federation of State High School Associations and National Association for Music Education (2020) released a document providing suggestions for face-to-face and virtual music instruction and stressing the need for music programs during societal hardships as a means to support participating individuals. The document also emphasized the fluidity of national, state, and individual district guidelines in regards to music participation in the classroom, further highlighting the elusiveness of a standard for musical instruction during the pandemic.

## CHAPTER II

### LITERATURE REVIEW

Advancement in technology in the 20th and 21st centuries brought about many changes in our society. Almost every facet of society has been impacted by the inception of the internet and the subsequent changes in the way we communicate with one another. Furthermore, there is a seemingly unlimited amount of information at our fingertips via the world wide web. Bauer (2020) explained:

Perhaps more than any other single technological advancement, the internet has a profound influence on both individuals and society as a whole. It is a major source of information about diverse topics and a platform that is often used without realizing it. (p. 3)

#### **Technology in the Classroom**

Technology plays a critical role in a creative-focused education (Zhao, 2012). Zhao stated that “You cannot have personalized learning without technology” (p. 322). This creates a stark contrast to the current norm of standardized testing, required by bureaucratic mandates (Zhao, 2012). Henriksen et al. (2016) maintained:

For all its importance, creativity is a concept that has not been well understood, framed, or defined. Education needs a frame to help students and teachers develop creative thinking skills that span disciplines and use technology tools for creative solutions and outcomes. (p. 28)

Henriksen et al. (2016) added:

New technologies have altered teaching and learning rapidly, with innovations and affordances for creating and sharing ideas and content. We must consider the development and impact of learning technology not in isolation, but rather alongside opportunities for creative education. (p. 27)

Henriksen et al. (2016) went on to say that teachers must be creative using technology to teach their specific curriculum because most digital tools were not designed for educational purposes. Essentially, the burden falls onto the teacher to “repurpose existing tools for educational purposes” (Henriksen et al., 2016, p. 31).

Technology has shown to have both a positive and negative affect on music instruction. Orman’s (1998) study revealed that interactive multimedia presentations proved to be more effective than the traditional model of instrumental music instruction in both written and performance assessments. In Willett and Netusil’s (1989) study comparing the use of traditional instructional methods with computer drills in note learning, they found that the group who received the computer instruction scored significantly higher.

Smith’s (2002) two comparative studies showed results towards traditional and technological approaches to teaching musical concepts. Smith’s comparative studies in technological approaches had a negative impact on student learning. Parrish (1997) concurred that the impact technology has on education cannot be underwritten with studies based on impact to student learning. Bodley (2000) provided a study in which the

results pointed out the flexibility technology provides to allow the instructor to individualize instruction. Bodley (2000) also found that technology has a flexibility to accomplish grading and assessment tasks that would otherwise be left for the teacher to finish.

Cohen (2001) maintained that the impact of technology is dependent on its application and stressed the need for technology to be partnered with specific student learning objectives. Waxman et al.'s (2003) study revealed that the impact of technology can be both positive, when applied to student learning, and negative, when examining student behavioral outcomes.

Educational institutions across the United States have embraced the integration of technology in the classroom in the 21st century. Increased school funding geared towards technology served as an impetus to place computers in classrooms and to purchase instructional software (Etherington, 2014). The access to virtual learning has led to unintended consequences. Bernard et al. (2004) pointed out:

The reality of “learn anywhere, anytime,” promulgated largely by the communication and technological resources offered by the internet and broadband internet service providers, has set traditional educational institutions into intense competition for the worldwide market of “online learners.” (p. 383)

The rapid advancement of technology poses additional challenges to its use in the classroom (Henriksen et al., 2016; Zhao, 2012). According to the National Education Association, integration of technology in the classroom is hindered by an inadequate

number of computers, lack of technical support, and insufficient teacher training to develop the pedagogical knowledge needed (Bauer, 2020).

### **Technology in the Music Classroom**

The impact of technology on the field of music has been evident for over 100 years, beginning with the advent of sound recordings. Initially, player piano rolls were used to playback sound recordings, and influenced the creation of low-fidelity cylinders/discs, which led to the development of vinyl records (Kernfeld et al., 2003). Peters (1992) explicated the five generational developments of Computer-Aided Instruction (CAI) for the music classroom in relationship to the major innovations in technology—the 1960s and the research computer developing technology beneficial to the music classroom; the 1970s and the personal computer, further providing tools to the public for experiencing and creating academic programming; the 1980s and Musical Instrument Digital Interface (MIDI), which unified the language necessary for digital instruments and their use for a wide variety of musicians; the 1990s and the multimedia presentations in educational settings, furthering the curve for complex and creative software that provided new avenues for music technological capabilities; and, most currently, the mainstream use of the internet in modern educational settings, which yet again further provides more accessibility to strictly web-based instruction.

Williams and Webster (2005) established four categories of music CAI: drill-and-practice, flexible practice, simulation, and multimedia. Drill-and-practice reinforces and/or introduces musical concepts, much like the websites Musictheory.net or

Teoria.com. Flexible practice provides feedback of different varieties, such as the software SmartMusic. Simulation software provides the user with the ability to notate musical ideas and playback. Examples of these programs are Sibelius and Logic Pro. Lastly, multimedia software provides an interactive experience with both visual and audio capabilities. An example of this is the Quaver elementary software. Current technology in music also includes the use of digital instruments, hardware and software for sound recordings, and the ability to create a professional sounding recording in any sort of environment (Bauer, 2020). Continued innovations in technology through the 21st century have resulted in the improved quality of digital recordings available today. The advancement in digital instruments, music hardware and software, and digital recording technology is on display in today's music classrooms (Bauer, 2020; Bauer et al., 2003; Himonides & King, 2016).

In a study conducted by Abril and Gault (2008), secondary school principals indicated that they were supportive of technological integration in the music classroom. When the principals were provided a list of music courses they could add to their curriculum, 10% of the courses selected were technology-based. Results further revealed that twice as many principals chose to add a music technology class to their school's curriculum when provided a list of potential courses.

Technology provides new avenues of "constructing, representing, communicating, and sharing knowledge," while offering novel opportunities for students to share in their creative output (Henriksen et. al., 2016, p. 31). Beckstead (2001) stated that using

notation software in music classrooms to support student compositions is an example of using technology for creative purposes. He went on to say that notation software aided in developing the musicality of the students' compositional potential by both efficient and transcendental means. Savage (2005) concurred, pointing out that the cost of composing music with technology has been greatly reduced.

Kieseler (1992) described technology in terms of being amplicative, leading to more efficiency in the achievement of tasks, and transformative, showing "a qualitative change in how people think, act and react" (Burge, 1993, p. 36). Beckstead (2001) offered music notation software as an example of being amplicative, making the process of entering notes on the staff more efficient, and being transformative, providing the composer with instant feedback with the replay feature and allowing them to hear the music performed with the designated instrumental timbres.

Bauer (2020) explained the need to distinguish between the use of traditional and non-traditional notational software when teaching composition and composition pedagogy. He pointed to the need to consider the teaching process, the approach to the art form, and individual student needs when selecting software. Bauer recommended using digital sequencers, a digital audio workstation, digital instruments, and other music production tools to achieve instructional goals when teaching composition.

Technology has enabled music educators to expand the types of music course offerings and potentially appeal to students who may not be interested in participating in conventional music classes (Bauer, 2020). Bauer explained that technology can assist in

the learning process by being an alternative to traditional ensemble participation; it can also be used to develop the aural skills necessary to improvise. He suggested that software could be used in music composition, audiation, and improvisation and could contribute to the development of musical creativity.

Brown (2016) proposed that video game music could be integrated into music education in three ways: 1) sound design of video games; 2) the use of music according to the specific outcomes of the game; and 3) the computing of scripts to provide algorithmic music in the video game. He explained that these three objectives highlight not just an expressive understanding of music, but an extension into other areas of knowledge and skills considered unconventional to the avid music student. Brown cited a music class in South Korea in which the teacher assigned student teams to create samples of music, develop a narrative, and present their findings. He also discussed the Berklee College of Music's video game interactive scoring curriculum, as well as the use of the coding, web-based application, Scratch, to teach students another form of "notation" through creative computing of sound effects and music, according to the programming needs of the piece.

### **Technology in Music Classes Prior to COVID-19**

A study conducted by Ruismäki et al. (2013) on music educators' iPad usage in their classroom, focused on the process of merging education and technology. According to their findings, little is known about the integration of these two distinct fields, yet it is progressing at a rapid rate. The authors also claimed that because education and

technology have unique and contrasting goals, the time and effort needed to integrate the two is undetermined and unknown.

In Aziz's (2013) study on music education software in Tennessee public high schools, he found that students have varying degrees of interest in music technology. Aziz found that music educators use a plethora of software encompassing many objectives and standards, including: Garageband and Fruity Loops, audio recording and editing interfaces; Finale and Sibelius, notational software; Music Ace, a program that covers musical concepts at the fundamental level; EarMaster, music skills training; and lastly, SmartMusic, a program designed to help students with their participatory ensemble's music through the use of interactive play and evaluation. Results of the study indicated that technology was used in all music program areas — choral, band, orchestra, and general music. Further, the software included in this study could even be considered interchangeable according to the need or standard addressed in the music class.

Music educators have made substantial progress in developing a technology-inclusive curriculum to align with the National Association for Music Education National Standards (Aziz, 2013). Aziz posited that the National Standards can all be addressed with technology, supplemented with YouTube. Aziz included an example of an educator who incorporated technology in the classroom, using a “work at your own pace” curriculum (2013, p. 19). In essence, this model creates a space for individuals to give attention and consideration to the process and practice of their musicianship. Aziz

explained that the budgetary support for the technology was provided by grants, Title I funding, and personal contributions.

Prior to the COVID-19 pandemic, Freedman (2019) documented a wide-lens view of the inclusion of technology in the music classrooms across the country. The author found a statistically insignificant relationship between the inclusion of music technology courses and the retention of high school band and orchestra students. However, Freedman's data indicated the increased student enrollment in music the year following the integration of technology to be statistically significant. This surge in enrollment can be attributed to the rise in non-traditional music students, known as the "other 80%" (Etherington, 2014) — who did not participate in band, orchestra, or choir programs.

### **Technology in Music Classes Post-COVID-19**

The COVID-19 pandemic served as an impetus for a heightened use of technology in the music education classroom. Concerns surrounding COVID transmission, due to the release of aerosol in choral, theater, and instrumental music activities, led to alternate approaches to instruction (Stockman et al., 2021). Stockman et al. (2021) indicated that although limited rehearsal times and face coverings were recommended to lower the aerosol with viral particles, the effectiveness of these measures to safeguard against potential infection was inconclusive. Thus, educators and administrators supported the use of technology in cultivating musical experiences, due to the lower risk factor.

In their webinar on virtual music instruction, Luehrsen et al. (2020) discussed how to effectively teach an array of skills and knowledge in a virtual classroom. The webinar presenters stated that they would not name or recommend any specific computer programs in order to present the information impartially. However, they did discuss the importance of the teacher connecting with students by increasing the amount spent with them and the student's need to connect with their music teacher and class peers. Another aspect that the panel members discussed was the relevance of technology to the educator's current body of knowledge to the current practices established in the music classroom.

Sherratt (2020) stated that music educators' use of video conferencing technology (e.g., Zoom and Google Hangouts) increased exponentially during the pandemic and continues to be used in post-pandemic music classrooms. They explained that the video platforms have served as effective tools to communicate information with students and music colleagues, ranging from general meetings and gatherings to sharing audio files and PDFs.

Luehrsen et al. (2020) discussed the importance of advocating for the retention of arts education for all students, both on a legislative and grassroots level. They provided suggestions for the use of technology to facilitate virtual instruction during the restrictive educational environment caused by the pandemic. They asked that arts educators consider multiple avenues for technology integration.

## **Issues Surrounding the Integration of Technology**

Macrides and Angeli (2018) stated that many music educators' use of technology can best be described as circumnavigating three comfortable destinations: music notation, recordings of student performances, and multimedia presentations. They went on to pinpoint lack of knowledge, frameworks, research, and lack of guidance as factors for the absence of technology in the music classroom. They added that university programs are being held accountable for providing the training in technology their graduates need to be successful in their music education career.

Hadley and Sheingold (1993) found that providing teachers with technological support and making technology more readily accessible led to a higher rate of teacher implementation. Likewise, Boone's (2005) study indicated that a lack of technological support for teachers and a lack of accessibility to technology led to a negative rate of teacher implementation of technology. On the other hand, Rashotte's (2004) study showed that the positive rate of teacher implementation of technology was directly related to student and administration engagement.

Teachers' primary concern surrounding the implementation of technology was availability (Agnew, 2009; Pavlidis 2001). Palvidis (2001) found that issues sometimes arose when students did not have immediate access to a computer or when they had to share the computer with another student. In addition to the availability of technology, studies have shown (Agnew, 2009; Gilbert, 2015; Palvides, 2001) that teachers recognize the importance of being proficient in troubleshooting the technology in their classrooms.

Another concern that revolves around the implementation of technology is self-efficacy. Agnew (2009) explained that a major factor in teachers using technology in their classrooms was their confidence to implement, troubleshoot, and guide their students in technology-based instruction. Beckstead (2001) discussed the societal effect that technology has on all individuals, not just the Western world, and went on to say self-efficacy in technology can translate to a universal opportunity for people to progress in not just the technology, but also in music making.

Technology implementation in the classroom can be successful with proper, consistent, and guided teacher training (Agnew, 2009; Bauer, 2020; Bauer et al., 2003; Dammers, 2009; Etherington, 2014; Hawkins, 2018; Luehrsen et al., 2020). Dammers's (2009) research revealed that teacher self-study outside of the classroom may predispose teachers' innate attitudes toward technology. Agnew (2009) explained that teachers' perceived attitudes can influence their decision about when and how to use the technology to facilitate student learning outcomes. However, Gilbert's (2015) study of first-year instrumental classes showed that there was no direct linear relationship between the actual use of technology and the perceived attitude towards the technology.

When there is a disparity between teacher and student attitudes towards technology, it can affect the outcome of its implementation and of student learning results (Gilbert, 2015). An additional factor affecting the successful incorporation of technology is building a positive rapport between teacher and student (Agnew, 2009). Luehrsen et al.

(2020) added that incorporating technology into the curriculum can help foster positive teacher and student relationships.

### **Purpose of the Study**

The purpose of this study was to determine how the COVID-19 pandemic impacted the use of CAI in Texas middle school choral classrooms. The focus of this study was on middle school choral directors and their experiences and attitudes while working with CAI prior to and during the 2020–2021 school year. Further goals of this study were to discover how technology can be effectively incorporated into the middle school choral classroom, which computer programs are used or preferred, and what limitations are being discovered in this era of virtual learning.

### **Justification for Study**

While studies were conducted on the use of technology in music classrooms prior to the pandemic, the increased dependence on CAI during 2020 and 2021 calls for a reexamination of the topic. Further, previous research on the use of CAI in educational settings has centered on elementary, high school, and college students and educators, with a paucity of studies targeting middle school students. This deficit in the body of research points to the need to explore, catalog, and quantify the use of CAI in the middle school music classroom.

Music teachers' skill, training, and experience using technology in an educational setting is a related issue that bears examination. An investigation of the relationship between the use of CAI and the corresponding educator's understanding of and

familiarity with technology is an important aspect of the matter. Few studies have been conducted to determine the amount and type of training required for a music educator to be sufficiently proficient with technology to teach virtually and utilize CAI in their classroom.

### **Research Questions**

The following research questions were addressed in this study:

1. Which CAI software is used most frequently by Texas middle school choral educators?
2. Has there been a change in the frequency that CAI is used in the middle school choral classroom since March 2020?
3. What is the middle school choral directors' comfort level in using CAI?
4. How do middle school choral directors incorporate CAI into the instructional process?
5. What are the advantages and disadvantages of using CAI in the middle school choral classroom?

### **Significance**

Results of this study will provide important pedagogical tools for future music educators. As the use of technology continues to grow in educational settings, music teachers need to be informed about current CAI programs to make the best possible curricular decisions for their students. Teacher's limitations create a rather safe, yet outdated, practice that can hinder the possibilities for technology's seemingly limitless

capability to drive student engagement and comprehension of musical topics. This study can reinforce the emerging body of information that suggests new directions and pedagogical practices music educators can adopt with technology in their classrooms, exploring new avenues in which music technology and education can venture.

## CHAPTER III

### METHODOLOGY

The purpose of this study was to determine how the COVID-19 pandemic impacted the use of CAI in Texas middle school choral classrooms. Participants were asked to complete a survey comparing their mode of instruction (i.e., in-person, synchronous, and asynchronous) availability of CAI resources, the amount of instructional time devoted to CAI, the types of CAI used, and their level of training for using CAI pre-March 2020 and post-March 2020.

A researcher-designed survey containing two sections—demographics and use of CAI—was administered to Texas music educators. The demographics questions included age, gender, teaching assignment, grade level assignments, and student class size. The CAI usage section addressed different categories of computer applications, implementation of technology inside and outside the classroom, teacher experience and comfort level using CAI, and reasons for using CAI. The results were analyzed through a comparison of pre- and post-pandemic experiences with using CAI in the middle school choral classroom.

#### **Participants**

Participants ( $n = 23$ ) for this study were Texas middle school choral directors who were members of the vocal division of Texas Music Educators Association (TMEA). They represented various demographics, in terms of age, gender, teaching assignment, teaching experience, and school size.

Email addresses were obtained through a TMEA vocal division membership database, which did not specify the grade level or the specific teaching assignment of the members. Therefore, it was not possible to filter the desired pool of participants. Upon joining TMEA, members are given the option to withhold contact information; thus, the only members of TMEA contacted were those who had agreed to publish their emails.

The email clearly defined the participant pool as an individual “...currently teach[ing] choir to students in grades 6, 7, or 8 in the state of Texas” and contained a letter of consent (see Appendix A) and a link to the survey (see Appendix B). The first question in the survey was:” Do you currently teach choir to students in grades 6, 7, and/or 8 in the state of Texas?” If respondents did not qualify as participants based on their teaching credentials, they were directed to the end of the survey and exited.

Initially, 400 emails were sent, and 60 responses were returned (either due to email error or rejected email by receiver), leaving 340 emails delivered. Out of 340 received emails, two email responses indicated disqualification because they did not teach choir to students in Grade 6, 7, and 8, leaving 338 potential participants. Out of 338, received emails 25 participants opened the link to the survey. Two of the 25 participants responded “no” to the preliminary question about currently teaching choir to sixth, seventh, or eighth Grade and were directed to the end of the survey. The remaining 23 participants responded “yes” to the preliminary question and were allowed to continue the survey. The response rate for this survey was 6.84%, given the 60 email error

responses and the four rejections either communicated through email or the survey's preliminary question.

### **Test Instrument**

The test instrument used in this study was based on two questionnaires used by Gilbert (2015) in her study of the use of technology in the first-year instrumental music class. Gilbert's first test instrument, Technology in Music Usage Questionnaire, a 10-question inventory of technology use in first-year instrumental music instruction, was designed to determine the teacher's experience in using technology. Gilbert's second test instrument, Technology in Music Attitude Questionnaire, a 25-question inventory, was used to compare teacher, student, and parent's overall attitudes toward technology in the music classroom. These two instruments were foundational to the survey for this study because they included questions about the demographics of the participants, the usage of CAI corresponding to participant experience, independent factors of each participant's teaching assignment (class size, unique challenges), and their respective perspective on the implementation of technology in music education.

For the purposes of narrowing the specific branches of technology, the word technology was replaced with CAI. This helped direct the participants' attention to the categories of software and programs used: multimedia, drill-and-practice, and flexible practice (Williams & Webster, 2005). Zoom and Google Hangouts were not included in this study, due to possible ambiguity regarding their use in CAI, and thus potentially skewing the survey results.

A pilot study was conducted with five Texas middle school choral directors to ascertain if the survey was clearly written and if any content needed to be added or deleted. Participants in the pilot study also provided feedback regarding the amount of time required to take the survey. They also presented items to add to the checklists through their responses to “Other.” The checklists in the survey were modified to reflect their input. Based on the recommendations of the participants in the pilot study, questions were added to the survey to address the research questions more fully.

The test instrument for this study was a 27-question survey consisting of checklists, Likert-type scale items, and open-ended response questions and was divided into two sections: demographics and CAI use. The survey was designed to collect data regarding:

- Teacher education and teaching experience
- Class size, per subject and number of students in each subject
- Teacher’s initial experience with CAI/advice for CAI use
- CAI applications for choral music classroom
- Teacher experience with CAI prior to March 2020
- How and why the CAI is being used

### **Procedure**

Permission to conduct the study was obtained from the Texas Woman’s University Institutional Review Board. Emails were sent to the school email addresses found on the database of the vocal division membership of TMEA. The email contained information

about the nature, purpose, and goal of the study, a link to the test instrument, as well as a letter of consent, outlining the time and risks involved in participation and the respondent's right to withdraw from the study at any time. The initial email was sent at the close of the school year under investigation, in June 2021. A second email was sent in September 2021 to provide teachers with a second opportunity to participate once they had returned to school.

Upon consenting to participate in the study, respondents were instructed to select the link that sent them to the beginning of the survey. If respondents answered "No" to the preliminary question, "Do you currently teach choir to students in grades 6, 7, or 8 in the state of Texas," then they would be directed to the end of the survey and would exit. Respondents who met the teaching qualifications completed the survey and their responses were stored in the Google form database.

### **Data Analysis**

The survey was distributed via Google Forms. Participants' responses were analyzed utilizing the computational software embedded in the Google program. Google Forms analytics disaggregated the data into three categories: summary (charts displaying the data), itemization (the individual survey item and the participants' corresponding answers), and individual responses (each participants' answers to the entirety of their survey). Data was viewed in the summation and itemization format in order to analyze the responses to each question and its relevance to the research questions. Responses to the checklist items and Likert-type scale items were summarized using basic descriptive

statistics (frequencies and percentages) and representative charts and tables. Responses from open-ended questions were coded and were aggregated into themes. I compared the emergent themes with the items listed in the survey and summarized in tables.

## CHAPTER IV

### RESULTS

The purpose of this study was to examine the COVID-19 pandemic's effect on the use of CAI in middle school choral classrooms across the state of Texas. Participants ( $n = 23$ ) responded to a two-part survey: 1) demographic information and teaching background of directors and 2) experience with CAI in their classroom. Surveys were administered via Google forms and data were extracted from the Google website. Results are reported in tables and charts in terms of frequency and percentage of responses.

#### **Demographics**

Participants included 22 females (96%) and 1 male (4%). An examination of the age ranges of the participants showed that the younger the age, the higher the response rate (see Table 1). Ten participants (44%) fell in the 20–29 years range, and each subsequent age range decreased in number of responses: five participants (22%) selected 30–39 years, four participants (17%) selected 40–49 years, three participants (13%) selected 50–59 years, and one participant (4%) selected 60–69 years.

Years of teaching experience as a secondary choral director, by and large, corresponded with the percentage of response (see Table 2). Eight participants (35%) reported having 5 years or less of teaching experience, followed closely by seven participants (30%) who reported they had 6–10 years of experience. The next highest percentage of responses (17%) was from the four participants who reported 21–25 years of experience, followed by the two participants (9%) with 16–20 years of experience.

Both the 11–15 years of experience and the over 30 years of experience had one participant (4%) each.

**Table 1**

*Comparison of Participants' Age Range*

Age	No. of Responses	% of Responses
20 - 29 years	10	44
30 - 39 years	5	22
40 - 49 years	4	17
50 - 59 years	3	13
60 - 69 years	1	4

**Table 2**

*Years of Teaching Experience in Secondary Choral Classroom*

Years	No. of Responses	% of Responses
Less than 5 years	8	35
6 - 10 years	7	31
11 - 15 years	1	4
16 - 20 years	2	9
21 - 25 years	4	17
26 - 30 years	0	0
Over 30 years	1	4

When asked about their highest level of education, 14 participants (61%) indicated that they had a bachelor's degree and nine participants (39%) stated that they held a master's degree. While all the participants taught middle school choir, four participants (17%) also taught general music, one participant (4%) also taught music

appreciation, and one participant (4%) also taught theater. Twenty-two participants (96%) taught sixth, seventh, and eighth grade, while one participant (4%) only taught seventh and eighth grade.

### **Student Enrollment**

Participants were asked to indicate their student enrollment according to grade level. Over half of the participants selected the two largest enrollment categories for sixth grade, with eight participants (40%) reporting 51+ students enrolled and five participants (25%) reporting 41–50 students enrolled (see Table 3). Both class ranges of 19–25 students and 33–40 students, respectively, had two participants identified as their number of enrolled sixth grade students (see Table 3). No participants identified either 1–9 students nor 26–32 students as part of their sixth grade class enrollment. It is also dutiful to note that two participants did not also correspond with answering their exact number of sixth grade enrollment, mistakenly answering “Choir” as part of the survey question.

**Table 3**

*Number of Participants’ Students Enrolled in 6th Grade*

No. of Students in class	No. of Responses	% of Responses
51+ students	8	40
41 - 50 students	5	25
33 - 40 students	2	10
26 - 32 students	0	0
19 - 25 students	2	10
10 - 18 students	3	15
1 - 9 students	0	0

Over half of the participants selected the two largest enrollment categories for seventh grade, with eight participants (38%) reporting 51+ students enrolled and six participants (28%) reporting 41–50 students enrolled (see Table 4). The remaining participants reported their seventh grade enrollment as follows: three participants (14%) had 10–18 students, two participants (10%) had 26–32 students, one participant (5%) had 19–25 students, and one participant had 33–40 students. Two participants disqualified themselves from inclusion in the reporting due to providing an invalid response.

Reporting of eighth grade enrollment revealed that over half of the participants selected the two largest enrollment categories, with eight participants (38%) reporting 51+ students enrolled and six participants (28%) reporting 41–50 students enrolled (see Table 5). The remaining eighth grade enrollment figures are as follows: four participants (19%) had 10–18 students, two participants (10%) had 26–32, and two participants (10%) had 33–40 students.

**Table 4**

*Number of Participants' Students Enrolled in 7th Grade*

No. of Students in class	No. of Responses	% of Responses
51+ students	8	38
41-50 students	6	28
33-40 students	1	5
26-32 students	2	10
19-25 students	1	5
10-18 students	3	14
1-9 students	0	0

**Table 5**

*Number of Participants' Students Enrolled in 8th Grade*

No. of Students in class	No. of Responses	% of Responses
51+ students	7	33
41-50 students	6	28
33-40 students	2	10
26-32 students	2	10
19-25 students	0	0
10-18 students	4	19
1-9 students	0	0

### **Incorporation of CAI in Choral Classroom**

When participants were asked to identify their greatest challenge when using CAI in the classroom, their most frequent response (18%) was difficulty in tracking students' progress (see Table 6). The following three challenges, each identified by three participants (13%), included: technology was too unfamiliar to incorporate in a timely manner; CAI troubleshooting and its respective learning curve; and the CAI they used had limitations with their preferred uses. Each of the following challenges were named by two participants (9%): students' lack of access to the internet at home, internet troubleshooting issues, and students being off task during their instructional time. Additional challenges, each named by one participant (4%), included: no access to a functioning device at home, finding additional CAI resources, the technology was too unfamiliar for the students to use, and students finishing their work quickly and not having anything to do during the remainder of class.

**Table 6***Participants' Greatest Challenge Using CAI in the Choral Classroom*

Challenge	No. of Responses
Difficult to track student progress	4
CAI unfamiliar to teachers	3
Technology limitations	3
Troubleshooting/learning curves for CAI	3
Internet troubleshooting issues	2
No access available for students (internet)	2
Students off-task	2
CAI unfamiliar to students	1
Finding additional CAI resources	1
No access to electronic devices (students)	1
Students not having enough work; finishing early	1

In a free response format, participants were asked what advice that they would offer to their colleagues regarding CAI use in the choral classroom (see Table 7). Each of the following responses were named by two participants: asking other educators for help, not using CAI for singing activities, individual student CAI focus, teacher investment in CAI, and student learning on CAI. Individual participants highlighted several additional entries for advice when using CAI in the choral classroom as detailed below.

**Table 7***Participants' Advice for Use of CAI in the Choral Classroom*

Participants' Advice	No. of Responses
Ask for help	2
Don't use for singing	2

Individual focus with each student on CAI	2
Invest in learning the CAI	2
Teaching students the CAI	2
No advice	2
Be as prepared as possible	1
Consistent/daily use	1
Focus on student relationships	1
Hybrid class, in-person & virtual attendance	1
Provide more energy to compensate for loss of face-to-face interaction	1
Provide paper materials in order to enhance focus	1
Smaller class sizes	1
Teach CAI expectations and etiquette prior	1
Using different approaches	1
Using multiple CAI platforms	1
Visual CAI/using share screen	1

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*Note.* 23 participants provided a total of 23 responses.

### **Video Apps**

Participants were asked to indicate how frequently they used Flipgrid, Loom, Voice Record Pro, or Other Video Apps in classroom instruction prior to March 2020 and after March 2020. They were also asked about the use of the same video apps in virtual instruction prior to March 2020 and after March 2020 (see Table 8). Over half of participants indicated that they increased their use of video apps in both classroom and virtual instruction after March 2020. Flipgrid was the most frequently used video app both prior to and after March 2020. The category of Other Video Apps was the next most popular category, and included apps such as Google Classroom, BeepBox, and Musiconline. Voice Record Pro was ranked third in terms of use and Loom was used by the lowest number of participants.

**Table 8***Participant Usage of Video Apps*

Video App	Type of Instruction/Time Period	No. of Responses
<i>Flipgrid</i>	In-Class Instruction/Prior to March 2020	3
	In-Class Instruction/After March 2020	8
	Virtual Instruction/Prior to March 2020	4
	Virtual Instruction/After March 2020	12
<i>Loom</i>	In-Class Instruction/Prior to March 2020	1
	In-Class Instruction/After March 2020	3
	Virtual Instruction/Prior to March 2020	1
	Virtual Instruction/After March 2020	3
<i>Voice Record Pro</i>	In-Class Instruction/Prior to March 2020	3
	In-Class Instruction/After March 2020	4
	Virtual Instruction/Prior to March 2020	2
	Virtual Instruction/After March 2020	5
<i>Other Video Apps</i>	In-Class Instruction/Prior to March 2020	7
	In-Class Instruction/After March 2020	8
	Virtual Instruction/Prior to March 2020	7
	Virtual Instruction/After March 2020	10

**Composition Apps**

Participants were asked to indicate how frequently they used Chrome Music Lab, eMedia Music Corporation, Flat for Education, Incredibox, Noteflight, Solfege.io, or Other Composition Apps in classroom instruction prior to March 2020 and after March 2020 (see Table 9). They were also asked about the use of the same composition apps.

**Table 9***Participant Usage of Composition Apps*

Comp App	Type of Instruction/Time Period	No. of Responses
<i>Chrome Music Lab</i>	In-Class Instruction/Prior to March 2020	3
	In-Class Instruction/After March 2020	5
	Virtual Instruction/Prior to March 2020	3
	Virtual Instruction/After March 2020	9
<i>eMedia MusicCorp.</i>	In-Class Instruction/Prior to March 2020	0
	In-Class Instruction/After March 2020	0
	Virtual Instruction/Prior to March 2020	1
	Virtual Instruction/After March 2020	1
<i>Flat For Educ.</i>	In-Class Instruction/Prior to March 2020	2
	In-Class Instruction/After March 2020	4
	Virtual Instruction/Prior to March 2020	0
	Virtual Instruction/After March 2020	4
<i>Incredibox</i>	In-Class Instruction/Prior to March 2020	3
	In-Class Instruction/After March 2020	4
	Virtual Instruction/Prior to March 2020	2
	Virtual Instruction/After March 2020	4
<i>Noteflight</i>	In-Class Instruction/Prior to March 2020	3
	In-Class Instruction/After March 2020	3
	Virtual Instruction/Prior to March 2020	2
	Virtual Instruction/After March 2020	2
<i>Solfeg.io</i>	In-Class Instruction/Prior to March 2020	1
	In-Class Instruction/After March 2020	1
	Virtual Instruction/Prior to March 2020	1
	Virtual Instruction/After March 2020	2

<i>Other</i>	In-Class Instruction/Prior to March 2020	4
<i>Comp Apps</i>	In-Class Instruction/After March 2020	4
	Virtual Instruction/Prior to March 2020	4
	Virtual Instruction/After March 2020	4

### Music Theory Apps

Participants were asked to indicate how frequently they used Aurelia, EarMaster, Sight Reading Factory, or Other Music Theory Apps in classroom instruction prior to March 2020 and after March 2020. They were also asked about the use of the same music theory apps in virtual instruction prior to March 2020 and after March 2020 (see Table 10). Most participants used Sight Reading Factory the most out of all other apps in this category. Other Music Theory Apps such as Musictheory.net came was the second most frequently used. Participants used Aurelia and EarMaster prior to March 2020 but did not use them after March 2020.

**Table 10**

#### *Participant Usage of Music Theory Apps*

Theory App	Type of Instruction/Time Period	No. of Responses
<i>Aurelia</i>	In-Class Instruction/Prior to March 2020	2
	In-Class Instruction/After March 2020	0
	Virtual Instruction/Prior to March 2020	0
	Virtual Instruction/After March 2020	0
<i>EarMaster</i>	In-Class Instruction/Prior to March 2020	1

	In-Class Instruction/After March 2020	1
	Virtual Instruction/Prior to March 2020	0
	Virtual Instruction/After March 2020	0
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<i>Sight Reading</i>	In-Class Instruction/Prior to March 2020	11
	In-Class Instruction/After March 2020	14
<i>Factory</i>	Virtual Instruction/Prior to March 2020	7
	Virtual Instruction/After March 2020	16
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<i>Other Theory Apps</i>	In-Class Instruction/Prior to March 2020	2
	In-Class Instruction/After March 2020	2
	Virtual Instruction/Prior to March 2020	3
	Virtual Instruction/After March 2020	3
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### Lesson Activity Apps

Participants were asked to indicate how frequently they used iTunes or Other Lesson Apps in classroom instruction prior to March 2020 and after March 2020. They were also asked about the use of the same lesson activity apps in virtual instruction prior to March 2020 and after March 2020 (see Table 11). Prior to March 2020, participants used iTunes more frequently than other lesson activity apps. After March 2020, other lesson activity apps such as YouTube, Teoria.com, and Canvas were used slightly more frequently than iTunes.

**Table 11**

#### *Participant Usage of Lesson Activity Apps*

Lesson App	Type of Instruction/Time Period	No. of Responses
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<i>iTunes</i>	In-Class Instruction/Prior to March 2020	8
	In-Class Instruction/After March 2020	7
	Virtual Instruction/Prior to March 2020	3
	Virtual Instruction/After March 2020	5
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<i>Other Lesson Apps</i>	In-Class Instruction/Prior to March 2020	4
	In-Class Instruction/After March 2020	5
	Virtual Instruction/Prior to March 2020	4
	Virtual Instruction/After March 2020	6
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### Digital Audio Workstations

Participants were asked to indicate how frequently they used Ableton Live, Garageband, Logic Pro, or Other DAW Apps in classroom instruction prior to March 2020 and after March 2020. They were also asked about the use of the same digital audio workstation apps in virtual instruction prior to March 2020 and after March 2020 (see Table 12). Garageband was the most frequently used DAW app. The second frequently used DAW app was Other Apps such as Soundtrap and SmartMusic, while only one participant used Ableton live and Logic Pro prior and after March 2020.

**Table 12**

#### *Participant Usage of Digital Audio Workstation Apps*

DAW App	Type of Instruction/Time Period	No. of Responses
<i>Ableton Live</i>	In-Class Instruction/Prior to March 2020	1
	In-Class Instruction/After March 2020	1
	Virtual Instruction/Prior to March 2020	1
	Virtual Instruction/After March 2020	1

<i>Garageband</i>	In-Class Instruction/Prior to March 2020	7
	In-Class Instruction/After March 2020	6
	Virtual Instruction/Prior to March 2020	3
	Virtual Instruction/After March 2020	4
<i>Logic Pro</i>	In-Class Instruction/Prior to March 2020	1
	In-Class Instruction/After March 2020	1
	Virtual Instruction/Prior to March 2020	1
	Virtual Instruction/After March 2020	1
<i>Other DAW Apps</i>	In-Class Instruction/Prior to March 2020	3
	In-Class Instruction/After March 2020	3
	Virtual Instruction/Prior to March 2020	3
	Virtual Instruction/After March 2020	3

### Other Forms of CAI

Participants were asked to list other forms of CAI they used that were not mentioned in the list of apps categorized under Video, Composition, Music Theory, Lesson Activity, and DAWs (see Table 13).

**Table 13**

#### *Other Forms of CAI Usage by Participants*

CAI Name	No. of Response
<i>Musictheory.net</i>	6
<i>Smartmusic</i>	2
<i>BeepBox</i>	1
<i>Canvas</i>	1
<i>Drawing Pad</i>	1
<i>Forescore</i>	1
<i>Google Classroom</i>	1
<i>Kahoot</i>	1

<i>Musiconline</i>	1
<i>Nearpod</i>	1
<i>Piascore</i>	1
<i>Quaver</i>	1
<i>SeeSaw</i>	1
<i>Soundtrap</i>	1
<i>Teoria</i>	1
<i>Theta Music Trainer</i>	1
<i>TPT Digital Activites</i>	1
<i>Virtual Piano</i>	1
<i>YouTube</i>	1

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### CAI Experience prior to March 2020

Participants were asked to indicate their experience with CAI prior to March 2020 (see Table 14). Sixteen participants (69%) said they had less than 1 year of CAI experience and two participants (9%) indicated that they only had 1 year of CAI experience, thus indicating that approximately 80% of participants had 1 year or less of CAI experience prior to March 2020. On the other hand, only two participants (9%) reported 5+ years of CAI experience, two participants (9%) reported 4 years of CAI experience, and one participant (4%) reported 3 years of CAI experience.

**Table 14**

*Participants' Experience with CAI Prior to March 2020*

CAI Experience (in years)	No. of Responses	% of Responses
Less than 1 year	16	69
1 year	2	9
2 years	0	0
3 years	1	4
4 years	2	9
5+ years	2	9

### Average Percentage of Instructional Time Dedicated to CAI

Participants were asked how much instructional time, on average, they dedicated to using CAI prior to March 2020 and after March 2020 (see Table 15). Prior to March 2020, approximately 90% of participants reported that they used CAI less than 10% of their instructional time. Furthermore, most participants used CAI less than 50% of the time prior to March 2020. After March 2020, the percentage of participants who used CAI less than 50% of the time decreased to approximately 70%. Conversely, prior to March 2020, approximately only 4% of participants reported using CAI over 50% of their instructional time, and after March 2020, that percentage increased to approximately 30%.

**Table 15**

#### *Average Percentage of Instructional Time Using CAI*

% of Instructional Time	Time Period	No. of Responses
Less than 10%	Prior March 2020	14
	After March 2020	6
10-19%	Prior March 2020	0
	After March 2020	2
20-29%	Prior March 2020	2
	After March 2020	3
30-39%	Prior March 2020	3
	After March 2020	2
40-49%	Prior March 2020	1
	After March 2020	4

50-59%	Prior March 2020	0
	After March 2020	1
60-69%	Prior March 2020	0
	After March 2020	0
70-79%	Prior March 2020	0
	After March 2020	3
80-89%	Prior March 2020	0
	After March 2020	0
90-100%	Prior March 2020	1
	After March 2020	3

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### **Student Usage of CAI Outside of Classroom**

Participants were asked how much, on average, students were expected to use CAI outside of the classroom prior to March 2020 and after March 2020 (see Table 16). Almost all participants used CAI for less than 1 hour, prior to March 2020. That number decreased after March 2020; however, most participants still kept CAI usage for less than 1 hour. The second most used time frame was 3 - 4 hours, with four participants spending 3–4 hours on CAI usage after March 2020. After March 2020, three participants spent 1–2 hours, two participants spent 5–6 hours, and one participant spent over 10 hours. Prior to March 2020, most participants did not use CAI for more than 1 hour.

**Table 16**

*Average Time of Expected Student CAI Usage Outside of the Classroom*

CAI Use Time	Time Period	No. of Responses
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Less than 1 hour	Prior March 2020	20
	After March 2020	13
1-2 hours	Prior March 2020	0
	After March 2020	3
3-4 hours	Prior March 2020	1
	After March 2020	4
5-6 hours	Prior March 2020	0
	After March 2020	2
7-8 hours	Prior March 2020	0
	After March 2020	0
9-10 hours	Prior March 2020	0
	After March 2020	0
Over 10 hours	Prior March 2020	0
	After March 2020	1

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### **Level of Comfort with Using CAI**

Using a 5-point Likert scale, participants were asked to rate their level of comfort using CAI in their classrooms (see Table 17). Categories included: 5) *Absolutely comfortable*, 4) *Semi-comfortable*, 3) *Neutral*, 2) *Semi-uncomfortable*, and 1) *Absolutely uncomfortable*. One participant (4%) said they felt *absolutely uncomfortable* using CAI in the classroom. Three participants (13%) said they felt *semi-uncomfortable* using CAI in the classroom. Three participants (13%) said they felt *neutral* using CAI in the classroom. Sixteen participants (70%) said they felt *semi-comfortable* using CAI in the classroom. Two participants (9%) said they felt *absolutely comfortable* using CAI in the classroom. The mean was 3.65, the median was 4, and the mode was 4.

**Table 17***Number of Participants' Students Enrolled in 7th Grade*

Level of Comfort	No. of Responses	% of Responses
Absolutely uncomfortable	1	4
Semi uncomfortable	3	13
Neutral	1	4
Semi comfortable	16	70
Absolutely comfortable	2	9

**Form of Instructional Delivery as of March 2020**

Participants were asked to indicate the format of instruction they have used since March 2020 (see Table 18). Eleven participants (49%) taught in-class and in synchronous (virtual instruction held simultaneously while in-person instruction occurred) and asynchronous (virtual instruction held at the time of the student's choosing, with pre-recorded material) format, followed by four participants (17%) who taught solely in-class, three participants (13%) who taught in-class and asynchronously, and two participants (9%) who taught solely synchronously. One participant reported teaching in-class and synchronous format, one in synchronous and asynchronous format, and one in asynchronous format.

**Table 18***Participants' Format of Instructions since March 2020*

Format(s)	No. of Responses	% of Responses
In-class + Synchronous + Asynchronous	11	49
In-class	4	17
In-class + Asynchronous	3	13
Synchronous	2	9
In-class + Synchronous	1	4
Synchronous + Asynchronous	1	4
Asynchronous	1	4

### CAI Usage and Form of Instructional Delivery

Participants were asked about the incorporation of CAI in various forms of instruction (see Table 19). Most of the participants (49%) incorporated CAI in all three formats of teaching. The second most frequent format was in-class instruction only, followed by the combination of in-class instruction and asynchronous, and then synchronous instruction only.

**Table 19***Participants' Incorporation of CAI in Various Formats of Instruction*

Format(s)	No. of Responses	% of Responses
In-class + Synchronous + Asynchronous	13	57
In-class	4	17
Synchronous	3	13
Asynchronous	2	9
In-class + Asynchronous	1	4

### How CAI is Used in the Music Classroom

Participants were asked to select the instructional categories in which they used CAI from a provided checklist (see Table 20). Over 50% of the participants reported using CAI in six out of the 12 categories, including singing recordings ( $n = 19$ ), listening ( $n = 17$ ), singing assessment ( $n = 16$ ), visual display of notation ( $n = 16$ ), accompaniment ( $n = 15$ ), and non-singing games (rhythm, audiation, kinesthetic;  $n = 12$ ). Composition/arranging ( $n = 10$ ) and singing games ( $n = 9$ ) were the next most frequent instructional categories selected. One participant selected each of the remaining instructional categories: social-emotional learning lessons/district initiatives for reading and writing, theory and rhythm assignments, non-singing knowledge checks, and notes.

**Table 20**

*Use of CAI in the Music Classroom*

CAI Category	No. of Responses
Singing Recordings	19
Listening	17
Singing Assessment	16
Visual Display of Notation	16
Accompaniment	15
Non-Singing Games (Rhythm, Audiation, Kinesthetic)	12
Composition/Arranging	10
Singing Games	9
Knowledge Checks (Non-Singing)	1
Notes	1
Social-Emotional Learning	1
Theory & Rhythm Assignments	1

### **Reasons for CAI Use in the Music Classroom**

Participants were asked to select reasons for using CAI in their classroom from a checklist (see Table 21). The most frequently selected reasons, each chosen by 14 participants, were because CAI was readily available and CAI was useful in teaching secondary choral music rhythms, audiation, and kinesthetic learning. The next most frequent responses, each selected by 10 participants, were because they felt confident about CAI, the CAI they used was inexpensive, CAI was easy for their students to use, and CAI bridged the gap between in-person and virtual instruction. Eight participants said they used CAI because it was required at their school, and eight participants said they used CAI because they were knowledgeable about the CAI they used. A single respondent selected each of the following reasons: they used CAI because they thought most students are still learning from home so there is no other way, they used CAI because it is an effective way to assess without spending too much time in class, and they used CAI because it was necessary to use during the pandemic.

**Table 21**

*Reasons for CAI Use in the Music Classroom*

Reasons	No. of Responses
CAI is readily available	14
I think CAI is useful in teaching secondary choral music (Rhythm, audiation, kinesthetic learning)	14
I feel confident about using CAI	10
I think CAI bridges the gap between singing in the classroom and virtual instruction	10
I think CAI is easy for my students	10

The CAI I use is inexpensive	10
CAI is required at my school	8
I am knowledgeable about the CAI I use	8
It is an effective way to assess without spending too much time in class	1
It was necessary during the COVID-19 pandemic	1
Most students are still learning from home	1

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### Other Reasons for CAI Use in Music Classroom

In a free response format, participants were asked to list their reasons for using CAI in the classroom (see Table 22). The most frequent response ( $n = 3$ ) was that students were still learning virtually, due to the pandemic. Two participants pointed to students being technologically advanced and accustomed to using technology. In addition, two participants explained that they used CAI for assessment, collection of data, and for assignments. Other responses provided by only one participant included: useful, staying relevant, providing students with a visual aid, future of musical notation, and required.

**Table 22**

#### *Other Reasons for Participants' CAI Use in the Classroom*

Reasons	No. of Responses
Students are still learning from home/pandemic	3
Individualized assessment, data, and assignments	2
Students are technologically advanced/accustomed to tech	2
Future of music notation	1
Required	1

Staying relevant	1
Student visual aid	1
Useful	1

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*Note.* 12 participants provided a total of 12 responses

### **Why CAI Was Not Used**

Participants were asked to select reasons why they had not used CAI in the classroom from a checklist (see Table 23). Five participants said they did not use CAI because they did not think it bridged the gap between singing in the classroom and virtual instruction. Four participants said they did not use CAI because they were not familiar enough with any of the programs to use them effectively. Two participants said they did not use CAI due to a lack of confidence. One participant selected each of the following reasons for not using CAI: it was not required at the school where they taught, it was not readily available to use, it was too expensive to use, they did not find it useful in secondary choral music, rhythm, audiation, or kinesthetic learning, it does not have a place in their instruction, it is too time consuming to teach students how to use the technology, their school district could not provide the technology resources, and it was considered to be “sometimes more work.”

**Table 23**

*Participants’ Reasons for Not Using CAI in the Classroom*

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Reason	No. of Responses
I think CAI does not bridge the gap between singing in the classroom and virtual instruction	5

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I do not know any CAI programs enough to use them effectively	4
I do not feel confident enough to use CAI	2
CAI is not readily available	1
CAI is not required at my school	1
CAI sometimes equates to more work	1
CAI is too time-consuming to initially teach students	1
I do not think CAI is useful in secondary choral music (rhythm, audiation, kinesthetic learning)	1
I don't use technology for everything	1
Lack of previous experience	1
Using CAI is too expensive	1

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### **Other Reasons for Not Using CAI**

In a free-response format, participants were asked to list their reasons for not using CAI in the classroom (see Table 24). The following were the answers they provided on their respective surveys. The most common reasons for not using CAI were not having enough teacher support to learn CAI as well as CAI's lack of accommodation when it came to matters of facilitating performance-based needs of singing. The following responses were individual participants sharing their specific concerns about not using CAI in the classroom.

**Table 24**

*Other Reasons for not Using CAI in the Classroom*

Reasons	No. of Responses
Not enough support to spend time learning CAI	2
CAI cannot accommodate performance-based needs of singing	2
Not using CAI for more than teaching	1

CAI cannot teach spirit of teamwork and comradery	1
Not valuable nor substantial substitute for functional music reading	1
Encourages off-task behavior	1
Not readily available	
School was in person, so CAI was not emphasized	1
Students are not confident using the CAI	1
Too much inclusion of technology in other classes	1

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*Note.* 8 participants provided a total of 12 responses

## CHAPTER V

### DISCUSSION

#### **Summary**

The purpose of this study was to determine how the COVID-19 pandemic impacted the use of CAI in Texas middle school choral classrooms during the 2020–2021 academic year. This descriptive research study documented the experiences of Texas choral directors and their uses of CAI while facing the unknown challenges of being an instructional leader in the midst of the COVID-19 pandemic.

Throughout the literature review, different aspects of CAI implementation were brought to light, along with the challenges and opportunities associated with including this technological tool in the music classroom. Research questions from this study were designed to provide insight into the middle school choral directors' experiences with CAI in their classrooms.

#### **Question 1**

Which CAI (Computer Aided Instruction) software is used most frequently by Texas middle school choral educators? A highly used video app was Flipgrid, which 12 participants (52%) said they used virtually after March 2020. This app was also mentioned in the Other category. Flipgrid was chosen more than the other video apps in its category. While it may have similarities to video-conferencing applications such as Zoom, this app was included on the list of video apps because it had the unique capability of creating individual recording beneficial for asynchronous learning. These recordings

of individual student performance could be submitted for direct feedback by the teacher. This could have been sufficient reason for the positive use amongst teachers.

The most frequently used composition app was Chrome Music Lab, with 39% of participants using the app after March 2020 during virtual instruction. One aspect to consider is the number of participants ( $n = 4$ ) that teach general music and the possible correlation between class subjects and the use of the app. Another aspect to consider is the grade levels that may have switched to virtual instruction. Almost all participants taught sixth, seventh, and eighth grade and over half of participants taught some format of virtual instruction. These factors could suggest the increase of popularity of Chrome Music Lab as an app to effectively deliver instructional content in both virtual and in-person settings.

The most frequently used music theory app was Sight Reading Factory. Participants frequently shared Sight Reading Factory in the other category as a CAI they used in the classroom. However, this could also be a case of a participant re-stating what they may have chosen in their answer to survey item 16. The popularity of Sight Reading Factory was demonstrated by the fact that around 25% of directors used it in in-person instruction and over 50% used it in virtual instruction after March 2020.

One participant wrote, “In a regular classroom setting, I only use Sight Reading Factory as a teaching resource.” Interestingly, 48% of all the participants used Sight Reading Factory prior to March 2020. Meanwhile, a decrease of CAI used less than 10% of instructional time was dispersed to other degrees of instructional time, ranging

between 20% to 100% of instructional time is dedicated to CAI. In both results, prior to and after March 2020, Sight Reading Factory's consistent results, in comparison to other applications, correlated with the overall response to the use of the application itself. This could perhaps be attributed to the nature of the different teaching situations given to teachers. The software could be considered a part of the drill-and-practice category (Williams & Webster, 2005), and as such, could have provided the student with an ability to practice skills. This may have also attended to the synchronous and asynchronous students, who would have access to the software simply by attending class online.

Garageband was reported to be the most frequently used (DAW) app by participants. It is interesting to note the slight decrease in use after March 2020 and the slight increase of use in the virtual format after March 2020. Perhaps the use of the app was simply transferred from in-person to virtual. Being an Apple-exclusive entity, Garageband's use in the classroom may be related to its innate presence, as well as its capabilities in both mobile devices and laptop/computers (Bauer, 2020; Etherington, 2014). This could have been the case with the increase in virtual instruction after March 2020.

## **Question 2**

Has there been a change in the frequency that CAI is used in the middle school choral classroom since March 2020? Overall, there was a positive increase in change in regard to the frequency that CAI was used in the middle school choral classroom since March 2020. Participants' choices increased in most of the categories. In fact, all apps

except eMedia, Aurelia, EarMaster, Ableton Live, and Logic Pro had increases in usage after March 2020, either in person or virtually. One thing to consider was the use of virtual instruction in participants' teaching. While participants held more in-person instruction, two-thirds of the participants had some form of virtual instruction (synchronous or asynchronous) as part of their teaching assignment.

The requirement for implementation of virtual instruction is unique to the music classroom post-March 2020, thus the studies in the literature review that address the use of CAI may not have taken virtual instruction into consideration. An exception is Carney's (2010) study of the use of web-based music theory instruction to a piano studio. With that in mind, the question now turns to the increase of the use of CAI, encompassing different categories and frameworks. One participant wrote that "kids are more technologically advanced and CAI instruction helps them refine their ear training, solfege singing, and vocal sing[ing], and music reading." This one account may also be indicative to other individual teachers' circumstances. Perhaps supplemental action to implement more CAI can counteract the problem of accessibility to student learning.

Another possible cause for the increase in the use of CAI could be correlated to the age of participants and the number of years of teaching experience. This study showed that over 60% of participants were between the ages of 20–39 years, and over 60% of participants had teaching experience of between 0–10 years. The age and experience factors may be related to the studies that favor CAI professional development (Agnew, 2009; Bauer et al., 2003; Beckstead, 2001; Luehrsen et al., 2020; Zhao, 2012)

and may have spoken to the reality of emerging, younger teachers and their emphasis on technological training. These results are inconclusive, however, based on the small participant size of this study. However, the data may provide insight into teachers' level of training using technology and CAI.

### **Question 3**

What is the middle school choral directors' comfort level in using CAI? Data showed that 70% of participants considered themselves to be *semi-comfortable* with using the CAI they had in their classrooms. Data also indicated that around 70% of participants had less than 1 year of experience using CAI in the classroom. Henriksen et al.'s (2016) study suggested an essentially systemic and creative change to the use of technology in our society. These authors considered the use of teacher education as a primary factor for developing creative teachers, which, in turn, means that teachers have the ability to incorporate technology that may help students examine their own creativity. This need for training teachers to effectively incorporate technology in their classes reveals a potential stumbling block for teachers who are ill-equipped to incorporate technology to guide their students.

Data from this study revealed that, while under different circumstances, the implementation of technology was an avenue for teachers to innately implement creative solutions to the challenge of teaching virtually and in person. This conclusion could be an alternative to the perhaps more traditional model, in which teachers may see technology as separate from the learning process.

Another aspect that Henriksen et al. (2016) considers is the educational policy that supports the widespread implementation of technology in classrooms. Data from the study revealed that the impetus for many teachers to implement CAI was due to the requirements of their respective school districts. While only eight participants (35%) claimed that their school districts required the use of CAI in the classroom, further investigation may reveal information necessary for consideration of requirements set forth by the school district and participants' level of comfort using CAI.

#### **Question 4**

How do middle school choral directors incorporate CAI into the instructional process? Data showed that the CAI chosen by 83% participants ( $n = 19$ ) was singing recordings. This was perhaps the most frequently used software due to the necessity of choral directors to hear their students from the acoustical framework that is more available from in-person instruction, rather than virtual instruction. With that said, this could perhaps account for the use of Flipgrid and other high-scoring apps, such as Chrome Music Lab, as part of the method that teachers used to have students record themselves singing. The type of CAI used in the classroom is directly related to the teachers and students' needs. Studies conducted by Aziz (2013) and Gilbert (2015) supported the use of SmartMusic with instrumental students. SmartMusic falls under the category of flexible practice (Williams & Webster, 2005). The use of CAI for singing recordings may be seen as a means to achieve the same result as a flexible program, such

as SmartMusic, in which a student is able to complete a practice round and receive feedback based on their recorded performance.

Participants ( $n = 17$ ; 74%) selected listening as the next highest scoring reason using CAI in the music classroom. In this category, both apps chosen from a checklist and those indicated in the other section were investigated. Sight Reading Factory was a frequent choice of participants ( $n = 16$ ) post-March 2020 as was Musictheory.net ( $n = 6$ ). The popularity of these apps indicated that some of the participants were interested in developing listening activities for their students, despite the unique circumstances created when teaching virtually and in person. This may correlate with the ideals set forth in Luehrsen (2020)'s webinar on effective online music instruction. It cannot be emphasized enough how crucial music listening is to helping students understand and unlock their musicality (Bauer, 2020; Himonides & King, 2016).

Sixteen participants selected both singing assessment and visual displays of notation, which tied for the third-highest scoring answer. There may be a correlation between Sight Reading Factory being ranked first among CAI used and the high percentage of participants choosing to use CAI for singing assessments. Another correlation could also be between Chrome Music Lab and visual display of notation. Pulham (2019) explored the alternatives to teaching choral ensembles online, and suggested the use of emporium reasoning, a method in which traditional instructional time is substituted for an open-lab style instructional period. Under the emporium model,

use of Chrome Music Lab and Sight Reading Factory could create an alternative, yet engaging experience for the choral student.

### **Question 5**

What are the advantages and disadvantages of using CAI in the middle school choral classroom? Participants were asked to provide reasons both for including CAI in the middle school choral classroom and for not including CAI. An average of 7.9 participants responded to questions about why they use CAI, whereas an average of 1.7 participants answered why they did not use CAI in their classroom. In the Other categories for each question, a total of 12 responses provided other reasons for using CAI, while a total of 8 responses provided other reasons for not using CAI.

This may reveal a few different aspects of this question and the inherent perceptions of CAI's role in the classroom. The different approaches schools took during this unknown and challenging school year may be one reason for the variety of answers and perspectives represented in the answers. Consideration of the geographic size of the state, as well as the variety of regions within the state, may account for this irregularity of responses. Another aspect to consider is the comparison of the number of answers between reasons for using CAI and reasons for not using CAI. Around 80% fewer participants answered why they did not use CAI in the classroom, compared to participants answering why they did use CAI in the classroom, and around 30% participants gave other reasons for why they did not use CAI compared to participants stating other reasons why they did use CAI.

Perhaps there might have been a disadvantage to questions towards the end of the survey test instrument. The test instrument may not have adequately represented participants' answers deemed representative to the not using CAI in the classroom. Teachers could consider the negative effects to CAI implementation according to the instructional demands in both in-person and virtual instruction. Another consideration could be that the answers for why to not use CAI could have had a greater burden of proof than the reasons for why to use CAI in the classroom. Therefore, the considerations for CAI use demonstrate a variety of perceptions given on the topic of the advantages and disadvantages of using CAI in the classroom.

For the documented reasons behind not using CAI in the classroom, one consistent response was that participants did not find that CAI bridged the gap between singing in person and singing virtually. Luehrson et al. (2020) described this aspect as a limitation to the use of virtual capabilities in such a way that tries to substitute for the in-person experience. Sherratt (2020) explained the limitations of a video-conferencing application in terms of using it to substitute for the in-person musical experience. This is also something to consider with application choices by participants because of the performance nature of music classrooms. Consideration for technology and future innovations can lead to closing the gap between in-person and virtual musical experiences.

When considering the advantages of using CAI in the classroom, several technological tools are available to music educators. Pulham's (2019) emporium model

of addressing alternatives of musical experiences, while not a direct substitute for an in-person musical experience, utilizes CAI software to enable students to perform certain musical tasks and apply certain musical concepts with some degree of authenticity. One example from this survey is the use of Sight Reading Factory during class. This CAI may be used as an accompaniment for both in-person and virtual students to follow. DAWs, while not used as frequently by participants, can be beneficial under the emporium model (Pulham, 2019). This simulation practice CAI (Williams & Webster, 2005) can provide students with opportunities to not only compose, but to experience in-person musical experiences in a new way. One participant said the following: “Technology is the future of musical notation for learning and performance. I want to prepare my students so that they can be successful when academic choral music moves beyond the parchment score.”

This consideration is solely one example of the potential benefit for CAI implementation. This also may coincide with participants’ choice in the answer “I think CAI is useful in teaching secondary choral music (rhythm, audiation, kinesthetic learning).” These CAI apps, along with the ability to compose, can provide a wide array of opportunities for students to experience music that is not so heavily contingent on the in-person factor (Bauer, 2020; Brown, 2016; Dammers, 2009; Himonides & King, 2016).

### **Implications for Music Education**

As the 2021–2022 academic year is underway, some practices may have remained to preserve continuity in music classrooms. The use of certain CAI may have continued into this current academic year, and there may not have been adequate time or resources

to reflect on the positive and negative aspects of CAI use in the music classroom. This study may preserve itself as a snapshot of the beginning of an immense movement towards CAI use in the classroom and may inherently document music education needs based on factors such as school district requirements, ease of use, and versatility in both in-person and the virtual realm. Music teachers may show increasing interest in using CAI, especially if current school conditions in schools today continue for the foreseeable future.

An implication this study may have uncovered is the appropriateness of CAI usage according to different types of instruction and assessment. This can show different sides to using CAI, according to different factors such as student size, class needs, and overall student learning outcomes. This study shows, on a small scale, the use of certain CAI and the possible outcomes that can occur because of the implementation. These findings can help teachers who may be curious to begin their own process of CAI use by considering some factors that may work for or against CAI use and certain applications that lead to successful student engagement and achievement of learning objectives.

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APPENDIX A

Email to Teachers Requesting Participation in Survey

## LETTER OF CONSENT

My name is Eleazar Hernandez, and I am currently a graduate music education student at Texas Woman's University. Under the supervision of my professor, Dr. Vicki Baker, I am in the process of collecting data for my thesis entitled "An Investigation of the Impact of the COVID 19 Pandemic on the Use of Computer-Aided Instruction in Middle School Choral Programs."

The purpose of this study is to investigate the use of computer program based technology during the 2020-2021 academic year.

If you would be willing to participate in this study, please complete the survey at the link

below: <https://forms.gle/ZCwnk966Ff7PcxNd8>

Completion of the survey will take approximately 10 minutes.

By completing this survey, you are indicating consent to participation in the study. While there is a potential risk of loss of confidentiality in all email, downloading, and internet transactions, the data will remain confidential as far as possible in compliance with state and federal law. An additional risk is the loss of time. Since the survey is online, you can take the survey whenever it is convenient. You may stop at any time, take breaks, and come back to the survey.

Participation in this study is voluntary and you may withdraw at any time. If you are

interested in the results of this survey, you can contact me at [smorgan4@twu.edu](mailto:smorgan4@twu.edu).

Thank you for your participation in my research.

Sincerely,

Eleazar Hernandez

M.A. in Music Education candidate

Texas Woman's University

Department of Music

[ehernandez42@twu.edu](mailto:ehernandez42@twu.edu)

This research study has been reviewed and approved by Texas Woman's University Institutional Review Board for the Protection of Human Subjects.

## APPENDIX B

### Survey Instrument

## SURVEY INSTRUMENT

Section 1 of 5

# Technology Use Prior to and During the 2020-2021 COVID Pandemic School Year

The following survey will address CAI (Computer Aided Instruction) programs. This survey will NOT address video conferencing programs such as Zoom, Skype etc.

Section 2 of 5

## Consent to Participate

By completing this survey, you are indicating consent to participation in the study.

Confidentiality will be protected to the extent that is allowed by law. There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions. When submitted, the survey will be sent directly to my Google forms account. I will store the files on my personal computer at home through my institution's Google drive account. This will only be accessed through my personal computer at home. Once finished with the study, I will erase all contents of the Google drive files.

The risk of time lost will be minimized through the opportunity for the participants to skip questions they do not desire to answer, which will inherently save time on going through the survey. Since the survey is online, you can take the survey whenever it is convenient. You may stop at any time, take breaks, and come back to the survey. Participation in this study is voluntary and you may withdraw at any time.

Thank you for your participation in my research.

Section 3 of 5

## Preliminary Question

Do you currently teach choir to students in grades 6, 7, and/or 8 in the state of Texas?

- Yes
- No

Section 4 of 5

## Demographics

Gender:

- Female
- Male

Years of experience in teaching secondary choral music (including current year):

- 5 years or less
- 6-10 years
- 11-15 years
- 16-20 years
- 21-25 years
- 26-30 years
- Over 30 years

Highest degree earned:

- Bachelors
- Masters
- Doctorate

Teaching assignment. (Select all that apply):

- Choir
- General Music
- Other

Grade(s) currently teaching:

- 6<sup>th</sup> Grade
- 7<sup>th</sup> Grade
- 8<sup>th</sup> Grade

Indicate the number of students enrolled for each grade level. (Select N/A if you do not teach a grade level listed)

	1-9	10-18	19-25	26-32	33-40	41-50	50+	Choir
Grade 6	<input type="checkbox"/>							
Grade 7	<input type="checkbox"/>							
Grade 8	<input type="checkbox"/>							

What is your greatest challenge to using CAI (Computer Aided Instruction) technology in your classroom?

Do you have any advice for your fellow music educators about using CAI (Computer Aided Instruction) in the choral classroom?

Section 5 of 5

## CAI (Computer Aided Instruction) Use

Select all that apply.

Video Apps:

	In class Instruction PRIOR to March 2020	In class Instruction AFTER March 2020	Virtual Instruction PRIOR to March 2020	Virtual Instruction AFTER March 2020
Flipgrid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Voice Record Pro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Composition Apps:				
	In class Instruction PRIOR to March 2020	In class Instruction AFTER March 2020	Virtual Instruction PRIOR to March 2020	Virtual Instruction AFTER March 2020
Chrome Music Lab	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
eMedia Music Corporation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flat for Education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incredibox	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Noteflight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
O-Generator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solfeg.io	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music Theory Apps:				
	In class Instruction PRIOR to March 2020	In class Instruction AFTER March 2020	Virtual Instruction PRIOR to March 2020	Virtual Instruction AFTER March 2020
Aurelia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EarMaster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Focus on Sound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Musition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sight Reading Factory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lesson Activity Apps:				
	In class Instruction PRIOR to March 2020	In class Instruction AFTER March 2020	Virtual Instruction PRIOR to March 2020	Virtual Instruction AFTER March 2020
Groovy Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

iTunes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DAWs (Digital Audio Workstation)				
	In class Instruction PRIOR to March 2020	In class Instruction AFTER March 2020	Virtual Instruction PRIOR to March 2020	Virtual Instruction AFTER March 2020
Ableton Live	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GarageBand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logic Pro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: Please specify which program(s) you are using.				
How much experience with using CAI (Computer Aided Instruction) in the classroom did you have PRIOR to March 2020?				
Years of experience in teaching secondary choral music (including current year):				
<input type="checkbox"/> Less than 1 year				
<input type="checkbox"/> 1 year				
<input type="checkbox"/> 2 years				
<input type="checkbox"/> 3 years				
<input type="checkbox"/> 4 years				
<input type="checkbox"/> 5+ years				
On average, what percentage of instructional time do you use CAI (Computer Aided Instruction) in the classroom?				
	PRIOR to March 2020		AFTER March 2020	
Less than 10%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10-19%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20-29%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30-39%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40-49%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50-59%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60-69%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70-79%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80-89%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

90-100%	<input type="checkbox"/>	<input type="checkbox"/>
<p>On average, how many minutes per week do you expect students to use CAI (Computer Aided Instruction) outside of the classroom?</p>		
	PRIOR to March 2020	AFTER March 2020
Less than 1 hour	<input type="checkbox"/>	<input type="checkbox"/>
1-2 hours	<input type="checkbox"/>	<input type="checkbox"/>
3-4 hours	<input type="checkbox"/>	<input type="checkbox"/>
5-6 hours	<input type="checkbox"/>	<input type="checkbox"/>
7-8 hours	<input type="checkbox"/>	<input type="checkbox"/>
9-10 hours	<input type="checkbox"/>	<input type="checkbox"/>
Over 10 hours	<input type="checkbox"/>	<input type="checkbox"/>
<p>On a scale of 1 - 5, with 1 being absolutely uncomfortable and 5 being absolutely comfortable, how would you rate your level of comfort with using your preferred CAI (Computer Aided Instruction) in the classroom?:</p>		
<p><input type="checkbox"/> 1 – Absolutely Uncomfortable</p> <p><input type="checkbox"/> 2 – Semi Uncomfortable</p> <p><input type="checkbox"/> 3 – Neutral</p> <p><input type="checkbox"/> 4 – Semi Comfortable</p> <p><input type="checkbox"/> 5 – Absolutely Comfortable</p>		
<p>In what format(s) of instruction are students being taught as of March 2020? (Select all that apply):</p>		
<p><input type="checkbox"/> In class instruction</p> <p><input type="checkbox"/> Synchronous Learning</p> <p><input type="checkbox"/> Asynchronous Learning</p>		
<p>In what format(s) of instruction is the CAI (Computer Aided Instruction) being used as of March 2020? (Select all that apply):</p>		
<p><input type="checkbox"/> In class instruction</p> <p><input type="checkbox"/> Synchronous Learning</p> <p><input type="checkbox"/> Asynchronous Learning</p>		
<p>How do you use CAI (Computer Aided Instruction) in the classroom? (Select all that apply):</p>		
<p><input type="checkbox"/> Singing Assessment</p> <p><input type="checkbox"/> Singing Recording</p> <p><input type="checkbox"/> Singing Games</p> <p><input type="checkbox"/> Accompaniment</p> <p><input type="checkbox"/> Composition/Arranging</p>		

<input type="checkbox"/> Visual Display of Notation <input type="checkbox"/> Listening <input type="checkbox"/> Non Singing Games (Rhythm, Audiation, Kinesthetic) <input type="checkbox"/> Other:
<p>Why do you use CAI (Computer Aided Instruction) in the classroom? (Select all that apply):</p> <input type="checkbox"/> I feel confident about using CAI <input type="checkbox"/> CAI is required at my school <input type="checkbox"/> CAI is readily available <input type="checkbox"/> The CAI I use is inexpensive <input type="checkbox"/> I think CAI is easy for my students <input type="checkbox"/> I think CAI is useful in teaching secondary choral music (Rhythm, Audiation, Kinesthetic learning) <input type="checkbox"/> I am knowledgeable about the CAI I use <input type="checkbox"/> I think CAI bridges the gap between singing in the classroom and virtual instruction <input type="checkbox"/> Other:
<p>Other: Why do you use CAI (Computer Aided Instruction) in the classroom?</p>
<p>Why do you NOT use CAI (Computer Aided Instruction) in the classroom? (Select all that apply):</p> <input type="checkbox"/> I do not feel confident about using CAI <input type="checkbox"/> CAI is not required at my school <input type="checkbox"/> CAI is not readily available <input type="checkbox"/> Using CAI is too expensive <input type="checkbox"/> I do not think CAI is useful in teaching secondary choral music (Rhythm, Audiation, Kinesthetic learning) <input type="checkbox"/> I do not know any CAI programs enough to use them effectively <input type="checkbox"/> I think CAI does not bridges the gap between singing in the classroom and virtual instruction <input type="checkbox"/> Other:
<p>Other: Why do you NOT use CAI (Computer Aided Instruction) in the classroom?</p>