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RELATIONSHIP BETWEEN SELF-EFFICACY AND MUSIC TEACHERS' ABILITY TO USE TECHNOLOGY IN THE CLASSROOM

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Abstract

Professional development has been shown to increase the self-efficacy of K–12 music teachers, specifically in terms of using music education technologies within their classrooms. This descriptive research study aimed to examine the relationship between teacher self-efficacy and the use of music education technologies in K–12 music classrooms and investigate the relationship between professional development initiatives and self-confidence using technology in music classrooms. One-hundred-twenty-nine Georgia music educators completed a survey inquiring about demographics, teaching experience, school setting, and self-confidence using technology generally and in teaching specific music skills and concepts. Respondents reported being more confident when they learned a technology independently or via professional development than learning from a peer. Respondents were fair to completely confident when using technology to plan, instruct, assess, and engage within the classroom. Overall confidence levels were rated lower when using technology to promote student thinking, creativity, motivation, and culture. Conversely, and in almost all cases, teachers reported their confidence level when teaching or reinforcing musical concepts as entirely confident. Finally, respondents also reported that the pandemic increased their technology use in the classroom, and confidence levels increased.

Keywords

Professional Development, Self-Efficacy, K-12 Music Teachers, Technology

Introduction

Music technologies are inextricably tied to modern music-making and should be taken advantage of in classroom settings to improve student educational outcomes (Dammers & LoPresti, 2020). Projectors, speakers, and playback devices such as recorders and tapes are all examples of historical technologies used within the K–12 music classroom setting (Rudolph et al., 2005). With the continuous addition of modern technologies, most classroom settings nowadays support technologies that include software programs, mobile devices, and tablet applications (apps), as they are wired for the internet. It has been reported that although pre-service teachers are proficiently prepared to integrate and utilize technology in their classrooms, they are not entirely confident when it comes to teaching within a music classroom that is 100% technology-based (Bauer & Dammers, 2016). Therefore, for these technologies to be implemented appropriately using pedagogical frameworks in a classroom meaningfully, it is integral that music teachers have a thorough understanding of them (Bauer & Dammers, 2016).

Aside from the need for K–12 music teachers to have more training in the music education technologies they want to use in their classrooms, many teachers do not possess the requisite knowledge to use these technologies (Dammers, 2019). The concept of self-efficacy comes from social cognitive theory, which outlines the following four factors that contribute to an individual's perception of their self-efficacy in each situation: (a) mastery experiences, (b) vicarious experiences, (c) verbal persuasion, and (d) physiological arousal (Bandura, 1978). K–12 music teachers who have high self-efficacy (and are consequently the most effective at teaching) demonstrate these four attributes of self-efficacy (Regier, 2019), proving the utility of using self-efficacy and social cognitive theory as frameworks for measuring the effectiveness of music teachers.

The manner of introduction and training in different technologies used in the classroom is also essential. Many educational institutions offer professional development programs that aid teachers in obtaining instruction on appropriately using technology in the classroom (Eyles, 2018). Music teachers learn best from professional

development initiatives that focus on the content most relevant to them, provide opportunities for active learning, encourage participation from everyone in the group, happen over a more extended periods, and are coherent in their content (Bautista et al., 2016; Bautista et al., 2019).

At all education levels, professional development programs that are implemented correctly can enhance a teacher's ability to do their job well, and with greater understanding and competence of a topic comes a greater sense of self-efficacy (Fabriz et al., 2020; McKim & Velez, 2017). This holds within music teaching, where research has indicated that professional development can improve music teachers' professional skills (Biasutti et al., 2019). For example, Bauer et al. (2003) conducted a study to determine whether a one-week technology workshop could assist music teachers in becoming more proficient in using technology in their classrooms. The researchers collected data from 63 music teachers and found that a workshop helped increase proficiency. The authors also concluded that there was a strong relationship in the frequency of technology use.

This study aimed to illuminate connections between the types of technology that K–12 music teachers used, whether there was a relationship between self-efficacy when teaching music, and how teachers were introduced to and trained on the technology. District-level personnel (fine and performing arts directors and coordinators, fine arts instructional specialists, and superintendents) could better understand music teachers' needs to build vital professional development programs. This is particularly important for schools in smaller rural districts, where for schools to succeed, the administration needs to plan how the technology will be used and offer high levels of professional development and many resources for teachers to lean on (Tyler-Wood et al., 2018).

Problem

Many K12 music teachers need help with implementing technologies within their classrooms. These difficulties persist even though music education is an especially robust area to incorporate technology, especially since music has progressively moved deeper into the digital sphere over the past decades (Gorbunova, 2019). For example, Gorbunova (2019) conducted research that focused on implementing electronic music instruments and music computer technologies as a form of teaching. The results of the study found that when using electronic music instruments and music computer technologies in the classroom, students creativity and the desire to continue studying within a music discipline increased. Therefore, Gorbunova concluded that electronic music instruments and music computer technologies can help teachers deal with pedagogical challenges in the classroom. Although there appear to be many advantages when incorporating technology into K–12 music classrooms, music teachers often do not utilize the available technology nor build the necessary technology skills to incorporate, for instance, mobile device music mixing apps, etc., in their lessons.

Technology integration into the music classroom may also be driven by factors such as the time teachers have and how comfortable they feel with the relevant technology (Dorfman, 2016a). Despite the importance of educating music teachers on the latest technology and research in their field, those in this profession typically have limited access to relevant knowledge regarding the use of technology (Dorfman, 2016). The self-efficacy of pre-service music teachers has also been widely studied, explicitly concerning how higher levels of personal self-efficacy can positively affect an environment. For example, research conducted by Prichard (2017) demonstrated that mentoring helps pre-service music teachers be more effective. Additionally, Prichard found that the experiences that pre-service teachers encounter alongside the quality of teaching can influence efficacy levels and commitment to the music field. In addition, Fisher et al. (2021) reported that music education students' disposition also impacts their efficacy. In terms of the use of technology in the music classroom, it is likely that teachers who use more technology also have greater self-efficacy in their ability to use the technology. By contrast, those who do not use technology—either by choice or for lack of access—likely also lack self-efficacy in its usage.

K–12 music teachers who do not employ music education technologies in their classrooms may be acting on a lack of self-efficacy, not a lack of willingness to do so. Given the numerous benefits of technology use in the music classroom for engaging with students and giving them a chance to learn valuable technology skills related to sound and sound production, it is essential that the reason for teachers' hesitancy to implement such technology and find ways to remove barriers and overcome challenges related to it. Therefore, this study aimed to provide a current picture of music teachers' confidence in using varying educational technologies in their day-to-day pedagogy.

Method

A Likert-scale survey was created to collect data regarding teachers' confidence levels related to technology use in the music classroom for planning, instructing, and assessing students, as well as promoting student thinking, creativity, motivation, culture, and musical concepts to understand better the larger picture of the relationship between teachers learning technology and their self-reported confidence. The following research questions guided this study:

RQ1: How do teachers perceive their confidence levels when using technology to plan, instruct, and assess within the classroom?
RQ2: How do teachers perceive their confidence levels when using technology to promote student thinking, creativity, motivation, and culture?
RQ3: How do teachers perceive confidence when using technology to teach musical concepts?
RQ4: What is the relationship between how teachers learn technology and their confidence in using it?
RQ5: What has changed in technology use since the pandemic, and what will teachers implement in the future?

Participants were recruited for this study from the Georgia Music Educators Association (GMEA) member list. This organization serves over 3,000 music educators who teach music education in K–12 school environments. The researcher found and compiled their email addresses and invited individual members to participate. Additionally, the researcher sent an email containing the link to the survey to the music and fine arts coordinators in Georgia, asking them to forward the email to the music teachers in their system.

The survey was open from August 25, 2020, until September 18, 2020. One-hundred-twenty-nine participants fully completed the survey (male = 58, female = 69, and prefer not to say = 2). Eighty-nine participants were Caucasian, 29 were African American/Black, five were Asian, one was Hispanic/ Latino, one identified as other, and four preferred not to say. The participants ages ranged from 18–29 (n = 29), 30–39 (n = 42), 40–49 (n = 33), 50–59 (n = 20), and 60+ (n = 8). The participants reported varying degrees of teaching experience. For example, 43 participants reported having 11 to 20 years of experience, 41 reported having 21 or more years, 25 reported having 6 to 10 years, and 20 reported having one to five years of teaching experience.

Respondents (n = 129) taught in suburban (n = 99), urban (n = 21), and rural (n = 9) schools of all sizes in the state of Georgia. These schools included Pk–12 (n = 3), elementary (n = 40), middle school (n = 51), middle/high school (n = 2), and high school (n = 33). One urban elementary teacher traveled to four schools ranging in size from 300–900 total students each and taught around 250 students per school. A suburban elementary school teacher marked the number of students at the school and the number of students he or she would teach as "unknown at this time." Additionally, there were three PreK–12 settings. One of these teachers taught music to all 70 students in a rural school, another taught 165 students in a suburban school of 1,750 students, and the third taught all 430 students in a rural school. One middle school/high school (grades 8–12) teacher taught 122 of 650 students in a suburban school, and another taught approximately 90 students out of 430 in an urban setting.

The respondents were also asked if they traveled across multiple schools. Of the respondents that completed the survey, ten reported that they traveled between multiple schools, whereas 119 reported that they did not travel between multiple schools. In addition, when it came to music courses in the schools, the respondents reported that some students were offered more than one music course in their school. Most schools (19%) offered music theory as a course. Choir was the next most common offering (18% of the schools offered this course), followed by general music, which 16% of schools offered to their students. Applied lessons was the least offered course at 1%. Show choir and keyboard were offered by 2% and 4% of the schools, respectively.

Results

After collecting the data from the surveys, data were downloaded from Qualtrics into an Excel spreadsheet. The researcher compiled the means and standard deviations of all participant demographics and confidence levels and broke down confidence levels by setting and placement. Additionally, the Statistical Package for the Social Sciences (SPSS) version 25 software was used to run a multinomial logistic regression Pearson's Product Moment Correlation Coefficient and ANOVAs as applicable to determine the relationships between variables and differences in the means between variables. The open-ended questions were subsequently coded, and emerging themes and categories utilizing grounded theory coding techniques were determined.

1:1 technology

A 1:1 technology initiative provides laptops or tablets for each student in the school. Out of 129 teachers, 88 (68.22%) responded that their school had a 1:1 technology initiative, and 40 teachers responded that their school did not have a 1:1 technology initiative.

Respondents of the survey selected their perceived level of confidence when using technology as basic (one), intermediate (two), or advanced (three). The respondents marked beginning level (B = 7), intermediate level (I = 79), or advanced level (A = 44). The overall mean (N = 129) was 2.25, with a standard deviation 0.56. The participants perceived their confidence level as a little above the intermediate level.

A Pearson's r was conducted to determine the relationships between school setting, age placement, school size, Professional Development (PD), and the overall technology literacy rating (see Table 4.1). There was a weak negative correlation between age and overall technology rating. As age went up, ratings for overall technology went down. No other significant correlations were found related to technology.

Table 1 Correlations Among Age, Setting Placement, School Size, PD, and Tech Literacy

	Age	Setting	Placement	School Size	PD	Tech Lit.
Age	1.00					
Setting	-.163	1.00				
Placement	-.115	-.022	1.00			
School Size	-.209*	.080*	.484**	1.00		
PD	.24	.46	-.026	.018	1.00	
Tech Lit.	-.231**	.085	.035	.100	-.026	1.00

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

To determine whether there were significant differences between respondents' tech literacy and age, I ran a one-way analysis of variance between age and confidence when using technology (N = 129, F (4,124) = 1.819, p = .129). This test showed no significant differences between age and tech literacy. Table 4.2 shows the confidence level by age. Additionally, respondents reported approximately how many hours of technology-related professional development they had attended in the past 12 months. Sixty-six respondents reported they received 7 hours of technology professional development, 17 reported 6 hours, nine reported 5, 12 reported 4 hours, ten reported 2 hours, ten reported 3 hours, and three reported 1. Two respondents reported receiving 0 hours of professional development. The average number of hours was 5.46 hours.

How Do Teachers Perceive Their Confidence Levels When it Comes to Using Technology to Plan, Instruct, and Assess Within the Classroom?

The respondents were asked to rate their confidence in using technology to plan, instruct, assess, and handle administrative tasks. Statements addressed educators' use of technology to prepare an activity in their content area, improve a class, implement an online course, implement an online lesson, find and select resources, create resources, share resources with colleagues, explore a specific topic, take attendance, keep student grades, work with students in groups, keep students motivated, communicate with students' parents, communicate with other teachers, and have students interact online for learning. Overall, teachers were primarily confident in using technology to plan, instruct, and assess within the classroom. Teachers were slightly confident implementing an online class and engaging and motivating students during instruction.

Table 2 Frequency of Confidence Levels on Administrative tasks, Planning, Instruction, and Assessment

	NC	SL	N	SW	FC	CC	*Mean*	*SD*
Prepare an activity	0	3	3	11	40	72	5.36	0.9
Improve a class	0	3	3	20	42	61	5.2	1
Implement an online course	2	6	6	23	39	53	4.94	1.2
Implement an online lesson	2	3	4	13	38	69	5.24	1.1
Find selected resources	1	3	1	16	33	75	5.34	1
Create resources	1	3	1	24	38	62	5.16	1
Share resources	1	3	2	12	37	74	5.35	1
Explore a specific topic	0	3	2	11	33	80	5.43	0.9
Take attendance	2	2	5	6	17	97	5.52	1
Keep students grades	1	0	4	7	16	101	5.64	0.8
Work with students in groups	4	7	8	18	36	56	4.88	1.3
Keep students motivated	4	6	14	20	39	46	4.72	1.3
Communicate with students' parents	0	1	0	7	23	98	5.68	0.7
Communicate with other teachers	0	0	0	5	21	103	5.76	0.5
Have students interact online	1	6	7	14	37	64	5.11	1.2

NC = not confident, SL = slightly confident, N = neither confident or not confident, SW = somewhat confident, FC = fairly confident, CC – completely confident

How do Teachers Perceive Confidence When it Comes to Using Technology to Teach Musical Concepts?

The second statement asked respondents to rate their confidence in using technology to teach and reinforce musical concepts during music instruction. Statements included "teach and reinforce music fundamentals during music instruction," "teach or reinforcement of performance and practice during music instruction," "teach or reinforce music composition during music instruction," "teach improvisation during music instruction," and "assist me with the day-to-day operations of my class and organization management," and "recording and playback as part of music instruction." Many of the respondents were somewhat confident (SC), fairly confident (FC), or completely confident (CC) when it came to using technology to teach and reinforce musical concepts. Respondents reported higher confidence levels regarding teaching and reinforcing music fundamentals, teaching or reinforcing performance practices, teaching music composition, and recording and playing back during music instruction. The respondents reported being less confident in using technology to teach improvisation.

How Do Teachers Perceive Their Confidence Levels When it Comes to Using Technology to Promote Student Thinking, Creativity, Motivation, and Culture?

The third statement asked respondents to rate their confidence in using technology to promote student thinking, creativity, motivation, and culture. Statements included using technology to: improve my teaching productivity, promote students' creative thinking, assess student learning, promote cultural understanding and awareness, and keep students motivated. See Table 4.6 for the respondents' confidence ratings. Most respondents ranked their confidence levels for using technology to promote student thinking, creativity, motivation, and culture as somewhat confident, fairly confident, and completely confident. Respondents were most confident in using technology to assess student learning.

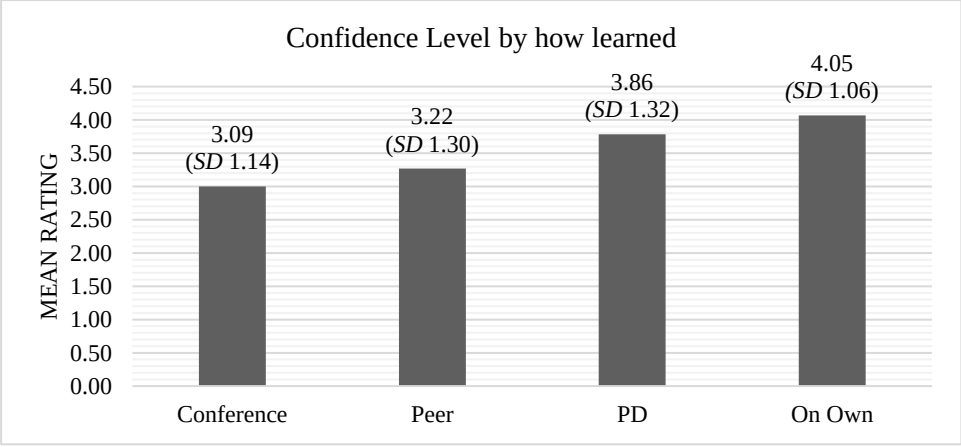
Learning of Technology

For this survey section, respondents were asked to describe how they were introduced and learned and to rate their confidence level using various music technologies. The respondents were only to select technologies they had tried using before for or with their students. The technologies listed were Smart Music, Modacity, Minute Guitar, VoVo Vocal Coach, Sibelius, Muse Score, Magic Score, Notion, Charms, Cut Time, Conn & Selmer, Google, YouTube, Garage Band, Audacity, and Easy Voice Music. Most respondents reported that they were introduced to various technologies on their own (n = 279), by a peer (n = 103), through professional development (n = 60), or other (n = 41). Additionally, respondents indicated how they learned each technology they had used with their students.

Additionally, respondents indicated how they learned each technology they had used with their students. Fifty-three respondents reported learning the programs above on their own, 23 reported learning in professional development, 13 reported learning from a peer, and 9 reported learning technologies some other way. Additionally, respondents rated themselves higher when using Google (FC=39), (CC= 57) and YouTube (FC= 34), and (CC=66).

To determine whether there were significant differences between how respondents learned a technology and confidence level, the researcher ran a one-way analysis of variance between all responses that included a question on how they learned the technology and confidence level for a total of 475 responses. The respondents learned 11 of the programs in conferences, 54 learned from peers, 320 learned them on their own, 50 learned from professional development, and 40 programs were learned in some other way. The researcher found a significant difference between confidence level and how respondents learned the technology ($I(4,470) = 8.308$, $p < .001$). Post hoc pairwise comparisons (with Bonferroni correction) showed differences in the means between learning from "peers" and "on my own" ($p < .001$) and learning from "peers" and "professional development" ($p = .047$). Figure 1 shows the respondents' mean overall confidence level by how they learned technology except for others.

Figure 1 Confidence Levels by How Respondents Learned Technology



Many respondents reported higher confidence levels when learning independently and in professional development than when they attended conferences and learned from peers.

Open-Ended Responses

The survey was initially created before the COVID-19 pandemic. However, the survey was sent out during the pandemic, so I added two questions to determine how and how the move to virtual instruction may have affected the survey results. The first question asked, "How and what has changed about technology use in your teaching since COVID-19?" I coded the responses, and several themes emerged from the dataset concerning how and what had changed about technology use in their teaching since the COVID-19 pandemic began. Most of the participants now use technology in teaching, with some participants reporting to have seen an improvement in their technology usage. Several themes emerged from the dataset: increased use of technology, administrative decisions to use technology to manage the classroom, and incorporating technology into their daily instructional practices. Surprisingly, many of the participants welcomed the various forms of technology software they learned due to the COVID-19 Pandemic. Various software programs provided new levels of efficiency for instruction. However, a few participants expressed that they would not continue to use technology in their instructional practices and look forward to teaching music how they did before the COVID-19 Pandemic.

Some participants also reported that during the pandemic, they were forced to use technology, received a lack of support, and used technology less once the height of the pandemic was over. However, most respondents generally reported learning a lot about technology during COVID-19. Most were willing to add technology to what they were already doing to improve their teaching approach and their students' experience further as they used more technology for student assignments and practicing at home. Additionally, the respondents reported that they would instill the use of technology in students by using more technology in classes and using it to help their students learn their parts during at-home practice time.

Discussion

The results have several implications for music education that need to be discussed. For example, these results demonstrate that more professional development opportunities need to be provided to music teachers on using technology. Even though teachers reported that they were learning technology on their own, they demonstrated that there was a learning curve for applying technology in the music classroom. One of the main implications of this study was that schools need to ensure that they offer professional development opportunities on the new technologies used within their curriculums. Recent COVID-19 experiences aside, Liao et al. (2017) reported prior to the COVID-19 pandemic that due to ever-changing technology in our society when schools implement updated technology initiatives, they rarely follow up with appropriate professional development opportunities. Therefore, schools need to create different task forces that can monitor the technologies that music teachers use and ensure that they provide adequate learning and professional development opportunities. When it comes to ever-changing technology, teachers are typically forced to adapt new technology into their instructional and assessment repertoires. Therefore, school districts must work to effectively offer ongoing training and professional development opportunities to their music teachers so that students can receive the benefits of technology in their K–12 educations. Furthermore, teachers will become more effective at their jobs by knowing how to use different technologies comprehensively, keeping up with their student's needs and expectations of a technologically based educational experience in a 21st-century classroom (Liao et al., 2017).

Another implication for music education is the need to begin encouraging teachers to utilize more technology in their everyday teaching experiences. Some participants preferred traditional face-to-face instruction over technology when teaching music, while others reported many benefits of using different technology programs or modes. Therefore, professional development opportunities may educate teachers to accept technology and begin to use it in their teaching repertoires. For example, teachers' perceptions of digital competency and instructional self-efficacy have been found to have a strong relationship (Elstad & Christophersen, 2017). Therefore, this relationship can indicate that teachers do not feel comfortable accepting technology into their teaching due to their low self-efficacy levels, which could be caused by fears of the discipline needed to use the technology and their ability to influence their students to use technology while studying in their course (Elstad & Christophersen, 2017). Therefore, educational programs and strong professional development opportunities could change attitudes toward technology use.

Ever-changing technology has also negatively affected schools as they struggle to offer up-to-date technology professional development opportunities to their teachers, exacerbating the difficulties experienced when introducing new technologies or shifting to an online platform for their students (Liao et al., 2017). Shifting online has demonstrated challenges and barriers for teachers, who are more apt to teach their subjects in a traditional face-to-face environment. For example, using technology in the classroom can be seen as easier for educators who teach science, technology, engineering, and mathematics (STEM) classes than those who teach the arts. The arts, such as music education, are not passive learning experiences but active ones in which students' experiences in the

classroom matter as much as the content being taught to them. Therefore, teachers, schools, and districts must ensure that technology is used to provide students with these experiences when learning music.

Schools must ensure that they adequately teach and provide information that demonstrates how to use the technology within the classroom effectively, but also to align the technology with pedagogical goals, instructional and assessment practices, and the curriculum. For example, Wesolowski et al. (2021) reported that when offering professional development opportunities to teachers, it is essential to ensure that education towards technology follows ten domains: (a) content, (b) evidence, and research, (c) coherence, (d) relevance, (e) active learning, (f) application, (g) collaboration, (h) reflection, (i) feedback, and (j) duration (p. 2). Additionally, the authors reported that many participants who found professional development opportunities helpful and interesting tended to experience trust and joy.

The application of technology in a music classroom empowers students and teachers to capitalize on the improved processing speed, storage capacity, and high-tech equipment that would not otherwise be available (Gorbunova & Hiner, 2018). However, these advancements are only sometimes the focus of including technology in a music classroom. The focus should be on how these tools can enhance a student's musical skills and understanding (Dammers & LoPresti, 2020). For this reason, the application of music technology in the modern classroom is neither considered a positive nor a negative attribute. Music educators should only implement available technology when expected to result in a more practical approach to music instruction. While technology may be the best approach to help some students exceed in one area, it may not be the best approach for other students to exceed in that same manner. Available technology increases the number of tools available to music educators to broaden their instructional approaches to enhancing students' musical skills and understanding (Eiksund et al., 2020). Among these include visual, aural, kinesthetic, and technology that can engage learners in a more interactive format. Increasing students' control over sound through these areas gives teachers new and powerful ways to present music, allows for greater individualized and differentiated music instruction, and mediates the broader interaction with music. These benefits often provide a means for increasing the effectiveness of traditional teaching approaches in music while further allowing for methods that were not possible before the introduction of technology. Therefore, teachers must differentiate instruction by varying projects according to student readiness, learning style, and interest. In doing so, teachers will be more equipped to meet the individualized needs of their students and improve their musical ability effectively and meaningfully.

Limitations and Recommendations

One of the limitations of this study was the small population size and the fact that most of the population came from suburban schools. Most of the schools in Georgia represent suburban settings, which could explain why many respondents reported their placement setting as suburban rather than rural or urban Therefore, it could be important for future researchers to replicate this study throughout an entire country or within specific urban and rural areas. Additionally, the researcher found participants via the Georgia Music Educator Association (GMEA). The researcher did not perform a more weighted or balanced sampling, so that the sample could have been more diverse. Therefore, future researchers should target teachers at different school levels and settings (e.g., rural and urban) for a more balanced sampling. Additionally, to account for this limitation in future research, the National Association for Music Education (NAfME) could survey music educators nationwide to obtain a more robust and comprehensive response rate.

Another limitation could have been the participants' experiences of the COVID-19 pandemic. At the beginning of this study, COVID-19 had not been a factor in the alignment of this research; however, after the Centers for Disease Control and Prevention (CDC) had provided recommendations on social distancing, leading many schools a move to online-only instruction, the researcher had to realign the study to account for this phenomenon. Therefore, two open-ended questions were added to the survey asking the participants' perceptions regarding how and what has changed regarding the use of technology due to COVID-19. The experience of COVID-19 could have acted as a limitation to this study, as the participants reported that they were forced to adapt and use technology due to online learning instruction. Therefore, this could have skewed both the participants' perceptions and experiences related to technology use. Future research could be continued on this subject when schools return to traditional face-to-face instruction.

Conclusion

Music Education remains essentially unchanged, despite the extensive technological advancements made in recent decades. The lack of this integration is likely because traditional music pedagogy is inherently conservative and resistant to change. However, music educators generally have a positive attitude toward integrating technology in their classrooms (Wozniak-Reese, 2003; Dorfman, 2008; Dorfman & Dammers, 2015). Despite this dichotomy, there have yet to be widespread applications of technological resources in music classrooms. Likewise, there is minimal research on implementing technology use, the implications for technological support, and the systemic and

structural changes necessary to institute technological advancements in the music classroom (Eiksund et al., 2020). It is likely the case that a dwindling budget and lack of resources have contributed to poor implementation of technology and music programs, as many music teachers find that they do not have access to the tools they need to incorporate technology as part of their teaching modality (Dammers & LoPresti, 2020). For these reasons, the combined results of this study underscore the need to understand further the importance and implications of integrating technology and music classrooms.

The results of this study highlight that most participants were fairly and completely confident in using technology to teach music; however, some reported lower confidence levels when it came to instructing, assessing, and motivating their students. The respondents reported that they have had to learn new technologies on their own to be successful within the classroom, which demonstrated an alignment with previous researchers who concluded that schools are not offering adequate professional learning opportunities when requiring new technological initiatives to be followed (Liao et al., 2017). This study revealed that some students might miss essential educational elements, including music experiences through performance, practice, and music composition. Previous research highlighted that many music teachers prefer to teach in a traditional face-to-face environment, which allows them to engage with their students and motivate them more easily. Due to COVID-19 and the requirements of instruction changing to either a part or full-time virtual approach, music teachers could be successful when planning, instructing, assessing, and motivating their students.

Schools must offer professional development opportunities to their music teachers to make them comfortable with technology when teaching music. Suppose schools offer more professional development opportunities, such as implementing a Pre-Planning Professional Learning Survey regarding the music standards for using technology in the classroom. In that case, they can allow for improved educational experiences and meet student expectations using technology in the 21st-century classroom. The more well-planned professional development opportunities offered to teachers, the higher their self-confidence levels will be within all areas of music instruction in K–12 environments.

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