The Status of Technology Integration in Music Classrooms and Implications for Technology Training: A Survey of K-12 Music Educators in Four Southeastern States

by

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A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Music Education

Auburn, Alabama
December 11, 2021

Keywords: Technology, Music, Education, Music Education, Covid-19

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Abstract

The purpose of this descriptive study was to investigate the status of technology integration in K-12 music classrooms after the onset of Covid-19 across four states in the southeast. Music teachers in Alabama, Arkansas, Louisiana, and Mississippi completed an online survey concerning their technology use, comfort levels with technology, training since the onset of Covid-19, and barriers to technology integration. Results of studies conducted before the onset of Covid-19 concerning technology integration in music classrooms demonstrated a slow increase in technology use. However, more studies emerging concerning technology in education since the onset of Covid-19 reveal a need for further training of pre-service and in-service educators to integrate technology into their instruction successfully.

The Technology Usage and Integration Survey developed for this study was sent to music educators in Alabama, Arkansas, Louisiana, and Mississippi through the National Association of Music Education Research Assistance Program. In addition, emails sent to the leadership of the music educators associations for each state concerning further disseminating the survey to their membership resulted in 58 total participants. Results revealed an increase in the use of and comfort level with technology specific to distance learning such as recording equipment, video conferencing software, online platforms, interactive websites, and apps for tablet devices after the onset of Covid-19. Most training the respondents received was either from their school district or from independent research. The results have implications for the effectiveness of training for educators who need to become comfortable with using technology during their instruction and will contribute to the continued conversation about the importance of technology training for pre-service and in-service music educators.

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Thank you to my family for all you have done for me throughout my life and my father-in-law for always being there for me. Thank you to my husband for your unwavering support in all that I do. I could not have achieved all I have in my life without you. Also, a special thank you to my mother-in-law, who is no longer with us, for helping me realize my dream and supporting me through the beginning of the process to make that dream a reality. We miss you and this is for you.

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CHAPTER 1

INTRODUCTION

The recent events concerning Covid-19 shed light on the importance of technology for education. Teachers worldwide had to adapt to teaching remotely and become more tech-savvy due to school closures from Covid-19. Music teachers at all levels of education found themselves forced to find ways to give their students a quality music education remotely. Many music educators began researching and teaching themselves how to create virtual choirs and bands, online classrooms and assignments, conduct virtual rehearsals, and even hold virtual auditions. The need for technology workshops, professional development, and courses for undergraduate and graduate music educators on technology use and integration became more prevalent than ever.

There are signs that some educators had begun integrating computer-based learning before the onset of Covid-19. However, the lack of knowledge on teaching remotely demonstrated that many educators are still basing their curricula mainly on a paper-based method (Norris & Soloway, 2020) and not exploring how technology can enhance their teaching. Many current educators may be digital immigrants in that they may have used technology growing up and are willing to use it in their classrooms. Still, they are not entirely familiar with all its potential uses (Herther, 2009). It is important to note that technology is not the final answer to all the needs in music education. However, integrating technology into music instruction can help music educators meet their students' needs in this digital society of virtual and hybrid learning. Past studies found that even though many current teachers are comfortable using technology in general, they may be hesitant to use technology in their classrooms (Aydin et al., 2016; Russell et al., 2003; Teo, 2011).

Need for Study

K-12 schools over the past few decades have begun to spend ever-increasing amounts of money on technology for their classrooms which revealed a need for more studies on the level of technology integration in these classrooms (Baron et al., 2003). Fortunately, more studies are investigating the role, effectiveness, integration levels, budgetary spending, and teacher training of education technology (Waddell & Williamon, 2019). These studies extend to almost all areas of education, including music. Research concerning technology integration in music classrooms since the mid-1990s includes the Sehmann and Hayes (1996) study concerning the integration of technology in music programs in Kentucky, the Reese and Rimington (2000) study of technology in Illinois music classrooms, and the Dorfman (2008) study of how music teachers use and integrate technology in Ohio schools. The few studies conducted since the onset of Covid-19 in February/March of 2020 specific to music education have found a unique set of challenges for music educators, especially in rural and higher poverty schools (Hash, 2021). My literature review did not reveal any similar studies conducted in the southern states, especially when considering any changes in technology usage for music educators after the onset of Covid-19. The four states chosen for this study are consistently among the lowest-ranked states in education in the southeast and the highest concerning poverty levels.

Education Statistics

The four states included in this study are Alabama, Arkansas, Louisiana, and Mississippi. The National Association of Education Statistics and the National Report Card consistently listed these four states in the bottom ten concerning education test data. They tended to be the bottom four or five compared to other states in the southeast since the early 2000s. Tests scores in 2019 for these four states were significantly lower than the national average. In contrast, most

surrounding southern states such as Oklahoma, Georgia, Florida, Tennessee, and Texas tended to test at or above average in almost all tested subject areas (The Nation's Report Card, n.d.). Teacher salaries for three of the four states for 2021 were in the bottom seven of all fifty states (World Population Review, n.d.). The percentage of children under eighteen years of age living in poverty for the four states in this study has been the highest of the surrounding southern states since 1990 (see Figure 1) (National Center for Education Statistics, 2020).

Purpose

The purpose of this descriptive study was to investigate the status of technology integration in K-12 music classrooms across four states in the southeast after the onset of Covid-19. Music teachers in Alabama, Arkansas, Louisiana, and Mississippi completed an online survey concerning their technology use, comfort levels with technology, training since the onset of Covid-19, and barriers to technology integration. The study results provided information about the training music teachers received from college and university music education programs and professional development opportunities to teach with technology. All states included in this study have revised their state education standards and frameworks in almost all subject areas to reflect the use of technology for instruction and students' technology education sometime during the last two decades. This study also revealed how those revised education standards are addressed in the music classrooms of those four states.

Research Questions

The following research questions guided this study:

1. Were there any changes in the most common forms of technology used by music educators after the onset of Covid-19 in each of the four states included in this study?

2. Were any changes in the music educators' comfort level with performing certain tasks using various forms of technology during their instruction after Covid-19 related to their years of experience or degree level?
3. Was there any relationship between changes in the music educators' comfort level with performing certain tasks using various forms of technology during their instruction after Covid-19 and the reported forms of technology training music educators received after the onset of Covid-19?
4. Were the music educators selected common barriers to technology usage and integration related to the participants' state, locale classification, or specific content area?

Assumptions, Limitations, and Delimitations

The participants included K-12 music educators teaching in public and private elementary and secondary schools across Alabama, Arkansas, Louisiana, and Mississippi. The survey was disseminated through the National Association for Music Education Research Assistance Program and the leadership of the music educators' associations in each state. Therefore, I assumed potential participants invited to complete the survey would respond accurately. Each survey question concerned technology use in their classrooms before and after the onset of Covid-19 in February/March of 2020.

A limitation of this study is that any music educator who is not a member of NAfME or their state's music educators association would not receive an invitation to complete a survey. Thus, not all music educators in each state would have the opportunity to complete the survey. Music educators that did receive an invitation to participate in the study may not have felt compelled to complete the survey. A delimitation for the study is that the respondents were

limited to music teachers in Alabama, Arkansas, Louisiana, and Mississippi and may not represent music teachers from other geographic locations in the United States. The results of future studies conducted on different geographic regions of the United States compared with the results of this study will demonstrate any differences between regions concerning technology use and integration in music classrooms.

CHAPTER 2

RELATED LITERATURE

Children today live in a world saturated with technology, with many using various forms of technology since birth. The National Center for Education Statistics (2019) found that in 2017, 97.3% of children ages three to eighteen were living in a home with some form of technology such as a computer, tablet, or smartphone. As teachers of these digital natives, it is crucial to understand how that impacts our educational practices (Herther, 2009; Portowitz et al., 2014). Educational institutions seek to adapt their teaching methods by integrating educational technology to meet the students' needs as digital natives. The ones on the front line of this technology integration effort are the classroom teachers who are increasingly "expected to use technology tools in many cases" (Teo, 2011, p. 2432). Leaders in the music education field have called for technology integration into the music classroom since the Tanglewood Symposium in 1968 (Dammers, 2012). While technology is becoming a critical aspect of music education, technology integration has been a slow process (Dammers, 2009). However, the onset of Covid-19 has created a new normal for educators' use of technology (An et al., 2021).

Several studies conducted worldwide investigated the level of technology integration in classrooms of all subject areas before the onset of Covid-19 (Aydin et al., 2016; Barron et al., 2003; Dammers, 2012; Dorfman, 2008; Portowitz et al., 2014; Reese & Rimmington, 2000; Sehmann & Hayes, 1996; Teo, 2011; West & Graham, 2005). In addition, studies conducted since the onset of Covid-19 are investigating how the pandemic has changed the use of technology in education (An et al., 2021; Hash, 2021; Spoel et al., 2020; & Rahmadi, 2020). The following sections discuss the findings of many of these studies. Those findings include several gaps in technology integration from school district to school district, barriers to integration,

teacher hesitation to integrate, lack of training, the numerous benefits to technology integration, revised education standards, education technology during a pandemic, and recommendations for teacher training.

Technology in Education

According to the National Center for Educational Statistics, 98% of schools in the United States had internet access in the classrooms by 2008 (2010). By 2017, 94% of children ages three to eighteen had access to the internet in their own homes (2019). Along with increased access to the internet, new and advancing technologies are being developed each day in all fields, including education. Schools, universities, administrators, and teachers are looking to these ever-evolving technologies in education to improve classroom learning and teaching (West & Graham, 2005). Budget spending on educational technology across the nation, at all academic levels, has increased in many institutions by as much as ten percent (Aydin et al., 2016; Barron et al., 2003; West & Graham, 2005). The number of students per computer reported in schools between 1997 and 2002 dropped from nine students for each computer to approximately four students for each computer (Hughs, 2014), and by 2008 that number had fallen to three students per computer (National Center for Education Statistics, 2008). The Institute of Education Sciences reported in the *Teachers' Use of Technology for School and Homework Assignments* (2020), for the 2018-2019 school year, that 26% of public-school teachers indicated their school or district-provided computers which could be taken home for each of their students during the school year.

Some researchers have pointed out that while some educators have shown enthusiasm for and a willingness to use the new technologies, many have either been hesitant, skeptical, or not willing to use educational technology to its full potential (Bauer et al., 2003; Matthews &

Johnson, 2017; Russell et al., 2003; West & Graham, 2005). Educators also work to keep up with updates or new technologies developed as older technologies become obsolete (Henriksen et al., 2019). Some teachers may also assume that with their students growing up using various forms of technology in their everyday lives, there is not much new that "teachers can teach them in this area" (Meltzer, 2001, p. 8). This belief may lead to teachers having low self-efficacy about effectively integrating technology in their classrooms (Matthews & Johnson, 2017). A survey of K-12 teachers from six schools in Ohio asked the participants about their self-efficacy and level of training in using educational technology (Vannatta & Fordham, 2004). Results revealed that teachers reported a moderately high level of self-efficacy and were open to making changes in their use of technology. However, the actual reported use of technology for students and teachers was on average twice a semester, with computers primarily used for the internet and word processing (Vannatta & Fordham, 2004).

Herther (2009) described children who have never known a world without technology and use technology for many of their daily activities as digital natives. Many teachers will fall into the categories of a digital immigrant, a digital refugee, or a digital recluse (Herther, 2009). Digital immigrants will use technology willingly but may not be as familiar with most technology uses. Digital refugees and recluses are not as willing to use many forms of technology and only use technology when there is no other choice (Herther, 2009). Educators must strive to be digital explorers and innovators by seeking new technologies and creating new ways to use existing or old technology tools for technology integration to be successful (Herther, 2009).

Technology in Music Education

Many educational institutions from K-12 and above have come to recognize the potential for technology to enhance their students' achievement (Sorah, 2012). Researchers have sought to investigate how technology is integrated into music classrooms across several states over the past few decades. In their survey of Kentucky music teachers, Sehmann and Hayes (1996) stated that while schools in the state were receiving funding for technology, the school and teacher access to the technology varied across the state. The researchers surveyed 143 Kentucky music educators concerning what type of hardware and software was available to that teacher and their frequency of technology use. Results revealed that 43% percent of the music teachers surveyed reported not having music software available for their computers (Sehmann & Hayes, 1996). Additionally, 67% of Kentucky music teachers surveyed in the Sehmann and Hayes' (1996) study reported not using technology during instruction. Even though almost all the respondents reported having some computer technology training, their training was not specific to music education (Sehmann & Hayes, 1996).

Reese and Rimington (2000) investigated the status of technology in the music classrooms of public K-12 schools in Illinois. The researchers surveyed 320 music teachers from elementary, middle, and high schools. Like Sehmann and Hayes (1996), the Illinois study examined how the students and teachers used technology, the teacher's access to technology, funding sources for any music technology, and any needs for technology training (Reese & Rimington, 2000). The results revealed that a relatively small percentage of participants use a computer during instruction, and a majority of those teachers use computers predominantly for communication and administration. One-fifth of the respondents also indicated that they asked their students to use a computer for their music classes, with 28% of those teachers asking their

students to use their computers with music software at home (Reese & Rimington, 2000). Although the Illinois study took place four years after Sehmann and Hayes (1996), a low number of Illinois music educators reported any use of computers during instruction.

Almost a decade after Reese and Rimington (2000), researchers continued to discover a lack of technology integration in the music classroom. A survey of 552 Ohio music teachers indicated that most participants reported using various forms of music technology less than once a month. An even more significant percentage of respondents reported requiring their students to use some form of music technology to complete specific tasks less than once a month as well (Dorfman, 2008). In addition, while the respondents indicated they were comfortable using technology, most of the technology was for planning and administrative purposes rather than integrated into their instruction (Dorfman, 2008). Dorfman's (2008) findings were consistent with the findings of Sehmann and Hayes's (1996) and Reese and Rimmington's (2000), in that music students were not being actively engaged with technology during instruction on a regular or even semi-regular basis.

Dammers's (2009) study examined technology-specific music classes in high schools in the public school system around New Jersey to see how technology was being used "as the primary medium for instruction" (p. 26). The first phase found that 28% of the respondents indicated music classes were being taught primarily with technology (Dammers, 2009). Those that offered technology-based music courses deemed music composition and sequencing as more essential skills. Furthermore, 80% of the music teachers agreed that a "technology-based music class" (Dammers, 2009, p. 31) was crucial in reaching those students not enrolled in a performance ensemble or "non-traditional music students" (Dammers, 2009, p. 33). A similar study of public high school music programs across the United States found that fourteen percent

of respondents offered classes on music technology, most with the primary purpose of reaching the "nontraditional music students" (Dammers, 2012, p. 81).

While there had not been many empirical studies conducted around the beginning of the twenty-first century concerning why teachers were not utilizing technology such as computers during instruction, researchers made many assumptions as to why (Zhao & Cziko, 2001). Some of these assumptions included "lack of suitable training, technical and administrative support, and systemic incentives, traditional pedagogical beliefs, and resistance to change" (Zhao & Cziko, 2001, p. 7). Studies conducted within the first decade of the twenty-first century found teachers becoming more comfortable with the use of technology but still did not feel they had the skills to integrate it into their instructional practices successfully (Bauer et al., 2003; Dorfman, 2008; Okojie et al., 2006; Staples et al., 2005; Vannatta & Fordham, 2004). Lack of software and hardware and disinterest in integrating instructional technology have also been barriers to technology integration in music classrooms (Bauer et al., 2003; Dorfman, 2008; Kay, 2006). Nevertheless, trends in music education, and the emergence of new technologies each day, have revealed the 2010s as a time for growth in music technology integration (Dammers, 2012; Henrikson et al., 2019; Klein & Lewandowski-Cox, 2019; Waddell & Williamon, 2019).

Defining Music Technology and Integration

The term 'technology' has its origins in the two Greek words; 'techne' and 'logos,' meaning craft/art and reason/logic, respectively (Webster, 2002). According to researchers Klein and Lewandowki-Cox (2019), "Music technology is an interdisciplinary field of study examining the interactions between the disciplines of music and technology from creative, technical, scientific, historical, philosophical, and cultural perspectives" (p. 637). The use of music education technology can be found as far back as the medieval period with the use of Guidonian

Hand by Guido of Arezzo (Webster, 2002). Music technology has evolved to become so much more over the centuries since Guido. The definition of music technology has seen a drastic evolution just in the past several decades. Music technology since the 1950s has moved from large computers found mainly on college campuses to personal computers that could run more affordable music software in primary and secondary schools. Since then, the development of compact discs (CD's), interactive software, and Music Instrumental Digital Interface, or MIDI (Webster, 2002), has changed music education technology use. Since the 1990s, music technology is a term that has become more widely used in music classrooms around the world. The term music technology can, however, have several different "operational definitions" (Dorfman, 2008, p. 25) and have different meanings based on what region of the world it is being used (Boehm, 2008).

Many researchers and authors offer a variety of definitions of music technology and its use in education. A basic definition of technology as it is used for instruction is some form of "technical device or tool used to enhance instruction" (Okojie et al., 2006, p.66). Music technology encompasses many such devices and tools developed over the past several decades. Hardware devices in music technology can include electronic keyboards and synthesizers, sound modules, guitar synthesizers, multi-track recorders, MIDI devices, and software for notation, recording, sequencing and arranging, and editing (Bryne & Macdonald, 2002; Smith, 2005). While the most common technology item used in music classrooms have been computers, which run the software and media devices, interactive whiteboards, laptops, and tablets are being found more frequently in music classrooms (Waddell & Williamon, 2019). Music technology has also come to include digital resources and tools. Media technologies, such as digital, visual, and audio media, can be used for music instruction (Okojie et al., 2006). Digital resources and tools can

include sites for streaming videos and music, apps that can be downloaded and used for music theory lessons, interactive digital instruments, notation and accompaniment software, games, and lesson planning websites and apps (Murillo, 2017).

Many music teachers find themselves limited on the types of technology they can utilize that are music-specific (Dorfman, 2013). Teachers integrating technology would decide what technology they would like to use based on the needs of the lesson, their students' learning goals, and adapt the technology for the lesson (Okojie et al., 2006). A variety of non-music specific technologies integrated into the music curriculum can include PowerPoint or Google Slides to create a presentation of musical examples, iMovie found on Apple systems to make music videos, and Adobe's pdf reader to set hyperlinks to other pages in a file to create music theory games (Smith, 2005).

Benefits of Music Education Technology

It is important to note that while technology is not the final answer to all the needs in education, integrating technology into educational instruction can help educators meet the students in this digital society. Music technology integration can motivate students and engage them in learning (Dammers, 2013; Gorgoretti, 2019). Murillo (2017) surveyed 72 elementary music teachers in the western part of Texas to investigate their beliefs on the benefits of digital resources as part of their curriculum and which of three digital music lesson platforms were most used and found to be most beneficial. The online platform known as Quaver's Marvelous World of Music was the most frequently used of the three more widely known platforms (Murillo, 2017). The participants reported the integration of technology in their classrooms has helped to improve student participation, behavior, and information retention (Murillo, 2017). Gorgoretti's (2019) study of technologies used by music teachers in North Cyprus revealed participants

reported technology use helped motivate their students, create more engaging lessons, save time, and assist in lesson planning. Participants also indicated that technology integration helped foster a more student-centered classroom, increasing student self-confidence (Gorgoretti, 2019).

Education During a Pandemic

The onset of Covid-19 across the world caused many schools to close. Alternative means of education had to be explored, such as virtual learning. Even educators who considered themselves digital natives before the pandemic found themselves more like digital immigrants when it came to quickly learning how to use new software and online platforms when creating effective and inclusive virtual classrooms for their students (An et al., 2021; Herther, 2009; & Rahmadi, 2020). Schools and other educational institutions were finding their students were more capable of quickly adapting to an online learning environment than many educators (Spoel et al., 2020). Studies of educators in Indonesia, Turkey, and the Netherlands found that teachers who had prior skills with using and knowledge of technology were more likely to adapt quickly to virtual classes and e-learning (An et al., 2021).

Barriers other than a lack of skills and knowledge among educators can prevent educators from adapting to virtual learning during the pandemic. Lack of participation among students, poor or no internet access in rural areas, and lack of access to devices for teachers and students have contributed to difficulties with virtual learning (An et al., 2021). While funding through local companies and federal grants helps provide hot spots and devices to facilitate virtual education, educators need the training to increase their confidence and comfort with using and implementing the technology necessary for the new reality of distance education. Music education for students in the K-12 and university settings faced a unique set of challenges with the rise of virtual learning (Thomas et al., 2021). Many pre-service teachers were in the middle

of their teacher internship when the pandemic hit. Schools closing due to lockdowns caused many teacher interns to finish their internships through live meets with their cooperating teacher and the students (Thomas et al., 2021). The need and effectiveness of technology after the onset of Covid-19 for pre-service and in-service teachers is still under research.

Music Technology Standards

The 2017 revision of the National Education Technology Plan states that technology can "help affirm and advance relationships between educators and students, reinvent our approaches to learning and collaboration, shrink long-standing equity and accessibility gaps, and adapt learning experiences to meet the needs of all learners" (p. 3). The authors of the NETP note that over the past decade technology has become so prevalent in our society that those involved in education are seeking to learn how to use technology to improve teaching and learning rather than whether or not it should be used (2017). The U.S. Department of Education frequently revises federal mandates for schools concerning technology integration. Schools are expected to create plans for integrating educational technology in all their classrooms and develop technology-literate students.

Researchers have defined technology literacy in several ways. All the definitions agree that for someone to be literate with the technology, they need to be able to evaluate, use, adapt, and communicate through technology in positive ways (Davies, 2011). Fine arts, including art, drama, music, theater, and dance, are now considered a core part of students' education. Technology is considered an essential part of arts education. States across the country, including the four that are a part of this study, have revised their state education standards and frameworks in almost all subject areas to reflect the use of technology as part of instruction in creating

technology-literate students. Updating arts education standards was an essential part of those revision processes.

Arts Standards for Alabama, Arkansas, Louisiana, and Mississippi

The Alabama 2016-2017 Course of Study for Arts Education stated that "technology is an integral part of the arts education classroom, enhancing the curriculum and providing avenues for creative self-expression" (p. 4). The writers did acknowledge that different areas around Alabama have different access to various forms of technology, and school districts can work to meet the standards in the course of study through whatever technology resources they have available in their area (Alabama State Department of Education, 2017). The music section in the Alabama Arts Education Course of Study (2017) includes technology not only as its content area but also to be used in the other music content areas such as general music, performing ensembles, theory, and composition. The Louisiana *Arts Content Standards*, revised in 2004, lists technology as a foundational skill that includes the ability to use computers, word processors, video and audio materials, interactive devices, information communication technology, and any new technologies emerging. The portion of the Arts Content Standards lists the frameworks and benchmarks for the different music content areas, including using technology throughout as an aspect of the music standards (Louisiana Arts Content Standards, 2004).

Arkansas and Mississippi also revised their music education state standards. Arkansas's Department of Education revised their *Fine Arts Standards and Courses* in 2014 and listed separate links to each section to each section of the standards. Several content areas specific to music instruction include technology as a tool used as part of music activities. The standards also have a link for a section specific to music technology which states that "Music Technology is a

two-semester course designed for the study of technologies used to create, manipulate, perform, record, and share music" (Fine Arts Curriculum Framework, 2014, p. 1). The Mississippi Department of Education revised its arts standards in 2017 to become the *Mississippi College- and Career Readiness Arts Learning Standards*. The revised standards not only list music technology as a performance standard to be integrated into music activities for all grades and music content areas, but also as its own music strand for grades nine through twelve in which students are to use technology tools specifically for performing, creating, and responding to music (Mississippi Department of Education, 2017).

Music Technology Training for Educators

Studies find that even though many current teachers are comfortable using technology, they are not comfortable using technology in their classrooms for instruction (Aydin et al., 2016, Funkhouser & Mouza, 2012, Russell et al., 2003; Teo, 2015). Simply having the technology available in the classroom is not enough. Music teachers need to integrate technology into their instructional practices. Okojie et al. (2006) describe technology integration "as a process of using existing tools, equipment, and materials, including the use of electronic media, for the purpose of enhancing learning" (p. 67). For teachers to effectively integrate technology into their instruction, they need to develop literacy with the technology they seek to integrate.

The National Association of Schools of Music 2019-2020 Handbook details procedures, standards, and policies concerning the accreditation of university and college music programs. The handbook lists various types of music technology that are to be adequately provided for students, whether they are music majors or non-majors or if their degree is specifically in music technology (National Association of Schools of Music, 2020). Although many higher education institutions are incorporating technology instruments into their teacher education programs,

studies are demonstrating that many teachers entering the classroom are not well-versed in the skills to fully integrate technology into their instruction and are mainly using technology as a tool for presentations (Funkhouser & Mouza, 2012; Lemon & Garvis, 2016).

Teacher Self-Efficacy and Training Needs

Lemon and Garvis (2016) surveyed 206 pre-service teachers from two universities in Australia, asking participants to rank their level of self-efficacy using technology for instruction. Overall, the pre-service teachers from Victorian University had higher mean scores on all but one item on the survey. These researchers suggested that this may be due to the participants' different experiences at their university, which lead to different influences on their self-efficacy using technology. For example, the content of their coursework, opportunities for professional experience, and how the degree program is structured can all foster different levels of self-efficacy. The researchers also suggested that the different mean scores could indicate a higher technology integration at Victorian University.

A study that began in 2001 and spanned three years with two phases surveyed 2,894 teachers across twenty-two school districts in Massachusetts as a part of the "Use, Support, and Effect of Instructional Technology Study" (Russell et al., 2003, p.298) or USEIT. Results revealed that while new teachers were more confident with the use of technology in the classroom than older teachers, newer teachers felt more strongly about technology harming their students' learning experience and required less classroom technology use from their students than the older teachers with six years or more of experience (Russell et al., 2003)

Researchers have also investigated music education training for pre-service and in-service music teachers. Gorgoretti (2019) surveyed eighteen undergraduate student music teachers from a university in North Cyprus in the last year of their studies. The questionnaire

results showed that while there was a lack of music technology resources in the schools where the SMTs were doing their student teaching, many SMTs were not even using the technology that was available such as digital pianos. The results also indicated the participants had an overall positive perception about technology improving music lesson efficiency, effects on learning, student enjoyment of the lessons, and teacher duties. The obstacles to using technology in the music classroom included poor internet connection at the school, low quality of equipment, and access to software (Gorgoretti, 2019).

Haning (2016) surveyed forty-six music education majors in 2013 from ten different institutions in the state of Ohio in their senior year who had completed or were close to finishing all the requirements for their degree. The participants answered closed and open-ended questions concerning their demographics, philosophical beliefs, technology instruction, and future plans. The results found that most participants indicated they had received technology training from "stand-alone courses" (Haning, 2016, p. 86), with technology not highly integrated into other coursework. The results also revealed that most of the participants' technology training revolved around sound editing, sound mixing, and notational software. Few participants indicated training in instructional music technology. Haning (2016) found a majority of the participants indicated they planned on using technology primarily for administrative and planning purposes, with a lower percentage indicating they would use technology specifically to deliver instruction, provide accommodations, and as a requirement for their students to use in the classroom. Concerning the overall question of whether or not the participants felt their coursework had prepared them to utilize various technologies in their classrooms, 57% said yes, and 43% said no (Haning, 2016).

A 2001 study conducted on 311 entering college music majors from five of the nine universities in the Big-10 Conference surveyed the participants' attitudes, skills, and knowledge of technology (Meltzer, 2001). The results revealed that the participants reported having "above-average levels of general computer literacy" (Meltzer, 2001, p. 126) and were more knowledgeable using specific word processing software. However, the participants reported being less comfortable learning new types of software (Meltzer, 2001). Almost all respondents indicated having and using a home computer, with a small number using their computers for music-related activities (Meltzer, 2001). The participants reported being comfortable with "using basic software, but want help when encountering difficulties, and their understanding of music technology is minimal" (Meltzer, 2001, p. 132). Meltzer (2001) recommended that teachers always seek opportunities to learn how to utilize and become comfortable using technology for instruction. Through workshops, staff development, and revised teacher education programs at universities, teacher training will allow teachers to improve their skills, knowledge, and attitudes with technology integration (Meltzer, 2001). Some teachers are also learning how to use music technology through personal exploration (Dorfman, 2008).

Researchers surveyed music teacher education programs in colleges and universities from nine southeastern states to inquire about their technology curriculum, types of facilities and equipment available, and the opinions of the faculty about the "status of music education technology in their state and institution" (Price & Pan, 2002, p. 58). Results revealed 39% of the universities and colleges that responded offered few, one to three, courses specific to technology training for music education, with 30% of those requiring the students to pass at least one course, and 12% required "students to pass a music education technology proficiency examination" (Price & Pan, 2002, p. 60). Many of the technology courses the music education students were

required to take only covered technology for administration purposes and were not necessarily specific to technology for instruction (Price & Pan, 2002). The researchers pointed out that many responding college and university music programs seek to expand their technology training for future music education (Price & Pan, 2002).

The effects of the pandemic lockdowns and school closures affect both in-service and pre-service music educators. The onset of the pandemic in February/March of 2020 fell in the middle of internship semesters for many pre-service music educators (Thomas et al., 2021). "Most universities and schools did not have plans in place that provided policies or guidelines for what to do in the event of extended school closures" (Thomas et al., 2021, p. 8). The lack of preparation caused many pre-service music educators not to have access to virtual classes either due to cooperating teachers believing arrangements would be made through the university or the cooperating teacher struggling to adapt to online teaching (Thomas et al., 2021). Thomas et al. (2021) found that just under 60% of pre-service music educators in Georgia "were contacted by their cooperating teacher within one week of school closures" (p. 8). Those pre-service music educators in areas with unreliable internet were limited by what form of "instruction their host school was providing" (Thomas et al., 2021, p. 8). Thomas et al. (2021) concluded that universities and host schools would need to continue to explore technology to facilitate instruction even after the pandemic is over.

Benefits of Teacher Training

Technology training programs for teachers have been beneficial to pre-service teachers. Funkhouser and Mouza (2013) study included 28 elementary teachers enrolled at a university in the Mid-Atlantic region in the U.S who had completed two required courses on technology in education. The participants completed a drawing representing themselves using technology for

instruction at the beginning and end of the course along with a written reflection for each drawing, and complete assignments that required them to do a weekly blog throughout the course to reflect on how and what they were learning (Funkhouser & Mouza, 2013). While the drawings at the beginning of the course revealed how the participants saw themselves in their classrooms using more teacher-centered techniques when using technology (96%), the drawings done at the end of the course showed the students more engaged in using technology (Funkhouser & Mouza, 2013). The results from the blog data revealed that the participants' mindset about technology for instruction began to shift over the six weeks of the course from a teacher presentation style to the students using the technology for completing projects, working on assignments, supplemental lessons, and collaboration with other students (Funkhouser & Mouza, 2013).

Collaborative work with technology training can also benefit educators. Matthew and Johnson (2017) examined perceptions pre-service music educators have of collaborating via online technology. The results indicated the participants did gain confidence in creating collaborative opportunities and learning environments using technology. They also found that collaboration activities during the project did reveal a rise in comfort levels with planning the type of technology that would be used for collaboration and preferred asynchronous collaboration tools (Matthew & Johnson, 2017). Another study conducted on participants of a week-long technology training workshop revealed that the participants' knowledge, comfort level, and use of music technology increased after completing the workshop (Bauer et al., 2003). While those numbers did remain significantly higher, there was a significant decrease in all three areas during the time that lapsed between the completion of the workshop and the follow-up questionnaire (Bauer et al., 2003). In their study of Illinois music teachers, Reese and

Rimmington (2000) found that most music teachers did have some training, with a majority wanting more training. Still, access to training was difficult, especially for those in rural areas.

Summary

Technology has become an essential part of our society and has permeated all aspects of our daily lives, and the field of education is no exception. Studies have been conducted on the use of technology and how effectively technology has been integrated into class instruction over the past few decades. Researchers have surveyed teachers and teacher educators in many areas of education, including music education, across many schools and universities. The sudden move to virtual learning after the onset of Covid-19 has revealed a need for more research as to technology needs and training in states around the country. My literature review included studies conducted during the lockdowns in spring and summer of 2020 and into the fall of 2020 and spring of 2021 as lockdowns lifted and schools began to shift to hybrid learning or complete in-person learning. My literature review did not reveal any studies conducted on K-12 music programs in the southern portion of the United States except for the Thomas et al. (2021) study of pre-service music educators in Georgia. This study was conducted in four states in the southeast, including Alabama, Arkansas, Louisiana, and Mississippi, to investigate changes in the use of technology and comfort level with using technology to complete specific tasks in the elementary and secondary music programs across those states before and after the onset of Covid-19.

CHAPTER 3

METHODS

The purpose of this descriptive quantitative study was to investigate the status of technology integration in K-12 music classrooms across four states in the southeast United States after the onset of Covid-19. This chapter includes the research design for this study, procedures, survey instrument, participants, and data analysis.

Research Design

I employed a quantitative design using data collected from an anonymous cross-sectional survey instrument, the Technology Usage and Integration Survey (TUIS) (see Appendix A). Along with demographic information, the survey collected data related to participants' change in technology use and comfort level using and integrating technology into their instruction. The survey also collected data concerning technology training they may have received after the onset of Covid-19 and any perceived barriers preventing the effective integration of music technology into music instruction.

Participants

Participants for this study included music teachers who are members of the National Association for Music Education (NAfME) through the chapters in their state and teach music at public and private K-12 schools in Alabama, Arkansas, Louisiana, and Mississippi (n = 58). The first round of participants received an email invitation sent by the NAfME Research Assistance Program that invited each recipient to complete the Technology Usage and Integration Survey (see Appendix A). The second round of participants received an email with the link to the information letter and survey link through the leadership of their state's music educators' association. The participants were music educators who teach a variety of music content areas,

including choir, band, general music, and group and solo instrument or voice lessons. The TUIS allowed current K-12 music teachers to report on the status of music technology in their music classrooms before and after the onset of Covid-19. The participants represented school districts from rural, town, suburban, and city locale classifications. The sample also ranged from first-year music teachers to experienced music teachers with twenty or more years of experience and varying earned degrees.

Procedures and Instrumentation

I gained Auburn University Internal Review Board approval. I then applied for the NAfME Research Assistance Program, requesting that the information letter and survey link be sent to potential participants. The Society for Research in Music Education Executive Committee (NAfME's research board) reviewed and approved my request. I submitted the information letter and email text that also included the survey link. After NAfME received the needed information, we selected two dates to send the emails to the potential participants. In addition, I completed an IRB Modification requesting permission to send the information letter and survey link directly to the leadership of each of the state's music educators associations. Once the IRB Modification was approved, I sent an email to the president, vice president, and executive director of the MEA for each of the states included in this study requesting they send the attached information letter and survey link to the membership of their state.

Questionnaire

I created the survey for this study using the online platform, *Qualtrics,* which also houses the anonymous data from the respondents. The Technology Usage and Integration Survey is a cross-sectional survey that consists of demographic questions and questions on their use and comfort level with technology usage and integration. The demographic section of the survey

included questions about their gender, years of teaching experience, years at their current school, the geographic category of their school, and the music subject areas they currently teach. In addition, the participants were also to indicate what forms of training they have received specific to technology use and integration since the onset of Covid-19 and how often they independently explored new software or applications to support their teaching since the onset of Covid-19 in February/March of 2020.

Following the demographic and training questions, the TUIS asked the participants to indicate how often they used specific technologies before Covid-19 and how often they used those same technologies after the onset of Covid-19. Those questions consisted of a five-point Likert-type scale ranging from "Never" to "Daily." The technologies specified included office tools for creating word documents, spreadsheets, databases, and presentations, programs for planning, administration, and classroom management, notation software, recording and editing software for audio, video, and music sequencing, software for creating CDs for practice and accompaniment, MIDI, electronic, and software-based instruments, online platforms/interactive websites such as Quaver Music, MusicPlay, interactive instruments, Google Classroom, My Choral Coach, Smart Music, among others, video conferencing software, and music education apps for tablet devices.

The following two survey questions asked the participants to indicate how comfortable they were with using specific technologies to complete specified tasks before and after the onset of Covid-19. The questions consisted of five-point Likert-type scales ranging from "Very Uncomfortable" to "Very Comfortable." The activities specified included administration, managing online files, music notation and transcribing, editing/sequencing music, recording audio and/or visual, running rehearsals, music theory and history activities, teaching instruments

via class and/or individual instruction, online video conferencing, and interactive web-based instruction.

The survey's final five-point Likert-type scale question asked the participants to indicate their level of agreement, from “Strongly Disagree” to “Strongly Agree,” with several statements concerning possible barriers preventing them from fully or effectively implementing technology into their instruction. The statements included topics about the importance of integrating technology as a component of music education, the level of preparedness they received from their undergraduate or graduate studies, adequate technology, and funding from their school district for training, software, subscriptions.

Pilot Study

A pilot study conducted using the first draft of the Technology Usage and Integration Survey sought to test the data collection procedures, collect feedback on the components of the survey, and test the procedures for the data analysis. The participants of the pilot study included music education graduate students. Changes to the survey instrument included modifying each of the Likert-scale questions from six points to five points and modifying the content area question to combine choir and show choir and band and marching band into one content area choice.

Data Analysis

The quantitative data collected from the TUIS was analyzed using the analysis software *IBM SPSS Statistics 25*. I utilized descriptive statistics to discover the frequency of responses to each of the demographic variables in the survey.

Research Question One

I created a new variable that reflected the change in use before and after the onset of Covid-19. The new change variable was then analyzed using crosstabulations with the four states included in the study.

Research Question Two

I created a new variable that reflected the change in comfort level before and after the onset of Covid-19. The demographic concerning years of experience asked the participants to enter the total years of teaching experience completed, including that current school year, 2020-2021. The years of experience variable was then recoded into a new variable that grouped the reported years of experience into four years of experience groups. The range of years for group one was zero to seven years, group two was eight to 15 years, group three was 16 to 24 years, and group four was 25 to 42 years since the highest reported number for years of experience was 42. The new variable for each of the sixteen changes in comfort level variables was analyzed using Spearman Rho to see if there was any correlation with the years of experience groups and the reported highest level of degree earned.

Research Question Three

The change in comfort level variable was run through a Spearman Rho with each training type the participants indicated in the survey to see any correlations between training they received after Covid-19 and their comfort levels.

Research Question Four

Spearman Rho and multiple response crosstabulations analyzed research question four which sought to examine any differences in the music educators selected common barriers to technology usage and integration based on state, locale classification, or specific content area.

Reliability and Validity

Cronbach's alpha calculated the reliability for each question concerning the frequency of technology use, comfort level with completing specified tasks using technology, and the respondents' level of agreement with statements concerning barriers to technology use and integration. The results of the study were consistent with the results from the pilot study.

Response Rate

The low response rate (n = 58) for this study may be due to an overall trend of decreasing response rates to online surveys over the past few years. Response rates to surveys conducted by the National Center for Education Statistics had declined by 63% from 1996 to 2007 (Czajka & Beyler, 2016). Response rates for Health and Human Services online surveys fell from 92% to 74% between 1997 and 2014 (Czajka & Beyler, 2016). A 2016 report by Mathematica Policy Research found declines in response rates for many federally conducted online surveys. Some of the declines were as little as two percent, while others dropped as much as 13% over a few years (Czajka & Beyler, 2016). Survey response rates have trended downward since the late 1990s. This decline is exacerbated due to the onset of Covid-19, possibly from the increased time most spend on the computer and the increased number of emails they may receive relating to online surveys and customer feedback (Ratekin, 2020).

Researchers report many reasons why the response rate declined for online surveys. Kato and Mlura (2021) reported that online surveys might be "overlooked as spam" (p. 83), and participants may be less inclined to complete surveys they think will take more time. The time of day the survey is received, the day of the week or the time of the month may also play a role in low response rates. Response rates tend to be higher on the first day the email is received and will usually drop off quickly in the days following (Fang et al., 2020). Further, Fang et al. (2020)

report that once a survey has been in the recipient's inbox for a more extended amount of time, the recipient may forget to complete the survey. They also suggest that surveys sent out on Mondays have better response rates than those sent closer to the weekend (Fang et al., 2020). NAfME sent both emails for this study on a Thursday. Surveys sent close to a holiday tend to also result in a lower response rate (Fang et al., 2020). The initial emails for this study were sent just before the Easter Holiday, with the second set of emails from the leadership of the music associations sent during the summer break. All those reasons mentioned above may have played a role in the low response rate (n = 58) for the survey of this study. Due to the low response rate, I was unable to generalize the results to the larger population. The results reflect the responses specific to the participants of this study.

CHAPTER 4

RESULTS

Participants

Participants for this study consisted of K-12 music educators (*n* =58) from Alabama, Arkansas, Louisiana, and Mississippi, with one participant not reporting their current state. The initial participants were recruited through email invitations sent through the NAfME Research Assistance Program. There were two rounds of emails sent through the program for a total of 1,154 emails sent to potential participants out of 1,329 members in the four states included in this study (see Table 1), resulting in 53 participants. Email invitations disseminated to each state's membership via the leadership of their state's music educator association yielded five more participants for a total of 58 participants for this study.

Table 1

NAfME Membership Numbers as of March 31, 2021 Versus Breakout per State for Current Study

Location	Membership Numbers	Breakout per State for this Study
Alabama	792	642
Arkansas	78	66
Louisiana	315	232
Mississippi	144	123
Totals	1,329	1,154

Participant Demographics

The respondents reported their gender, the state they currently teach, their years of experience, their school's locale classification, their highest earned degree, and the content areas of music they teach. The respondents resided in the southeastern states of Alabama (*n* = 23, 39.7%), Arkansas (*n* = 9, 15.5%), Louisiana (*n* = 7, 12.1%), and Mississippi (*n* = 18, 31%). Over half of the respondents were female (*n* = 37, 63.8%). The remaining respondents indicated male

(*n* = 20, 34.5%) or preferred not to answer (*n* = 1, 1.7%) (see Table 2). The mean years of experience of the respondents was 17.2 (*SD* = 8.9), with the minimum being three years and the maximum being 42 years. After grouping the respondents into four years of experience groups, most respondents had between eight and 15 years of experience (*n* = 19, 32.8%) (see Table 2). The demographic question concerning their school's locale asked the respondents to choose between four school locale classifications. Locale classifications were based on the National Center for Education Statistics descriptions for school locale classifications (see Appendix D). Most respondents reported town (*n* = 18, 31%) as their locale classification (see Table 2). Most respondents reported having earned at least their master's degree (*n* = 27, 46.6%) or their bachelor's degree (*n* = 20, 34.5%) (see Table 2). When asked about what content areas they taught, most respondents indicated general music (*n* = 40, 69%), choir (*n* = 22, 37.9%), or band (*n* = 14, 24.1%) (see Table 3). The participants reported that most training they received specific to technology use in their classroom after the onset of Covid-19 was either independent research and training (*n* = 43, 74.1%) or school district-provided training (*n* = 41, 70.7%) (see Table 4). Most respondents reported they conducted independent research of new technologies or applications at least a few times per month (*n* = 22, 37.9%) (see Table 2).

Table 2

Gender, School Locale, State, Highest Earned Degree, and Years of Experience Groups, Independent Exploration of New Software/Apps/Tech

Demographic	*n*	%
Gender		
Female	37	63.8
Male	20	34.5
Prefer Not to Answer	1	1.7
School Locale		
City	9	15.5
Suburban	15	25.9
Town	18	31.0
Rural	15	25.9
State		
Alabama	23	39.7
Arkansas	9	15.5
Louisiana	7	12.1
Mississippi	18	31.0
Highest Earned Degree		
Bachelor's	20	34.5
Master's	27	46.6
Ed. Specialist/Master +30	5	8.6
Doctoral	4	6.9
Other	1	1.7
Years of Experience Groups		
0 – 7 years	9	15.5
8 – 15 years	19	32.8
16 – 24 years	18	31.0
25 + years	11	19.0
New Software/App/Tech Personal Exploration		
Never	1	1.7
A Few Times Per Year	14	24.1
Once Per Month	8	13.8
A Few Times Per Month	22	37.9
Once Per Week	5	8.6
A Few Times Per Week	4	6.9
Daily	2	3.4

Table 3

Content Area Frequency, Percentage, Mean, and Standard Deviation

Content Area	*n (%)*		*M*	*SD*
	Yes	No		
General Music	40 (69)	16 (27.6)	.71	.46
Choir/Show Choir	22 (37.9)	34 (58.6)	.39	.49
Band/Marching Band/Jazz Band etc.	14 (24.1)	42 (72.4)	.25	.44
Orchestra	1 (1.7)	55 (94.8)	.02	.13
Strings	1 (1.7)	55 (94.8)	.02	.13
Guitar	6 (10.3)	50 (86.2)	.11	.31
Keyboard	7 (12.1)	49 (84.5)	.13	.33
Voice	7 (12.1)	49 (84.5)	.13	.33
Technology	4 (6.9)	52 (89.7)	.07	.26
History/Theory/Composition	7 (12.1)	49 (84.5)	.13	.33
Other	4 (6.9)	52 (89.7)	.07	.26

Table 4

Training Received after Covid-19 Frequency, Percentage, Mean, and Standard Deviation

Training	*n (%)*		*M*	*SD*
	Yes	No		
Undergraduate Coursework	9 (15.5)	47 (81)	.16	.37
Graduate Coursework	10 (17.2)	46 (79.3)	.18	.39
Independent Research / Training	43 (74.1)	13 (22.4)	.77	.43
School District Provided Training	41 (70.7)	15 (25.9)	.73	.45
Workshops offered by Colleges / Universities	10 (17.2)	46 (79.3)	.18	.39
Attending Presentations at Professional Conferences	22 (37.9)	34 (58.6)	.39	.49
Workshops through Professional Organizations	27 (46.6)	29 (50)	.48	.50
Workshops offered by Other	6 (10.3)	50 (86.2)	.10	.31
Other	3 (5.2)	53 (91.4)	.05	.23

Response Frequencies

The second section of the TUIS first asked respondents to indicate how often they used specified technologies before the onset of Covid-19. The technologies most respondents reported using daily included office tools for creating word documents (*n* = 33, 56.9%), online platforms/interactive websites (*n* = 18, 31%), office tools for creating multimedia presentations (*n* = 15, 25.9%), and electronic instruments (*n* = 14, 24.1%) (see Table 5). After the onset of Covid-19, there was a notable increase in the respondents' daily use of many technologies. Those technologies included office tools for creating word documents (*n* = 41, 70.7%), online platforms/interactive websites (*n* = 30, 51.7%), office tools for creating spreadsheets (*n* = 23, 39.7%), office tools for creating multimedia presentations (*n* = 23, 39.7%), and music education apps for tablet-like devices (*n* = 16, 27.6%) (see Table 6). In addition, video conferencing software increased in usage after the onset of Covid-19, with most respondents reporting using that technology at least once per week to daily (*n* = 38, 65.5%).

Table 5

Frequency and Percentage of Response to Frequency of Technology Use Before Covid-19; Mean, Median, Mode, and Standard Deviation

Technology	*n (%)*					*M*	*SD*
	Never	At Least Once Per Year	At Least Once Per Month	At Least Once Per Week	Daily		
Office tools for creating word documents	0 (0)	1 (1.7)	4 (6.9)	17 (29.3)	33 (56.9)	4.49	.72
Office tools for creating spreadsheets	4 (6.9)	1 (1.7)	17 (29.3)	17 (29.3)	16 (27.6)	3.72	1.13
Office tools for creating multimedia presentations	8 (13.8)	6 (10.3)	12 (20.7)	14 (24.1)	15 (25.9)	3.4	1.38
Office tools for creating databases	36 (62.1)	7 (12.1)	4 (6.9)	5 (8.6)	3 (5.2)	1.76	1.25
Planning, administration, and classroom management software or online programs	14 (24.1)	5 (8.6)	11 (19.0)	13 (22.4)	12 (20.7)	3.07	1.5
Music Notation Software	14 (24.1)	14 (24.1)	16 (27.6)	6 (10.3)	5 (8.6)	2.52	1.25
Software for Recording and Editing	18 (31.0)	15 (25.9)	14 (24.1)	5 (8.6)	2 (3.4)	2.27	1.18
Software for Recording that ALSO allows for Sequencing	28 (48.3)	12 (20.7)	7 (12.1)	6 (10.3)	2 (3.4)	1.95	1.19
Using a MIDI-type controller	43 (74.1)	4 (6.9)	2 (3.4)	3 (5.2)	3 (5.2)	1.52	1.15
Software-based Instruments	37 (63.8)	9 (15.5)	3 (5.2)	3 (5.2)	3 (5.2)	1.65	1.16
Using Recording Equipment	8 (13.8)	17 (29.3)	17 (29.3)	8 (13.8)	5 (8.6)	2.73	1.16
Software for Creating CDs for practice and/or accompaniment	14 (24.1)	21 (36.2)	16 (27.6)	2 (3.4)	2 (3.4)	2.22	.99
Electronic Instruments	12 (20.7)	12 (20.7)	8 (13.8)	9 (15.5)	14 (24.1)	3.01	1.52
Online Platforms/Interactive Websites	14 (24.1)	9 (15.5)	7 (12.1)	7 (12.1)	18 (31.0)	3.1	1.63
Video Conferencing Software	31 (53.4)	15 (25.9)	2 (3.4)	5 (8.6)	2 (3.4)	1.76	1.12
Music Education Apps for Tablet-like devices	17 (29.3)	21 (36.2)	4 (6.9)	8 (13.8)	5 (8.6)	2.33	1.31

Table 6

Frequency and Percentage of Response to Frequency of Technology Use After Covid-19; Mean, Median, Mode, and Standard Deviation

Technology	*n (%)*					*M*	*SD*
	Never	At Least Once Per Year	At Least Once Per Month	At Least Once Per Week	Daily		
Office tools for creating word documents	0 (0)	0 (0)	1 (1.7)	12 (20.7)	41 (70.7)	4.74	.48
Office tools for creating spreadsheets	3 (5.2)	2 (3.4)	10 (17.2)	16 (27.6)	23 (39.7)	4	1.13
Office tools for creating multimedia presentations	4 (6.9)	2 (3.4)	11 (19.0)	14 (24.1)	23 (39.7)	3.93	1.21
Office tools for creating databases	31 (53.4)	5 (8.6)	6 (10.3)	4 (6.9)	8 (13.8)	2.13	1.53
Planning, administration, and classroom management software or online programs	15 (25.9)	2 (3.4)	5 (8.6)	18 (31.0)	14 (24.1)	3.26	1.58
Music Notation Software	13 (22.4)	13 (22.4)	14 (24.1)	7 (12.1)	7 (12.1)	2.67	1.33
Software for Recording and Editing	14 (24.1)	14 (24.1)	13 (22.4)	10 (17.2)	3 (5.2)	2.52	1.23
Software for Recording that ALSO allows for Sequencing	26 (44.8)	7 (12.1)	10 (17.2)	10 (17.2)	1 (1.7)	2.13	1.26
Using a MIDI-type controller	39 (67.2)	10 (17.2)	0 (0)	3 (5.2)	2 (3.4)	1.5	1.02
Software-based Instruments	37 (63.8)	7 (12.1)	5 (8.6)	1 (1.7)	4 (6.9)	1.67	1.20
Using Recording Equipment	6 (10.3)	9 (15.5)	18 (31.0)	15 (25.9)	6 (10.3)	3.11	1.16
Software for Creating CDs for practice and/or accompaniment	22 (37.9)	15 (25.9)	9 (15.5)	7 (12.1)	1 (1.7)	2.07	1.13
Electronic Instruments	14 (24.1)	4 (6.9)	12 (20.7)	12 (20.7)	12 (20.7)	3.07	1.50
Online Platforms/Interactive Websites	4 (6.9)	1 (1.7)	9 (15.5)	10 (17.2)	30 (51.7)	4.13	1.21
Video Conferencing Software	2 (3.4)	3 (5.2)	11 (19.0)	21 (36.2)	17 (29.3)	3.89	1.04
Music Education Apps for Tablet-like devices	10 (17.2)	7 (12.1)	12 (20.7)	9 (15.5)	16 (27.6)	3.26	1.48

Section three of the survey asked respondents to indicate their comfort level with using technology to complete certain tasks before the onset of Covid-19. Most respondents reported being very comfortable with using technology to manage online files (n = 30, 51.7%), running choir or band rehearsals (n = 30, 51.7%), teaching and supporting music theory content (n = 25, 43.1%), giving one-to-one instruction (n = 19, 32.8%), teaching and supporting music history content (n = 19, 32.8%), transcribing notation (n = 17, 29.3%), and composing/arranging using notation software (n = 17, 29.3%) (see Table 7). After the onset of Covid-19, respondents reported an increase in their comfort level using many of the technologies to complete certain tasks. Those tasks included manage online files (n = 43, 74.1%), course learning management (n = 32, 55.2%), online video conferencing software (n = 27, 46.6%), teaching/supporting music history content (n = 22, 37.9%), recording audio (n = 21, 36.2%), and recording video (n = 21, 36.2%) (see Table 8). The respondent also indicated their level of agreement with ten statements concerning barriers that may prevent them from integrated technology in their instruction (see Table 9).

Table 7

Frequency and Percentage of Response to Comfortable with Technology Use Before Covid-19; Mean, and Standard Deviation

Technology/Tasks	*n (%)*					*M*	*SD*
	Very Uncomfortable	Uncomfort-able	Neutral	Comfort-able	Very Comfortable		
Class or Program Administration Software	13 (22.4)	5 (8.6)	16 (27.6)	12 (20.7)	7 (12.1)	2.91	1.36
Managing Online Files	1 (1.7)	2 (3.4)	7 (12.1)	13 (22.4)	30 (51.7)	4.30	.97
Transcribing Notation	6 (10.3)	5 (8.6)	8 (13.8)	17 (29.3)	17 (29.3)	3.64	1.33
Composing/ Arranging Using Notation Software	6 (10.3)	6 (10.3)	9 (15.5)	15 (25.9)	17 (29.3)	3.58	1.35
Composing/ Arranging using Sequencing Software	13 (22.4)	11 (19.0)	10 (17.2)	7 (12.1)	12 (20.7)	2.89	1.50
Recording Audio	4 (6.9)	8 (13.8)	8 (13.8)	18 (31.0)	15 (25.9)	3.60	1.26
Editing Audio	10 (17.2)	10 (17.2)	10 (17.2)	11 (19.0)	12 (20.7)	3.09	1.44
Recording Video	4 (6.9)	5 (8.6)	16 (27.6)	13 (22.4)	15 (25.9)	3.57	1.22
Editing Video	11 (19.0)	10 (17.2)	13 (22.4)	11 (19.0)	8 (13.8)	2.91	1.36
Running Choir and/or Band rehearsals	2 (3.4)	4 (6.9)	3 (5.2)	14 (24.1)	30 (51.7)	4.25	1.11
Teaching/Supporting Music Theory Content	1 (1.7)	1 (1.7)	4 (6.9)	22 (37.9)	25 (43.1)	4.30	.85
Teaching/Supporting Music History Content	1 (1.7)	2 (3.4)	8 (13.8)	23 (39.7)	19 (32.8)	4.07	.92
Teaching Classes like Class Piano, Class Guitar, etc.	3 (5.2)	3 (5.2)	25 (43.1)	13 (22.4)	9 (15.5)	3.42	1.03
Giving One-to-One Instruction	2 (3.4)	7 (12.1)	8 (13.8)	17 (29.3)	19 (32.8)	3.83	1.17
Online Video Conferencing Instruction	10 (17.2)	15 (25.9)	18 (31.0)	6 (10.3)	4 (6.9)	2.60	1.15
Course Learning Management	3 (5.2)	8 (13.8)	16 (27.6)	18 (31.0)	8 (13.8)	3.38	1.10

Table 8

Frequency and Percentage of Response to Comfortable with Technology Use Since Covid-19; Mean, Median, Mode, and Standard Deviation

Technology/Task	*n (%)*					*M*	*SD*
	Very Uncomfortable	Uncomfort-able	Neutral	Comfort-able	Very Comfortable		
Class or Program Administration Software	7 (12.1)	1 (1.7)	22 (37.9)	13 (22.4)	10 (17.2)	3.34	1.21
Managing Online Files	0 (0)	1 (1.7)	1 (1.7)	8 (13.8)	43 (74.1)	4.75	.58
Transcribing Notation	1 (1.7)	3 (5.2)	13 (22.4)	20 (34.5)	16 (27.6)	3.89	.97
Composing/ Arranging Using Notation Software	4 (6.9)	4 (6.9)	11 (19.0)	17 (29.3)	17 (29.3)	3.74	1.21
Composing/Arranging using Sequencing Software	8 (13.8)	11 (19.0)	11 (19.0)	10 (17.2)	13 (22.4)	3.17	1.41
Recording Audio	1 (1.7)	4 (6.9)	8 (13.8)	19 (32.8)	21 (36.2)	4.04	1.02
Editing Audio	3 (5.2)	7 (12.1)	14 (24.1)	13 (22.4)	16 (27.6)	3.60	1.21
Recording Video	0 (0)	6 (10.3)	5 (8.6)	21 (36.2)	21 (36.2)	4.08	.98
Editing Video	2 (3.4)	11 (19.0)	12 (20.7)	12 (20.7)	16 (27.6)	3.55	1.23
Running Choir and/or Band rehearsals	2 (3.4)	4 (6.9)	7 (12.1)	17 (29.3)	23 (39.7)	4.98	7.09
Teaching/Supporting Music Theory Content	0 (0)	2 (3.4)	4 (6.9)	22 (37.9)	25 (43.1)	4.32	.78
Teaching/Supporting Music History Content	0 (0)	3 (5.2)	6 (10.3)	22 (37.9)	22 (37.9)	4.19	.86
Teaching Classes like Class Piano, Class Guitar, etc.	4 (6.9)	4 (6.9)	17 (29.3)	16 (27.6)	12 (20.7)	3.53	1.15
Giving One-to-One Instruction	3 (5.2)	3 (5.2)	14 (24.1)	13 (22.4)	20 (34.5)	3.83	1.17
Online Video Conferencing Instruction	0 (0)	4 (6.9)	6 (10.3)	16 (27.6)	27 (46.6)	4.25	.94
Course Learning Management	1 (1.7)	2 (3.4)	4 (6.9)	14 (24.1)	32 (55.2)	4.40	.93

Table 9

Frequency and Percentage of Response to Comfortable with Technology Use After Covid-19; Mean, and Standard Deviation

Statements	*n (%)*					*M*	*SD*
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Disagree		
I consider the integration of technology as an important component to music education.	0 (0)	1 (1.7)	5 (8.6)	27 (46.6)	20 (34.5)	4.24	.71
My undergraduate program prepared me to implement technology integration in my classroom.	27 (46.6)	15 (25.9)	8 (13.8)	3 (5.2)	0 (0)	1.76	.92
My graduate program prepared me to implement technology integration in my classroom.	14 (24.1)	6 (10.3)	16 (27.6)	13 (22.4)	4 (6.9)	2.76	1.30
Most of my students have adequate technology access in my classroom.	6 (10.3)	6 (10.3)	7 (12.1)	21 (36.2)	13 (22.4)	3.55	1.29
My school district considers it important to provide me with adequate funding to purchase new technology equipment.	7 (12.1)	10 (17.2)	12 (20.7)	15 (25.9)	9 (15.5)	3.17	1.3
My school district considers it important to provide me with adequate funding to purchase new software.	11 (19.0)	13 (22.4)	10 (17.2)	11 (19.0)	8 (13.8)	2.84	1.38
My school district considers it important to provide me with adequate funding to purchase subscriptions to online music education platforms.	11 (19.0)	9 (15.5)	14 (24.1)	10 (17.2)	9 (15.5)	2.94	1.38
My school district considers it important to provide me with adequate in-service technology training for new tools and software they require me to use for administration and planning.	4 (6.9)	9 (15.5)	8 (13.8)	21 (36.2)	11 (19.0)	3.5	1.22

Statements	*n (%)*					*M*	*SD*
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Disagree		
My school district considers it important to provide me with adequate in-service technology training for new tools and software they require me to use for instruction.	2 (3.4)	8 (13.8)	10 (17.2)	20 (34.5)	13 (22.4)	3.64	1.13
My school district considers it important to provide me with funds to seek out outside district training specific to music technology.	11 (19.0)	12 (20.7)	15 (25.9)	9 (15.5)	6 (10.3)	2.75	1.28

Changes in Usage

The participants reported some significant changes in their usage of certain technologies before and after the onset of Covid-19. Cronbach's alpha calculated for question nine concerning technology usage before the onset of Covid-19 and question ten concerning the use of technology after the onset of Covid-19 found both questions reliable. The Cronbach α for question nine (α=.834) indicated high reliability for that question, and a Cronbach α of .855 indicated question ten as highly reliable. The participants reported an overall increase in recording equipment such as microphones, mixers, and video cameras (n = 24, 44.5%). More respondents from each state, except for Alabama, reported a one to a three-point increase in their use of recording equipment after the onset of Covid-19 (see Table 10). Over half of the respondents reported an increase in the use of online platforms or interactive platforms such as Quaver, MusicPlay, Interactive Instruments, Google Classroom, My Choral Coach, Smart Music, among others, with each state showing an increase in use (n = 30, 55.6%) (see Table 11).

Table 10

Percentage of Change in Use of Recording Equipment (Microphones, Mixers, Video Cameras, etc.) Before and After the Onset of Covid-19 by State

Points of Change	State				
	Alabama	Arkansas	Louisiana	Mississippi	Total
4 point decrease in use	0	0	0	1.9	1.9
1 point decrease in use	3.7	0	0	7.4	11.1
No change in use	18.5	9.3	5.6	9.3	42.6
1 point increase in use	13	5.6	5.6	9.3	33.3
2 point increase in use	1.9	1.9	1.9	3.7	9.3
3 point increase in use	1.9	0	0	0	1.9

Note. Percentages are of the total number of respondents.

Table 11

Percentage of Change in Use of Online Platforms/Interactive Websites Before and After the Onset of Covid-19 by State

Points of Change	State				
	Alabama	Arkansas	Louisiana	Mississippi	Total
4 point decrease in use	0	0	1.9	0	1.9
2 point decrease in use	1.9	0	0	0	1.9
1 point decrease in use	1.9	0	0	1.9	3.7
No change in use	16.7	3.7	1.9	14.8	37
1 point increase in use	5.6	3.7	1.9	5.6	16.7
2 point increase in use	7.4	5.6	5.6	1.9	20.4
3 point increase in use	3.7	3.7	1.9	1.9	11.1
4 point increase in use	1.9	0	0	5.6	7.4

Note. Percentages are of the total number of respondents.

There was a notable increase in the use of video conferencing software such as Google Hangout, Zoom, WebEx, Facetime, etc. All but seven respondents reported an increase in the use of video conferencing software, with a majority of the respondents indicating a one to three-point increase in use (n = 47, 87.1%) (see Table 12). The final increase was in music education apps for tablet-like devices such as iPads, Chrome Books, or other tablets. Among the respondents,

59.3% (n = 32) reported and one to four-point increase in use, with each state showing an increase (see Table 13).

Table 12

Percentage of Change in Use of Video Conferencing Software Before and After the Onset of Covid-19 by State

Points of Change	State				
	Alabama	Arkansas	Louisiana	Mississippi	Total
No change in use	1.9	3.7	0	7.4	13
1 point increase in use	7.4	0	1.9	5.6	14.8
2 point increase in use	13	3.7	3.7	7.4	27.8
3 point increase in use	13	5.6	5.6	7.4	31.5
4 point increase in use	3.7	3.7	1.9	3.7	13

Note. Percentages are of the total number of respondents.

Table 13

Percentage of Change in Use of Music Education Apps Before and After the Onset of Covid-19 by State

Points of Change	State				
	Alabama	Arkansas	Louisiana	Mississippi	Total
4 point decrease in use	1.9	0	0	0	1.9
2 point decrease in use	0	0	0	1.9	1.9
1 point decrease in use	0	0	0	1.9	1.9
No change in use	13	5.6	5.6	11.1	35.2
1 point increase in use	5.6	9.3	0	11.1	25.9
2 point increase in use	13	0	3.7	3.7	20.4
3 point increase in use	3.7	0	3.7	1.9	9.3
4 point increase in use	1.9	1.9	0	0	3.7

Note. Percentages are of the total number of respondents.

Changes in Comfort Using Technology Versus Years of Experience and Degree Level

Research question two investigated if any changes in the comfort level using specific forms of technology before and after the onset of Covid-19 were related to the respondents' years of experience or degree level. Survey questions eleven and twelve covered the respondents' comfort levels before and after the onset of Covid-19. A Cronbach's α was calculated for each question and found a Cronbach's α of .882 for question eleven and .639 for question twelve, which indicated high reliability for both questions. All but seven respondents reported an increase in comfort level using video conferencing software such as Google Hangout, Zoom, WebEx, Facetime, etc. Only nine (15.5%) respondents reported no change in their comfort level using video conferencing software, and 83.1% (n = 44) reported an increase of one to four points. No respondents reported a decrease in comfort level using video conferencing software. A majority of the respondents (n = 36, 67.9%) indicated an increase in comfort level using course learning management such as Canvas, Blackboard, Schoology, or Google Classroom. Of the respondents, only two (3.8%) reported a decrease in their comfort level using course learning management Canvas, Blackboard, Schoology, or Google Classroom, while 28.3% (n = 15) reported no change in their comfort level.

The computed change in comfort level using each of the sixteen specified technologies before and after the onset of Covid-19 correlated with the reported highest degree earned using a Spearman Rho correlation found no significant correlations between the two variables. In addition, the reported years of experience of the respondents recoded into four years of experience groups and then correlated using a Spearman Rho correlation with the change in comfort level variable also found no significant correlations found between the variables.

Changes in Comfort Level and Technology Training

Research question three investigated whether or not the technology training the respondents received after the onset of Covid-19 impacted the change in the respondents' comfort level using and integrating technology in their classroom. Most respondents that indicated they had received training from their school district had an increase of one to four points in their comfort level using software for online video conferencing during their instruction (n = 35, 66%) and using course learning management systems such as Canvas, Blackboard, Schoology, or Google Classroom (n = 27, 51%). Most respondents that indicated they had conducted independent research and training also reported an increase of one to four points in their comfort level using software for online video conferencing during their instruction (n = 36, 68%) and using course learning management systems such as Canvas, Blackboard, Schoology, or Google Classroom (n = 27, 51%). There were no other significant trends found when comparing the variables in a crosstabulation.

There was a significant moderate positive correlation found between those indicating they had received technology training through workshops offered by colleges and universities (n = 10, 18.9%) and a change in their comfort level using technology to teach classes such as class piano, class guitar, and other instrument-specific classes (r (51) = .377, p = .005). Half of those respondents indicated an increase of one to two points in their comfort level teaching instrument-specific classes (n = 5, 9.4%). A significant moderate negative correlation was found between technology training by attending presentations at professional conferences and a change in the comfort level using technology to transcribe notation for instruction (r (51) = -.321, p = .019). A majority of the respondents indicated they had not received any training through professional conference presentations (n = 32, 60.4%). All but two of those respondents indicated either no

change in their comfort level transcribing notation or a one to two-point increase in comfort level. A significant weak negative correlation was found between technology training through workshops conducted by professional organizations and a change in their comfort level using technology to transcribe notation for instruction (r (51) = -.282, p = .041). There was a split in the respondents who selected 'yes' (n = 26, 50.9%) for technology training via a professional organization workshop and those that selected 'no' (n = 27, 49.1%). Those respondents all reported either no change in comfort level with notation transcription (n = 18, 34%) or a one to two increase in their comfort level (n = 9, 17%).

Some respondents indicated they had received technology training through workshops offered by other sources not mentioned in the survey. Responses included webinars offered by Tech Company and workshops by Essential Elements, AMRO, music educators association elementary divisions, neighboring school districts, Dr. Carol Krueger, and CEU technology through different universities. There was a significant weak negative correlation found between those who received technology training from other sources (n = 6, 11.3%) and a change in their comfort level using class or program administration software (r (51) = -.277, p = .044). All indicated no change or a one-point decrease in their comfort level using administration software. A significant weak negative correlation was also found between those who indicated technology workshops from other sources and a change in their comfort level using technology to give one-to-one instruction such as individual voice or instrument lessons (r (51) = -.287, p = .037). Again, all indicated no change to a one to four-point decrease in their comfort level.

Respondents also indicated they had received technology training through their peers at their local school, google certification, and a paid membership to online webinars in classroom google skills. The analysis found no significant correlations between these other sources and any

changes in comfort levels using the specified tasks using technology. The respondents indicated how often they had explored new software or applications to support their teaching and their students' learning since the onset of Covid-19, with 56.8% (n = 33) indicating they had explored new technologies a few times per month to daily since the onset of Covid-19. A Spearman Rho correlation found a moderate positive significant correlation between how often they explore new software/apps and a change in their comfort level using technology to teach/support music theory content (r (51) = .303, p = .028). There was also a correlation with using technology to teach classes such as piano, guitar, and other instrument instruction classes (r (51) = .335, p = .014). A weak positive significant correlation was found between how often they explore new software/apps and a change in their comfort level using technology to teach/support music history content (r (51) = .291, p = .034). All those respondents that indicated they explore new technology, apps, or software either once a week, a few times a week, or daily (n = 10, 18.8%) indicated a zero to two-point change in their comfort level using technology for those three tasks above.

Barriers to Technology Integration

Research question four asked the participants to rate their level of agreement with statements concerning barriers that may prevent them from using and integrating technology in their classroom instruction. The Cronbach's α test for these statements in question thirteen revealed an α of .820, indicating high reliability for question thirteen. Spearman Rho found correlations between the statements' responses and the state, locale classification, and specified content areas to reveal any correlation. A majority of the respondents either agreed or strongly agreed with statement one (n = 47, 81.1%), "I consider the integration of technology as an important component to music education". Most respondents (n = 39, 72.5%) either disagreed or

strongly disagreed with statement two, “My undergraduate program prepared me to implement technology integration in my classroom”, however, the respondents were split concerning the same question concerning their graduate program for statement three (see Table 14).

Table 14

Frequency and Percentage of Level of Agreement for Statements Two and Three

Level of Agreement	Statement Two		Statement Three	
	n	%	*n*	%
Strongly Disagree	27	46.6	14	24.1
Disagree	15	25.9	6	10.3
Neither Agree nor Disagree	8	13.8	13	27.6
Agree	3	5.2	13	22.4
Strongly Agree	0	0	4	6.9

Note. Statement Two: “My undergraduate program prepared me to implement technology integration in my classroom.” Statement Three: “My graduate program prepared me to implement technology integration in my classroom”

More respondents either agreed or strongly agreed with statement four, “Most of my students have adequate technology access in my classroom” (*n* = 34, 58.6%). While a majority of the respondents (*n* = 24, 41.4%) agreed or strongly agreed with statement five, “My school district considers it important to provide me with adequate funding to purchase new technology equipment,” 29.3% (*n* = 17) either disagreed or strongly disagreed with 20.7% (*n* = 12) neither agreed nor disagreed. Statement six, “My school district considers it important to provide me with adequate funding to purchase new software,” had a majority of the respondents either disagreeing or strongly disagreeing (*n* = 24, 41.4%) while 32.8% (*n* = 19) either agreed or strongly agreed. Statement seven, “My school district considers it important to provide me with adequate funding to purchase subscriptions to online music education platforms,” had a relatively even distribution between agreement and disagreement (see Table 15).

Most of the respondents either agreed or strongly agreed (n = 32, 55.2%) with statement eight, “My school district considers it important to provide me with adequate in-service technology training for new tools and software they require me to use for administration and planning.” A majority of respondents either agreed or strongly agreed (n = 33, 56.9%) with statement nine, “My school district considers it important to provide me with adequate in-service technology training for new tools and software they require me to use for instruction.” Statement Ten, “My school district considers it important to provide me with funds to seek out outside district training specific to music technology,” had a slight majority of respondents that either disagreed or strongly disagreed with the statement. Otherwise, there was an even distribution between the levels of agreement (see Table 15).

Table 15

Frequency and Percentage of Level of Agreement for Statements Seven and Ten

Level of Agreement	Statement Seven		Statement Ten	
	n	%	*n*	%
Strongly Disagree	11	19.0	11	19.0
Disagree	9	15.5	12	20.7
Neither Agree nor Disagree	14	24.1	15	25.9
Agree	10	17.2	9	15.5
Strongly Agree	9	15.5	6	10.3

Note. Statement Seven: “My school district considers it important to provide me with adequate funding to purchase subscriptions to online music education platforms,” Statement Ten: “My school district considers it important to provide me with funds to seek out outside district training specific to music technology”

Correlations with State and School Locale Classification

There were no significant correlations between the level of agreement responses for each statement and the state in which the participants taught. There were significant correlations between the reported levels of agreement and the locale classification of the respondents, specifically for the first two statements. A moderate positive correlation was found between the school locale and statement one (r (51) = .368, p = .007). As reported earlier, a majority of

respondents either agreed or strongly agreed with statement one. All the respondents who reported their school locale as 'Town' (n = 17, 32.1%) agreed or strongly agreed with statement one. At the same time, respondents who reported their school locale classification as City, Suburban, or Rural either disagreed with statement one or selected neither agree nor disagree (n = 6, 11.4%). The weak positive correlation was found between the school locale and statement two (r (51) = .296, p = .032). Statement two also had a large majority of the respondents either disagree or strongly disagree. The respondents who reported 'City' (n = 8, 15.1%) as their school locale classification either disagreed or strongly disagreed with statement two. Many respondents who indicated Town, Suburban, or Rural as their school locale classification indicated they either agreed or neither agreed nor disagreed with statement two.

Correlations with Content Area

General Music. The Spearman Rho analysis found a weak positive correlation between those who indicated they teach general music and statement seven (r (51) =.276, p = .046), with a majority of the respondents indicating they either disagreed or strongly disagreed with the statement (37.8%). The analysis also found a weak positive correlation between statement nine and those that indicated they teach general music (r (51) =.277, p = .045), with a majority of the respondents indicating they either agreed or strongly agreed with the statement (62.2%). No statistically significant correlations were found between those that indicated they teach general music and any of the other eight statements.

Choir/Show Choir and Band/Marching Band/Jazz Band. A moderate positive correlation was found between those that indicated they teach choir/show choir and statement ten (r (51) =.424, p = .002). Those respondents who indicated they taught some form of choir (n = 22, 41.5%) had a majority agree or strongly agree with the statement (n = 11, 20.7%). There was

a weak negative correlation found between those that indicated they teach some form of band (n = 13, 24.5%) statement five (r (51) = -.273, p = .048), with a majority of those respondents indicating they either disagreed or strongly disagreed with the statement (n = 6, 11.3%). A moderate negative correlation was found between those that taught band and statement seven (r (51) = -.363, p = .007) with a majority who indicated they either disagreed or strongly disagreed with the statement (n = 10, 15.1%). A moderate negative correlation was also found between band teachers and statement eight (r (51) = -.475, p < .000) and statement nine (r (51) = -.440, p = .001). Most respondents disagreed or strongly disagreed with statement eight (n = 7, 13.2%) and statement nine (n = 7, 13.2%).

Other Content Areas. No statistically significant correlations were found between the statements for research question four and all other content areas, such as orchestra, strings, guitar, keyboard, voice, or technology. There were weak positive and negative correlations indicated, but none were statistically significant, and each p-value was than .05, which may be due to the low response rate for this study. A significant moderate negative correlation was found between those that indicated other for their content area and statement four concerning adequate technology for the students in their music classroom (r (51) = -.368, p = .007). No other significant correlations were found. See Table 16 and 17 in Appendix C for r value for all content areas and each statement.

CHAPTER 5

DISCUSSION

Summary of Findings

Technology has become an integral part of today's society. Even before the onset of Covid-19, many music educators were using technology in their instruction. After the onset of Covid-19, technology became an even more critical part of daily education. The results of this study are based on the specific responses and cannot be generalized to the overall population due to the low response rate. Results indicate increased technology use for video conferencing, online platforms, and music education apps for tablet devices. In addition, there was an increase in comfort levels using those same technologies. There was no correlation with the increase of comfort and the participants' degree levels or years of experience. Correlations were found between certain forms of technology training and their comfort level in completing specific tasks using certain forms of technology. The final question asked the respondents to rate their level of agreement with statements concerning barriers that may prevent them from using or implementing technology in their instruction. The analysis found correlations between participants' level of agreement with many of the statements and their school locale classification, and certain music content areas.

Findings and Interpretations

Technology Usage and Integration Trends

Responses from participants demonstrate an increase in the use of technologies that allow the educator to interact with the students during live instruction or allow the student to interact with a lesson to enhance learning. Increases in the use of recording equipment such as microphones and video cameras, and video conferencing software indicate a rise in virtual

learning instead of in-class instruction. Even before the lockdowns caused by Covid-19 and the rise of virtual learning in many school districts across the four states included in this study, distance learning and the use of software for video conferencing were growing (Waddell & Williamon, 2019). Many respondents indicated they were using microphones and video cameras for recording before the onset of Covid-19, possibly for creating music videos as part of an assignment for their students (Murillo, 2017; Waddell & Williamon, 2019). Recording equipment may have even been used for some of the participants in their first few years of teaching during their teacher training courses to record themselves during their internships (Liu et al., 2015).

Online platforms, interactive websites, and music education apps for tablet-like devices also significantly increased in use among the participants. Websites such as Quaver, MusicPlay, and Smart Music have been widely used for many years. Murillo (2017) found that over 70 elementary music educators in Texas who used various online music education platforms reported student behavior, retention, and participation benefits. Virtual learning has increased the need for online interactive tools music educators can use during live meets. Those interactive tools can also allow their students to complete assignments during independent learning. Some school districts have also provided their students with computers or other devices such as chrome books or iPads, often through federal grants. The increase in the use of music education apps indicates that many of the respondents may have utilized those devices for their music lessons with the students. Any decreases in use could have resulted from the respondents not being able to use certain technologies during online instruction. For example, the negative correlations that involved notation software may be due to the music educator not having the instruction time to incorporate composing or arranging activities (Hash, 2021).

Comfort Levels

Respondents in this study indicated an increase in the comfort level with video conferencing software such as Zoom, WebEx, Facetime, or Google Hangouts and course learning management systems such as Canvas, Blackboard, Schoology, or Google Classroom. While there were no correlations between an increase in those comfort levels and the respondents' degree level or years of experience, the increase in the respondents' use of those technologies may have increased their comfort in using those technologies. Before Covid-19, researchers were finding that even though many teachers are comfortable using technology, integrating technology into their instruction depends partly on their literacy with those technologies (Aydin et al., 2016; Funkhouser & Mouza, 2012; Okojie et al., 2006; Russell et al., 2003; Teo, 2015). The data analysis did not find any correlations between the respondents' years of experience or degree level with any changes in their comfort level using technology for various instructional tasks.

Data analysis did find correlations between a change in comfort level using technologies for certain tasks and the respondents' type of training after the onset of Covid-19. Negative and positive correlations were found between three types of training specified in the survey and the respondents' comfort level completing tasks using technology. Other correlations were found between their comfort level and other forms of training, as indicated by some of the respondents not specified on the survey. Several respondents indicated they had received training through workshops offered by colleges and universities, half of which showed no change in their comfort level using technology to teach specific instrument classes. The other half did indicate an increase in their comfort level. None of those respondents showed a decrease in their comfort level teaching instrument-specific classes. Teaching instrument-specific classes such as guitar or

piano require a slightly different set of skills than teaching and directing an ensemble of instruments. Universities and colleges such as Friends University and The University of New Mexico offered workshops during the summer and fall of 2020 aimed at helping teachers learn skills and techniques for virtual education.

Professional organizations were also offering presentations and workshops during the pandemic to assist in technology training. No correlation was found between those that had attended a presentation and any changes in comfort levels. However, there was a correlation between those who did not participate in those presentations and their ability to transcribe notation for instruction. The same trend was seen for those who did not participate in a professional organization's workshop and using technology to transcribe notation. Educators can also attend workshops and seminars through other organizations such as tech companies, school districts, and individuals specializing in specific teaching techniques.

Interestingly, those who sought out and participated in those specific workshops had no change, and in some cases, there was a decrease in their comfort level using technology for specific tasks. There could be a few reasons for this result. First, there is a possibility that those workshops or other training sessions were ineffective, or the respondents participated in them so early after the onset of Covid-19 that they had stopped utilizing the techniques they had learned. Bauer et al. (2003) found the more time that lapses after training, especially if the educator is not using the techniques learned in that training regularly, the less likely they are to retain the information or use those skills. Music educators may be more willing to use any technology or technology skills they learn if they do the research and train themselves. Those that did personal training more often showed a more consistent increase in their comfort levels using technology.

Possible Barriers

Barriers preventing music educators from implementing technology into their instruction can often include a lack of funds for software and equipment, no support from their school or district, no proper training on technology implementation, and a belief that technology is not an essential component of music education. Most of the respondents in this survey agreed that technology integration is a crucial component of music education, and many felt their pre-service educators' courses did not prepare them to implement technology into their instruction. All those who reported their school locale as city indicated a level of disagreement that their undergraduate programs had successfully prepared them to implement technology in their classroom. That is consistent with findings from studies conducted during the 2010s that found that technology is a part of the music educators' curriculum during their pre-service years. However, they tend to be stand-alone technology courses rather than technology integration instruction in their other coursework (Funkhouser & Mouza, 2013; Gorgoretti, 2019; Haning, 2016). The respondents of this study agreed their school district supported them with training for the technology required for use by their district. However, they also indicated their school district did not provide them with the funding to seek out technology-specific training for music educators. Nor did they provide opportunities for training outside of the school district to use music-specific technology.

Respondents represented a range of music content areas from general music to choir and band, and theory, history, technology, and instrument classes. Respondents who teach general music mostly agreed that their school provides adequate in-service training for new technology the school requires them to use but disagreed that their school considers it important to provide adequate funding for online music education subscriptions. Online music education platforms such as Quaver music, Prodigies Bells, and Musicplay Online can often provide general music

educators with much of their curriculum (Murillo, 2017). Unfortunately, many school districts found it necessary to focus their money and training on new or existing software not specific to music education needed during virtual or hybrid education.

Only thirteen of the respondents indicated they teach some form of a band. There were negative correlations found between those respondents and several statements concerning barriers that may prevent integrating technology. Most of the band teachers from this survey disagreed that their school provides adequate funding for new technology equipment or online music education subscriptions. They also disagreed that their school district provided them with adequate in-service training for technology or software the school requires them to use for administration, planning, or instruction. The respondents who teach band mainly taught in rural schools where a lack of internet access could explain the lack of agreement with the statements concerning training and funds (An et al., 2021). Virtual learning is especially challenging for those that teach instruments. Even as online platforms such as Our Virtual Ensemble, developed by GPG Music, works to provide a virtual ensemble setting (School Band & Orchestra, 2020), school districts are using their school budgets, or any federal grants they receive, on technology and training specific to virtual learning for core classes, not band education (Hash, 2021; Thomas et al., 2021). Interestingly no similar correlations were found among those respondents who teach some form of a choir. A positive correlation was found among those respondents and their agreement with the statement concerning their school district providing funds for music technology training outside the school district.

Participant Thoughts

Several participants included their thoughts on technology in their classrooms and how Covid-19 has affected their teaching in the optional final, open-ended question. While the

comments varied, a common theme was an increase in the use of technology for the participants. Some participants mentioned that their schools had provided the students with Chromebooks over the past school year to help facilitate virtual learning but also helped to relieve the general struggle many teachers were having with adequate technology before the onset of Covid-19. Music-specific platforms mentioned by a participant included Quaver music and Seesaw, with Seesaw being a "new addition after Covid." One participant commented that chrome books and Google Forms provided quicker grading of assignments, allowing more prep time. Another commented that they felt students were already spending "too much time plugged in during the day," and Chromebooks added to that problem. Even with Chromebooks and Google apps, one participant commented that they had issues accessing music-specific technology or software. Another stated they had not been allowed to teach their music classes directly since March of 2020.

> Some of these questions have been difficult because I haven't been allowed to teach my classes since March 2020. I was instructed on how to do Google Slides and they were updated weekly but Schoology wouldn't hold my information and kicked me out on a daily basis. Although the children were not required to log into my class, I had to rely on Google slides only to provide Music classes. On top of that, I was placed into a 4th grade class as a teacher from October until last week. So, I feel as if I've lost an entire year with my students. Instead of the pandemic making me a stronger online teacher, it has done major damage to my program.

An et al. (2021) identified the lack of face-to-face time with students as one challenge educators faced after the onset of Covid-19. I feel one participant's statement neatly summed up

technology use and training for the months since the onset of Covid-19; “Necessity has certainly been” pivotal to “technology learning this past year.”

Limitations of the Study

The response rate for the initial two emails sent via the NAfME Research Assistance Program was consistent with the average response rate for surveys distributed by this program (see Figure 2). However, NAfME has noted a significant drop in responses rates for studies that send multiple emails with the same information (R. Poorbaugh, personal communication, June 9, 2021). Therefore, the low response rate means the results of this study cannot be generalized to the whole population of the four states, but rather the results reveal a view into the specific classrooms of the respondents.

Implications

The need to transition to virtual learning has created challenges for both educators and students. Educators find themselves coping with a lack of face-to-face time with their students, a decline in student participation, using new technologies without enough training, and the feeling of being overloaded in the new virtual world (An et al., 2021; Hash, 2021; Kaplan-Rakowski, 2020). While the results of this study cannot be generalized, the responses from the participants are consistent with the findings of other studies that have been conducted since the beginning of the pandemic. An increase in the use of video conferencing software was a common finding throughout many studies (An et al., 2021; Daniel, 2020; Hash, 2021; Kaplan-Rakowski, 2020).

The need for technology training for all educators has never been more apparent. Virtual learning requires teachers to quickly become proficient with the technology necessary to reach their students online (An et al., 2021). Even with a low response rate for this study, there were few increases in comfort levels using technology, indicating a need for technology training for

music educators. The training most educators are receiving since the onset of Covid-19 tends to come from their school district. School district training sessions more often are centered around technology the school requires them to use for administration, online lesson planning, and virtual teaching (An et al., 2021; Daniel, 2020). A large majority of the respondents for this study felt their pre-service training did not prepare them for implementing technology in their instruction. Pre-service educator programs had begun to incorporate technology training even before the onset of Covid-19 (Thomas et al., 2021). After the onset of Covid-19, music educators at all levels of education needed to take "advantage of the growing music technology resources" (Thomas et al., 2021, p. 3) they had not used before to be able to teach music virtually. The results of this study implicate a need for more training specific to new and existing music technology, software, and online platforms. Pre-service training programs for music educators need to explore technology-specific courses for future music educators and technology training workshops for in-service music educators. When creating training sessions for their teachers, school districts need to realize that technology integration for music educators can present a different set of challenges than educators in other content areas (Hash, 2021).

Further Investigation

The four states selected for this study show similar education trends, such as higher poverty levels and lower scores on state tests than the surrounding states in the southeast. A follow-up study using a shorter survey will seek to compare the results of this study to the results from music educators in those surrounding states. Future studies will also investigate any changes in technology training for pre-service and in-service music educators since the onset of Covid-19. Covid-19 has changed the face of technology in education, and the effects of the pandemic "will likely linger for years" (Kaplan-Rakowski, 2020, p. 134). Schools transitioning

between face-to-face, hybrid, and virtual learning will require music educators to become familiar with many different forms of technology to facilitate learning for all their students. Studies into technology training will assist colleges, universities, music education associations, and school districts in creating training that can best prepare music educators for teaching music of all content areas in the new normal of education.

Conclusions

The onset of Covid-19 in February/March of 2020 and the effects of lockdowns and quarantines on schools' present music educators with unique challenges. I sought to investigate the role of technology in overcoming those challenges. The overall question of this study asked how the onset of Covid-19 affected music educators' technology use during instruction. The four research questions examined changes in technology usage, changes in comfort level using technology, barriers to technology integration, and if any of those changes or barriers were affected by various demographics of the participants. Participants for this study included music educators from four states in the south who represented different music content areas, school locales, and degree levels.

Technology has become an essential part of the curriculum for many music educators. Even before the onset of Covid-19, technology was being utilized by more educators around the nation. Many states have updated their music education frameworks to reflect the changes in technology usage in the music classroom. Research conducted before the onset of Covid-19 revealed a slow embrace of technology in education through all levels of education, even with technology equipment, online platforms, and other digital resources for music education becoming more widely available. Unfortunately, many music educators have been hesitant to integrate these technologies due to a lack of access to training or availability in their school

district. In addition, the pandemic forced many music educators to explore new and existing technologies as they developed new activities for virtual or hybrid learning.

This study showed an increase in the use of and comfort level with using technology specific to distance learning, such as recording equipment, video conferencing software, online platforms, interactive websites, and apps for tablet devices. Most training the respondents received was either from their school district or from independent research, with most of that independent research done a few times per month to daily. While most of the respondents agreed that technology is an important competent of music education, most felt their pre-service studies did not prepare them to implement technology in their instruction. Most respondents did indicate their students have adequate technology to use in the music classroom. Respondents also indicated they received adequate training from their school district to implement technology and software the school district required them to use after the onset of Covid-19. However, a majority did not feel their school district provided them with adequate training or funds for training to use technology specific to music education.

A low response rate prevents any generalization of the results to the general population of music educators from the four states included in this study. Response rates to online surveys have seen a decline over the past few decades. Surveys distributed via email tend to be treated as junk mail, overlooked, or ignored. Many recipients may not feel inclined to complete online surveys due to the high rate of online surveys many have received since the onset of Covid-19. Studies have also found that surveys sent during certain times of the year, month, or week can result in low response rates. Future studies will need to consider this and select a better window when sending invitations for survey participation.

Although results cannot be generalized to the greater population of music educators, the results of this study reveal valuable information. Few positive correlations found an increase in the comfort level and some forms of training the respondents received after the onset of Covid-19. Most respondents who indicated they had received training through their school district, or independent research, showed increased comfort levels using technology and software they needed for virtual learning, such as video conferencing software and course learning management systems. These results implicate training effectiveness for educators who need to become comfortable with using technology during their instruction. Course work for pre-service music educators before Covid-19 often did not provide technology-specific training. Future training for pre-service and in-service music educators should focus on technology that will be most useful to the music educator. The onset of Covid-19 shed light on the need for more technology training for all educators going forward. While the pandemic may wain, technology growth in society will continue to be felt in all facets of life. Continued training is crucial for educators to incorporate the new technological advancements society will see. The results of this study can contribute to the ongoing conversation about the importance of technology training for pre-service and in-service music educators.

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APPENDIX A: Technology Usage and Integration Survey

1. What is your birth-assigned sex?
   - ❍ Male
   - ❍ Female
   - ❍ Prefer not to answer

2. How many total years of teaching experience have you completed?
   Type the number (for example 1, 2, 12, 14, etc.). _____

3. What is your highest earned degree?
   - ❍ Associate's Degree
   - ❍ Bachelor's Degree
   - ❍ Master's Degree
   - ❍ Education Specialist or Master's +30
   - ❍ Doctoral Degree
   - ❍ Other, please indicate: _____

4. Where is your school's locale classification?
   - ❍ City - defined as a school inside a principal city/urbanized area with a population of 100,000 to 250,000
   - ❍ Suburban - defined as a school outside a principal city but inside an urbanized area with a population of 100,000 to 250,000
   - ❍ Town - defined as a school inside an urban cluster but 10 to 35+ miles from an urbanized area
   - ❍ Rural - defined as a school that is 2.5 to 25+ miles from an urbanized area or urban cluster

5. In which state do you currently teach?
   - ❍ Alabama
   - ❍ Arkansas
   - ❍ Louisiana
   - ❍ Mississippi

6. What areas in music do you currently teach? (Select all that apply).
   - ❒ General Music
   - ❒ Choir/Show Choir
   - ❒ Band/Marching Band/Jazz Band
   - ❒ Orchestra (Strings, Wind, and Percussion)
   - ❒ Strings
   - ❒ Guitar
   - ❒ Keyboard
   - ❒ Voice
   - ❒ Technology
   - ❒ History/Theory/Composition
   - ❒ Other, please specify: _____

7. What forms of training have you received specific for technology use, and/or technology integration into instruction after the onset of Covid-19? (Select all that apply).
   - ❒ Undergraduate coursework
   - ❒ Graduate coursework
   - ❒ Independent research/training
   - ❒ School District provided training
   - ❒ Workshops offered by colleges/universities
   - ❒ Attending Presentations at Professional Conferences
   - ❒ Workshops through Professional Organizations
   - ❒ Workshops offered by other, please specify:

     _____
   - ❒ Other, please specify _____

8. How often have you explored new software/apps to support your teaching and/or your students' learning since the onset of Covid-19?
   - ❍ Never
   - ❍ A Few Times Per Year
   - ❍ Once Per Month
   - ❍ A Few Times Per Month
   - ❍ Once Per Week
   - ❍ A Few Times Per Week
   - ❍ Daily

9. How often DID you use the following software and hardware technologies BEFORE the onset of Covid-19 in February/March of 2020?	**Never**	**At least once per year**	**At least once per month**	**At least once per week**	**Daily**
Office tools for creating word documents (such as Word, Google Docs, etc.)	❍	❍	❍	❍	❍
Office tools for creating spreadsheets (such as Excel, Google Sheets, etc.)	❍	❍	❍	❍	❍
Office tools for creating multimedia presentations (such as PowerPoint, Smart Notebook, Google Slides)	❍	❍	❍	❍	❍
Office tools for creating databases (such as Microsoft Access, OpenOffice, etc.)	❍	❍	❍	❍	❍
Planning, administration, and classroom management software or online programs	❍	❍	❍	❍	❍

(Q 9 continued)	Never	At least once per year	At least once per month	At least once per week	Daily
Music Notation Software (such as Finale, Noteflight, Sibelius, etc.)	❍	❍	❍	❍	❍
Software for Recording and Editing (such as Audacity, Audition, etc.)	❍	❍	❍	❍	❍
Software for Recording that ALSO allows for Sequencing (such as GarageBand, Logic, Studio One, Cakewalk, Mixcraft, etc.)	❍	❍	❍	❍	❍
Using a MIDI-type controller (for example to enter notes into a software program)	❍	❍	❍	❍	❍
Software-based Instruments (for example using MIDI and connecting to a specific virtual instrument sound)	❍	❍	❍	❍	❍
Using Recording Equipment (Microphones, Mixers, Video Cameras, etc.)	❍	❍	❍	❍	❍
Software for Creating CDs for practice and/or accompaniment	❍	❍	❍	❍	❍
Electronic Instruments (such as Digital Keyboards, Guitars, Drum Pads, etc.)	❍	❍	❍	❍	❍
Online Platforms/Interactive Websites (such as Quaver, MusicPlay, Interactive Instruments, Google Classroom, My Choral Coach, Smart Music, etc.)	❍	❍	❍	❍	❍
Video Conferencing Software (such as Google Hangout, Zoom, WebEx, Facetime, etc.)	❍	❍	❍	❍	❍
Music Education Apps for Tablet-like devices (such as iPads, Chrome Books, etc.)	❍	❍	❍	❍	❍

10. How often HAVE you used the following software and hardware technologies SINCE the onset of Covid-19 in February/March of 2020?	**Never**	**At least once per year**	**At least once per month**	**At least once per week**	**Daily**
Office tools for creating word documents (such as Word, Google Docs, etc.)	❍	❍	❍	❍	❍
Office tools for creating spreadsheets (such as Excel, Google Sheets, etc.)	❍	❍	❍	❍	❍
Office tools for creating multimedia presentations (such as PowerPoint, Smart Notebook, Google Slides)	❍	❍	❍	❍	❍
Office tools for creating databases (such as Microsoft Access, OpenOffice, etc.)	❍	❍	❍	❍	❍
Planning, administration, and classroom management software or online programs	❍	❍	❍	❍	❍
Music Notation Software (such as Finale, Noteflight, Sibelius, etc.)	❍	❍	❍	❍	❍
Software for Recording and Editing (such as Audacity, Audition, etc.)	❍	❍	❍	❍	❍
Software for Recording that ALSO allows for Sequencing (such as GarageBand, Logic, Studio One, Cakewalk, Mixcraft, etc.)	❍	❍	❍	❍	❍
Using a MIDI-type controller (for example to enter notes into a software program)	❍	❍	❍	❍	❍
Software-based Instruments (for example using MIDI and connecting to a specific virtual instrument sound)	❍	❍	❍	❍	❍
Using Recording Equipment (Microphones, Mixers, Video Cameras, etc.)	❍	❍	❍	❍	❍
Software for Creating CDs for practice and/or accompaniment	❍	❍	❍	❍	❍
Electronic Instruments (such as Digital Keyboards, Guitars, Drum Pads, etc.)	❍	❍	❍	❍	❍
Online Platforms/Interactive Websites (such as Quaver, MusicPlay, Interactive Instruments, Google Classroom, My Choral Coach, Smart Music, etc.)	❍	❍	❍	❍	❍
Video Conferencing Software (such as Google Hangout, Zoom, WebEx, Facetime, etc.)	❍	❍	❍	❍	❍
Music Education Apps for Tablet-like devices (such as iPads, Chrome Books, etc.)	❍	❍	❍	❍	❍

11. How COMFORTABLE were you with completing these TASKS using various forms of technology BEFORE the onset of Covid-19 in February/ March of 2020?	**Very Uncomfort-able**	**Uncomfort-able**	**Neutral**	**Comfort--able**	**Very Comfort-able**
Class or Program Administration Software (such as Charms)	❍	❍	❍	❍	❍
Managing Online Files (such as Google Drive, Dropbox, etc.)	❍	❍	❍	❍	❍
Transcribing Notation	❍	❍	❍	❍	❍
Composing/Arranging Using Notation Software	❍	❍	❍	❍	❍
Composing/Arranging using Sequencing Software	❍	❍	❍	❍	❍
Recording Audio	❍	❍	❍	❍	❍
Editing Audio	❍	❍	❍	❍	❍
Recording Video	❍	❍	❍	❍	❍
Editing Video	❍	❍	❍	❍	❍
Running Choir and/or Band rehearsals	❍	❍	❍	❍	❍
Teaching/Supporting Music Theory Content	❍	❍	❍	❍	❍
Teaching/Supporting Music History Content	❍	❍	❍	❍	❍
Teaching Classes like Class Piano, Class Guitar, etc.	❍	❍	❍	❍	❍
Giving One-to-One Instruction (such as Individual Voice or Instrument Lessons)	❍	❍	❍	❍	❍
Online Video Conferencing Instruction	❍	❍	❍	❍	❍
Course Learning Management (such as Canvas, Blackboard, Google Classroom, Schoology, etc.)	❍	❍	❍	❍	❍

12. How COMFORTABLE have you become completing these TASKS using various forms of technology SINCE the onset of Covid-19 in February/March of 2020?	**Very Uncomfort-able**	**Uncomfort-able**	**Neutral**	**Comfort--able**	**Very Comfort-able**
Class or Program Administration Software (such as Charms)	❍	❍	❍	❍	❍
Managing Online Files (such as Google Drive, Dropbox, etc.)	❍	❍	❍	❍	❍
Transcribing Notation	❍	❍	❍	❍	❍
Composing/Arranging Using Notation Software	❍	❍	❍	❍	❍
Composing/Arranging using Sequencing Software	❍	❍	❍	❍	❍
Recording Audio	❍	❍	❍	❍	❍
Editing Audio	❍	❍	❍	❍	❍
Recording Video	❍	❍	❍	❍	❍
Editing Video	❍	❍	❍	❍	❍
Running Choir and/or Band rehearsals	❍	❍	❍	❍	❍
Teaching/Supporting Music Theory Content	❍	❍	❍	❍	❍
Teaching/Supporting Music History Content	❍	❍	❍	❍	❍
Teaching Classes like Class Piano, Class Guitar, etc.	❍	❍	❍	❍	❍
Giving One-to-One Instruction (such as Individual Voice or Instrument Lessons)	❍	❍	❍	❍	❍
Online Video Conferencing Instruction	❍	❍	❍	❍	❍
Course Learning Management (such as Canvas, Blackboard, Google Classroom, Schoology, etc.)	❍	❍	❍	❍	❍

13. How much do you agree or disagree with the following statements?	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I consider the integration of technology as an important component to music education.	❍	❍	❍	❍	❍
My undergraduate program prepared me to implement technology integration in my classroom.	❍	❍	❍	❍	❍
My graduate program prepared me to implement technology integration in my classroom.	❍	❍	❍	❍	❍
Most of my students have adequate technology access in my classroom.	❍	❍	❍	❍	❍
My school district considers it important to provide me with adequate funding to purchase new technology equipment.	❍	❍	❍	❍	❍
My school district considers it important to provide me with adequate funding to purchase new software.	❍	❍	❍	❍	❍
My school district considers it important to provide me with adequate funding to purchase subscriptions to online music education platforms.	❍	❍	❍	❍	❍
My school district considers it important to provide me with adequate in-service technology training for new tools and software they require me to use for administration and planning.	❍	❍	❍	❍	❍
My school district considers it important to provide me with adequate in-service technology training for new tools and software they require me to use for instruction.	❍	❍	❍	❍	❍
My school district considers it important to provide me with funds to seek out outside district training specific to music technology.	❍	❍	❍	❍	❍

14. SURVEY ENDING

Optional: If you have any comments about this topic or this study, please feel free to type them below. Please click the next button to finish this survey.

Appendix B: Figures

Figure 1 displays poverty percentages for households with related children under 18 years of age taken during the Census and complied by the National Center for Education Statistics. The first bar for each year represents the national average. The next four represent the four states included in this study, with the remaining representing the other states in the southeast and the last represents the south overall. The four states included in this study have had a higher percentage of poverty within the state consistently since 1990.

Figure 1

Poverty Percentages for States in the Southeast from 1990 to 2019 as Reported by the National Center for Education Statistics

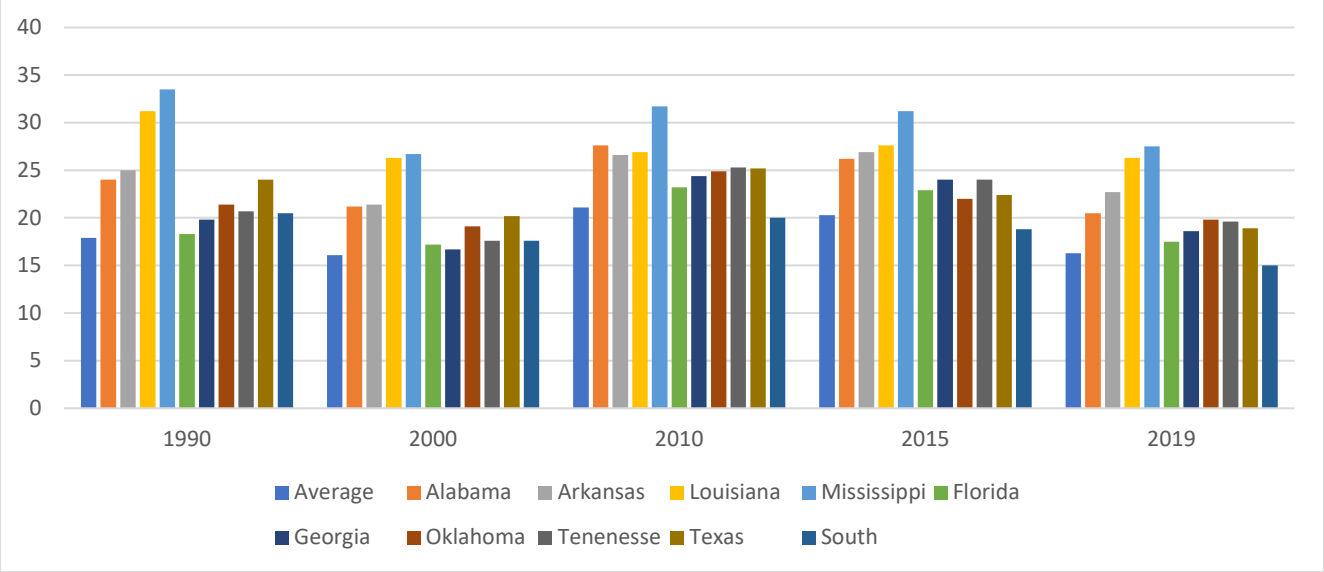
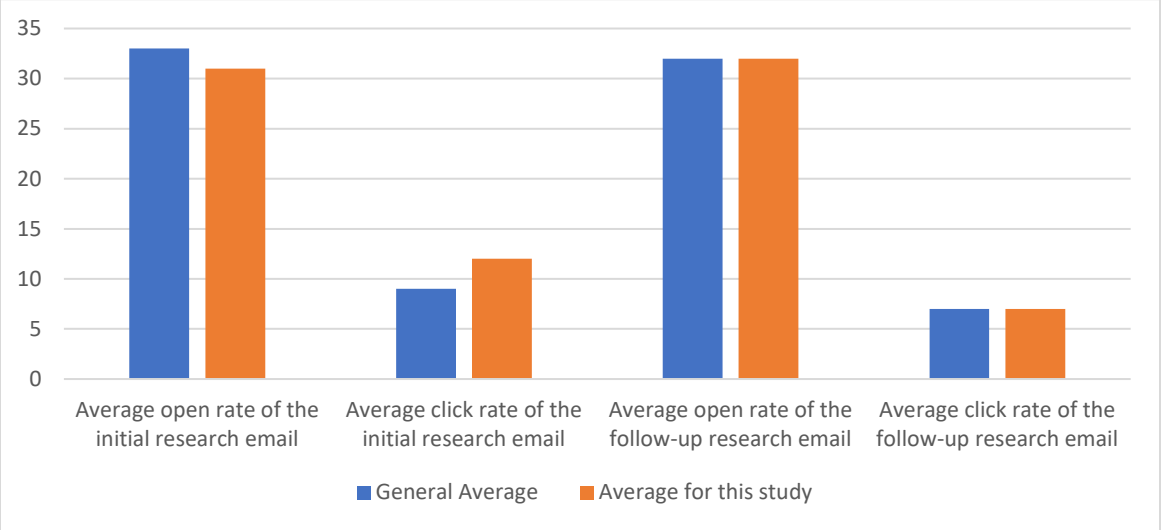


Figure 2

Average Response Rates for Surveys sent through the NAfME Research Assistance Program



Note. Figure is in percentages

Appendix C: All Tables

Table 16

Spearman Correlation r and Approximate Significance for Content Area and Level of Agreement Statements 1 through 5

Content Area	Statement									
	1		2		3		4		5	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
General Music	.082	.56	-.004	.975	.006	.968	.051	.715	.109	.435
Choir/Show Choir	-.112	.423	.110	.431	-.155	.267	.081	.564	.115	.410
Band/Marching Band/Jazz Band	-.068	.627	.187	.179	-.127	.364	-.132	.347	-.273	.048
Orchestra	-.231	.096	-.128	.359	-.183	.191	.028	.840	-.033	.817
Strings	-.231	.096	.193	.167	-.183	.191	-.222	.110	-.214	.124
Guitar	-.168	.228	-.053	.707	.013	.926	-.258	.063	-.182	.193
Keyboard	-.218	.117	-.104	.459	-.111	.431	-.256	.064	-.084	.551
Voice	.022	.875	-.195	.163	.132	.347	.080	.570	.105	.456
Technology	.220	.113	.143	.309	.157	.262	.041	.768	.189	.175
History/ Theory/ Composition	-.008	.954	-.111	.428	-.092	.512	.044	.756	.041	.770
Other	-.106	.449	.115	.414	-.104	.460	-.368	.007	-.201	.149

Table 17

Spearman Correlation r and Approximate Significance for Content Area and Level of Agreement Statements 6 through 10

Content Area	Statements									
	6		7		8		9		10	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
General Music	.057	.683	.276	.046	.164	.240	.277	.045	.053	.704
Choir/Show Choir	.232	.095	.202	.146	.210	.131	.158	.259	.424	.002
Band/Marching Band/Jazz Band	-.264	.056	-.363	.007	-.475	.000	-.440	.001	-.257	.063
Orchestra	.023	.869	.005	.974	-.090	.523	.033	.814	-.088	.529
Strings	-.195	.163	-.195	.162	-.170	.223	-.194	.165	-.195	.161
Guitar	-.112	.424	-.071	.612	-.114	.415	-.149	.285	-.188	.177
Keyboard	-.052	.713	-.064	.651	.006	.965	.061	.665	-.112	.426
Voice	.169	.225	.017	.905	.051	.715	.070	.617	.043	.760
Technology	.234	.092	.127	.367	.141	.313	.083	.556	.105	.453
History/ Theory/ Composition	.171	.220	-.151	.281	-.066	.636	-.068	.627	-.050	.720
Other	-.124	.376	-.081	.563	-.127	.367	-.238	.086	-.163	.244

Appendix D:

Local Classification Definitions from the National Center for Education Statistics

City – defined as a school inside a principal city/urbanized area with a population of 100,000 to 250,000

Suburban – defined as a school outside a principal city but inside an urbanized area with a population of 100,000 to 250,000

Town – defined as a school inside an urban cluster but 10 to 35+ miles from an urbanized area

Rural – defined as a school that is 2.5 to 25+ miles from an urbanized area or urban cluster