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High school choral students' perceptions of their use of technology in their independent choral practice habits

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High School Choral Students' Perceptions of

Their Use of Technology in Their Independent Choral Practice Habits

by

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Dedication

To my loving wife, and wonderful son, and supportive parents without whom I could

not have completed this work.

Additional thanks to the administration at my school and my always-inspiring

students for being willing to take part in this research.

Acknowledgements

Table of Contents

List of Tables

Abstract

This action research was based on an empirical, descriptive design using survey technique. The aim of this investigation was to determine the perceptions of high school choral students taught by the researcher in the Inland Northwest of the USA on their use of technology in their independent choral practice habits. All 45 choral students who provided signed consent forms were given a survey with open-ended questions. Data were analyzed using emergent thematic categories. The researcher asked students to reflect on background questions regarding the general nature of their practicing and, more specifically, on the role technology plays in their practicing. The results of the analysis determined that the use of technology (specifically the playback of recordings) is helpful in independent choral practice. Most students reported practicing 1 to 3 times a week (34.8%) for 10 to 30 minutes (61.9%) at a time. Many students identified practice venues (21.8%), time constraints (12.7%) and a lack of ability to play a keyboard instrument (14.5%) as being challenging factors to independent rehearsal. Through the use of individual vocal part recordings and full choir performance recordings, students reported being able to practice their parts with clear models of performance expectations (44.2%). Most students referred to the ease of practicing with the part recordings and their role in helping them practice (88.6%). The recordings were mostly played back on their cell phones (77.8%) or personal computers (44.4%). Overall, students reported positive attitudes towards having access to the technology and to using it on a regular basis.

The results of this action research have been valuable in informing the researcher's further decisions regarding the use of vocal part recordings and full choir performance recordings. The researcher was also able to use the background practicing information to help guide parents and guardians in supporting individual student practice environments, such as ensuring quiet, private spaces to rehearse. The researcher also looked at ways in which the school may provide practice venues for those unable to do so in the home.

Chapter 1: Introduction

Background

Literature indicates that technology is playing a major role in the lives of students today (Wise, 2011). Technology has the capacity to make learning materials more accessible to students and communicates those materials through mediums that are more familiar to them (Greher, 2011; Stowell & Dixon, 2014; Wise, 2011). As more schools integrate expanding uses of technology into their curricula, research in this field needs to stay current.

In secondary education, technology is being utilized to help complement the content being delivered through instruction (Willis & Raines, 2001; Williams, Iglesias, & Barak, 2008). As teachers' anxiety towards using technology in the classroom decreases, technology is being integrated into teaching at a more rapid pace (Kotrilk & Redmann, 2009). All around the world, students are using technology as a means to enhance their education and develop skills for entering the workforce (Chikasanda, Otrel-Cass, & Jones, 2010; Newby, Hite, Hite, & Mugimu, 2012; Williams et al., 2008). Areas with limited resources are also investing heavily in technology in their schools (Newby et al., 2012)   While technology continues to be adopted for use in instruction, it is not yet being used to its full potential (Kotrlik & Redmann, 2009).

Development of digital technology usage in the music classroom has been rapid over the last decade and has had some major implications for music educators

(Wise, 2011). In the USA, music is now contained within the definition of a well-rounded education and is seen as a critical requirement of every student's education (Every Student Succeeds Act, 2015). Research has indicated many ways in which fulfillment of this requirement may be assessed (Raths, 2014; Furby, 2013).

While much attention has been given in the literature to the use of technology in many disciplines, less attention has been given to its impact on rehearsing and performing choral literature in the secondary classroom. Furthermore, with the increasing availability of technological resources applicable for use both in and out of the music classroom, there is a need to determine student voice regarding their experience thereof. While limited research is available on technology in the choral classroom at secondary level (Fredstrom, 2011; Hale, 2012), there is a particular need for a focus on the value of technology in choral learning outside of the classroom.

In his own teaching, the researcher directs choral students to practice their choral literature at home, in order to prepare for the next day's lesson. Unfortunately, he has noticed that few students have sufficient music literacy and keyboard skills to practice their choral parts independently out of class, and some are even without access to a keyboard outside of the school. However, there is now technology available aimed at assisting students in practicing at home without the need of a keyboard or keyboard literacy skills (Raths, 2014). One of the relevant techniques involves students playing back recordings of choral music during their independent

rehearsal time. With the aim of optimizing his students' individual rehearsing skills outside of the classroom, the researcher embarked on this action research pertaining to independent choral rehearsal using playback of audio recordings.

Paradigm of engagement

The paradigm in which the researcher offers the general choral program is one of engaging students. The high school certification program requires students to pass at least one arts class. Therefore, many students in the general choirs participate for one quarter only. As the choral teacher, the researcher's overall philosophy pertains to engaging students with music through helping them develop a love of music and a foundation for lifelong participation in music. Including a balance of learning through both aural and literacy approaches is considered important in enhancing that engagement. Of course, audio recordings provide just one of numerous technological options that may be available to support independent student choral practicing. However, the playback of recordings for home practice offers newer students who are not musically literate immediate access to singing engagement.

Balancing music learning through sound and literacy

One could argue that the exclusive use of recordings as a tool for learning music would compromise a student's development of music literacy skills. Parncutt and McPherson (2002) identify arguments pertaining to learning through sound or literacy that are fiercely debated in the literature:

> One of the most contentious issues in music pedagogy concerns when and how to introduce notation to a beginning instrumentalist. Most current teaching introduces musical notation very early in the process, perhaps because many teachers believe that beginners who are taught by ear will never reach the same level of reading proficiency as children who are introduced to notation from their earliest lessons. In contrast, proponents of the *sound before sign* approach argue that children will have difficulty learning to read notation unless their musical knowledge is sufficiently developed for them to be able to relate the sound of what they can already play with the symbols used to represent them. (p. 99)

It is generally understood that students who desire a career in Western classical music need to be literate in music and able to rehearse on their own without assistance. Developing skills in music reading and theory are an essential part of a well-rounded musical education. It is common knowledge that vocal students entering university music programs are more likely to lack music literacy skills than instrumentalists. Therefore, it is stressed that the use of recordings in the choral program at the researcher's school is largely limited to the general, non-auditioned choirs of which each choral singing must be a member. The more advanced singers also join additional, specialist choirs in which students are expected to be musically literate and are required to practice at home with scores rather than recordings. With each choral student at this school being required to participate in at least one general choir, everyone participating in this study had experienced being provided with recordings and being expected to use them for independent practice. Furthermore, the reading of musical scores and sight singing are taught in the researcher's general choirs, ensuring some development of music literacy skills for all choral students.

Listening to student voice

According to Blau & Shamir-Inbal (2018) student voice empowers students to take a more active role in the shaping of their learning. It is increasingly recognized that we need to provide platforms for listening to student voice in music education, not only in practice, but also in research. O'Neill (2014) states that "An understanding of diverse music learning ecologies, particularly through young people's own accounts of their experiences, provides insights into how researchers and practitioners might best encourage and enhance music learning in the 21st century" (p. 5). O'Neill (2010) writes that student ownership is "recognized both as a process and an outcome and is dependent on both the individual and social context" (p.17). Students participating in this study enjoy an atmosphere facilitated by the researcher in which student voice and ownership of learning are paramount. Many opportunities are made available on a consistent basis for student voice to be heard.

Self-reporting may be an issue in any study that involves a survey of student perception. It was found by Engels, Knibble and Drop (1997) as well as Brener, Billy and Grady (2003) that when looking at self-reports on risky behaviors by adolescents that the responses may have been affected by both cognitive and situational factors. In those circumstances, issues of accuracy of self-reporting may arguably have been different for the student than in a study involving choral rehearsal. In another study analyzing middle and high school student self-evaluations it was found that these students have a difficult time self-evaluating (Hewitt, 2005).

It is worth mentioning that the same study states that high schoolers do a better job of self-evaluation than middle schoolers, and this researcher's study is using high school students. Hewitt states that, in order for students to be better self-evaluators, they must practice self-evaluating in the classroom (2005). In line with this theory, the students participating in this study have each previously been engaged in frequent self-reflection and assessment pertaining to performances and rehearsal. Their practice in self-reporting conceivably put them in a better position for providing honest and constructive responses to survey questions. May (2004) noted that students who reflect on music rehearsals in the classroom can use those same skills to reflect on their music practice sessions at home. The researcher finds that there is an honest rapport that exists between him and his choral students, with students being encouraged on a daily basis to express their opinions. For example, the researcher is accustomed to them openly and positively criticizing approaches to learning in the choral sessions. Furthermore, they contribute ideas on interpreting the music in class rehearsal and engage in self-reflection on their in-class rehearsals, public performances, and independent practicing. Immediatley prior to administering the survey, the researcher emphasized that dishonesty would result in the study having no value and that students should be both thoughtful and brutally honest in their responses.

Theoretical Framework

The main theoretical framework for this study is pragmatism, aimed at exploring students' perceptions of their independent choral practicing, thus informing the researcher as he makes future decisions on how to best support his students in this regard.

Theoretical Basis

This study in based on the theory put forth by Tobias (2014) that technology integrated into a class has the ability to provide connections from students' in-school learning to their out-of-school learning. This study pertains to behaviors in independent practice that directly impact what is achieved in the classroom.

Problem Statement

The researcher, through his own choral teaching experience, has found that his high school choral students do not appear to be adequately practicing their repertoire outside of classroom enough to be well-prepared for daily classes.

Significance of the Study

While the results are not generalizable beyond the study population, it is anticipated that the findings of the study may be of interest to music teachers seeking ways to motivate student practice outside of the classroom. The researcher's ultimate goal was to investigate these experiences of his students and to then either adapt or reinforce his guidance towards his students in this regard.

Purpose Statement

The purpose of this action research was to determine choral student perceptions of their independent practice habits and their use of technology in those practices.

Research Questions

The research aimed to find answers to the following main question:

1. What are high school choral student perceptions on the role of technology in their choral practice outside of the classroom?

Furthermore, to provide some background information on general conditions pertaining to student practice, the study also aimed to answer this secondary question:

2. What are high school choral student perceptions on the general nature of their choral practicing outside the classroom?

Research Design

This action research has an empirical, descriptive design using survey technique.

Research Analysis

After collection, the survey data were analyzed for evidence of themes and disparities pertaining to students' perceptions.

Limitations of the Study

Results are limited to the students who elected to participate in the study at the high school in which the survey was conducted. Results of this study are not generalizable to broader populations and it is possible that results of a similar study at other institutions may vary from these. Furthermore, results are limited to the accuracy and skill of the students in articulating their perceptions.

Definitions

Part Recording: In this study "part recording" refers to an audio recording of a single melodic vocal part being performed prominently on a keyboard either by itself or with simple keyboard accompaniment in the background. For example, this might be a recording of a single alto line, either acapella or with simple harmonic chords.

Full Performance Recording: This terminology refers to a complete recording of any choral piece that is performed by a full choir.

Chapter 2: Review of Related Literature

Introduction

Increasingly in the modern world, we find technology surrounding us everywhere we go. For many populations across the globe, technology is becoming more and more embedded in people's lives (Wise, 2011; Stowell & Dixon, 2014; O'Neill, 2014). Young people are typically some of the first to adapt new technology into their lives, oftentimes knowing how to use newer technology before adults do. This is a reversal of the typical hierarchy of learning (Wise, 2011; Greher, 2011; Stowell & Dixon, 2014). Student access to technology has become more prevalent, with devices such as smartphones or tablets becoming more and more commonplace for students (Webster, 2016). Music itself has become more "technology-based" as electroacoustic music and electroacoustic hybrids of music continue to become more popular (Macedo, 2013). It has been suggested that, as students become increasingly fatigued by monotonous lesson structure, technology has found its way into the classroom to encourage student engagement (Popovych, 2014). In his own experience, the researcher has found students to be characteristically enthralled with technology and more engaged when the material meets them at their level of technological experience. As technology continues to become a bigger part of the modern-day classroom, choral educators may benefit from harnessing available technologies to enhance their teaching. With the scarcity of literature pertaining to the use of technology in students' independent choral

practicing, this review provides an initial background of sources linked to diverse roles of technology in education, much of which might conceivably have application beyond the classroom, followed by exploration of literature pertaining specifically to the use of technology in promoting learning outside of the classroom.

Student Engagement

The literature offers numerous sources pertaining to technology assisting in promoting student engagement. Dunbar (2017) proposed that technology allows us to help ensure individual student participation. She advocates interacting with current day students in the same ways they interact with the world. Student engagement benefits are further indicated through the use of their own personal devices in the classroom (Stowell & Dixon, 2014). These same principles might well be applicable for promoting student engagement in learning outside of the classroom.

The relatively recent development of wireless technology has impacted the teachers' choices for positioning themselves within the classroom space (Wise, 2011). The researcher's own experience aligns with this finding. He notices that, as a teacher he is more visible to his students by walking around the classroom when using technology with a remote control to present a lesson to the class. This frees him up as a teacher to work one-on-one with his students. Furthermore, one of the hindrances to using technology in the classroom is the ease with which a student might become distracted and open other websites or applications that a teacher may not want them to access at that moment. Software companies are helping to combat

this by programming specific applications, such as the *Apple* application, *Casper*, which essentially locks students into the *iPad* program they are using so they are unable to access other programs without a password (Raths, 2014). This provides the teacher with a way to monitor what students access and keep them focused on the task at hand.

Assessment

Through using technology software, Furby (2013) proposes that teachers may compile assessment dates, supplement materials aiding sight reading or music theory in preparation for assessment; and establish an online gradebook. As an outcome of providing students with access to such organizational tools, Furby suggests that students develop more accountability pertaining to their own grades. Furthermore, he advocates that they are able to access materials for taking the appropriate steps needed to address any issues in their performance. Furby also proposes that assessment isn't only about objectively measuring acquired knowledge or skill over time for a grade. Assessment can also be used to help identify future learning targets for students to enhance their learning. Furby sees technology as providing the ability to assess students individually in a practical and time-saving manner. He further proposes its value in providing individualized assessments that might show students their value to an ensemble and further support the idea that every person must do their part in rehearsal and performance. The researcher has found technology to save substantial time during individual assessment in his own school choral program.

Furby claims that assessments on note-accuracy may help students develop a sense of independence and self-sufficiency as musicians, if used properly. Furby (2013) suggests that such individualized recordings may be used to show progress over time, as students grow in their abilities. He sees this ability to demonstrate the impact music education has on students as offering a valuable advocacy tool for music education. There are conceivably numerous ways in which these methods of using technology could be applied to encouraging self-assessment in students' individual practicing beyond the classroom.

Composition and Improvisation

In the researcher's experience, composition is not typically taught in a choral classroom. However, he suspects that using technology would make composition more accessible than ever to students and advocates the inclusion of composition in a well-rounded choral music education program. Most teachers have seen composition as being beyond the capabilities of public school due to the assumption that a composer must have great knowledge of instruments and a mastery of notation (Beckstead, 2001). Deutsch (2009) believes that it is teachers' lack of experience in composing that has led to their avoiding the idea of teaching composition. Furthermore, she points out that students without any previous school music are composing music using educational technology (Deutsch 2009). How could this be? Beckstead (2001), O'Neill (2014), and Webster (2016) observe that technology has made new tools available that make composition easier by eliminating the need for a

base knowledge in notation. Beckstead further suggests that this is not to say that notation is unimportant in music education, it just tends to stop students from being able to express their composed musical ideas until they have acquired a necessary basic knowledge of notation. Through MIDI sequencers students are able to record their compositions and hear their progress back instantaneously (Stephens-Himonides & Hilley, 2017). Programs such as *Garageband* or *Soundation* allow for students to arrange different pre-programmed drum loops and instrument excerpts in a way to create their own composition (Raths, 2014). As mentioned earlier, Wise, found that teachers using *Garageband* in their classroom reported a higher rate of composition being done at home because of the notation barrier being removed (2010). There is some criticism it the profession regarding composing in this way, as some see cutting and pasting different loops together as not truly composing. However, Wise (2011) believes this may be a very useful tool for students who have very limited knowledge and ability to compose.

Furthermore, the argument is posed that skill in traditional theory and notation is critical to students at more advanced composition levels (Wise, 2011). Schultz (2014, cited in Raths, 2014, p. 32) is quoted as saying "They (students) are interested in creating a piece, but they also want to have the skills to pull it off." Using notation programs like *Sibelius*, students have the ability to input music using traditional notation and have immediate playback of the part they have written through the computer (Wise, 2011). Using a compositional method like *Sibelius*

may hopefully show students the importance of developing music notation skills and hopefully inspire them to continue to grow in their knowledge. Students may input their own vocal part into a notation program and write their own variations or arrangements of their part, as a means of beginning to create their own work (Raths, 2014). Students may also be assigned parameters in a composition assignment such as a certain rhythmic pattern that must be used or a melody that must be written to fit a certain accompaniment (Wise, 2011).

Advances in music technology also award students an opportunity to practice improvisation. Using technology, a teacher has the ability to create a rhythm track for students to improvise over without needing to take up copious amounts of time or resources (Stowell & Dixon, 2014; Perez & Jaworski, 2011). The researcher has used the program *iRealBook* to create rhythm section tracks for his jazz choir students and found it very helpful for their independent practicing of jazz solos. There have even been developments in improvisational programs, such as *MIROR-Impro*. This is a program that uses algorithms to create a response to a student's improvisations by using elements from what the student has played (Rowe, Triantafyllaki & Anagnostopoulou, 2014). So far, this has been used for young piano students, but this type of technology might soon find its way into an application that may be accessible to all musicians. Compositional technology is seen as a good intermediate step in learning composition (Beckstead, 2001).

Accessibility

Greher (2017) suggests that technology may be helpful for including students of all abilities in a performance ensemble. He explains that technology may play a positive role in engaging students with many cognitive, physical, or other types of challenges into the more traditional roles of music making. Through the use of technology, students with special needs have been able to listen to and play music as well as access videos and music on touchscreen devices like the *iPod touch* in ways they have never been able to before (Kagohara et al., 2011). Nelson (2013) suggests that, through the ease of communication in using devices like iPads, students have been able to become more engaged. The researcher has experienced similar success, having had a student with special needs who communicated with an *iPad*.   Scores would be scanned and then e-mailed to the student for ease of access both in and outside of the classroom.

Specific software the researcher found useful for the iPad includes *MyTalkTools* that uses pre-recorded sounds or phrases attached to pictures to allow non-verbal students communicate. Furthermore, he proposes this program being used for students to create simple phrases and responses. This may improve music literacy skills through different pitches being associated with their places on the music staff. Nelson continues that chords have the ability to be associated with symbols so that a student might virtually accompany other students while they perform. Students who have issues internalizing a beat might use different

applications like *ZYMI Metronome* that utilize the haptic feedback function of a cell phone or device to feel the beat on their body to assist in keeping the beat (Carlisle, 2013). Devito states that through the use of technology we are redefining ways that students with any type of disability may participate in our musical ensembles (2017). He reiterates that, by using technology, we have the ability to continue to integrate students of all abilities into the choral classroom.

Teacher Preparation

Another hurdle to integrating technology in the choral classroom is the preparation of the teacher. Technology has always been met with reservation, even when the chalkboard was introduced in the early 19th century (Dunbar, 2016). Gall states that she has seen issues when confronting technology in teaching preservice teachers because of the immense focus in performing ensembles in the preservice curriculum (2017). Most teachers have little confidence in their ability to integrate technology into their lessons in the classroom as they struggle with the unpredictability of the technology (Greher, 2011). Those teachers who believe they are competent in technology still struggle with applying technology in a curriculum context (Savage, 2018). Many secondary teachers come from a Western classical tradition that dictates rehearsal time being the most important aspect of a music classroom (Wise, 2011). The researcher postulates that it is perhaps because of that old-school thinking that teachers haven't seen the integration of technology as an important part of their classroom. Hughes & Potter (2005) state in *Tweak to*

Transform that teachers are more apt to making small changes in their approach as opposed to making big dramatic changes. At the college level, technology has begun to find its way into the classroom in the way of projection and organization, but Greher (2011) suggests only some have actually integrated technology into their coursework. Additionally, a survey of preservice teachers has shown that those who had an interest in technology initially would carry that through to their teaching, where teachers who did not have that previous interest wouldn't be as motivated to integrate technology into their classroom (Kale & Akcaoglu, 2017). Raths (2014) recommends that a teacher should acquire and experiment with technology to become more confident and familiar with it. Belief in technology and confidence therein is an important aspect to integrating technology into teaching in the music classroom (Wise, 2011). Conceivably, the same principle would apply to integrating technology into activities teachers require of students outside of the classroom.

Extending learning outside the classroom through technology

The current infusion of technology in young people's lives is leading to increasingly diverse ways of learning music outside of the classroom. O'Neil (2014) describes how

> Music learners in the 21st century have undergone transformations in their
> musical lives, experiencing dissolving boundaries of traditional learning
> spaces, and new opportunities for creating their own musical worlds and
> music learning identities. As the 'digital generation' has become immersed in
> 'social networks' and 'participatory media cultures,' and encouraged to act
> and aspire to 'connected learning,' 'peer-based learning,' and 'do it yourself
> learning,' concerns and tensions have increased about how to best harness the

affordances of digital media technologies for music education among diverse learners across multiple learning spaces. (p. 1)

Albert (2015) discusses how technology has changed the way people communicate and how teachers are able to extend learning beyond the classroom. Birch (2017) found that students would share scores of assessments in the piano practice game that was constructed for her study, leading to a social sharing of learning outside of class time. Albert (2015) claims that social media may be used to create an interactive learning experience for complementing existing music practices. He explores teachers using social networks to post video or audio files for students to leave feedback and engage in discussion, including outside of the classroom. He gives examples that these conversations might pertain to the choir's rehearsal recordings from the day or other recordings of the choral literature being rehearsed for critique. The researcher successfully guided his students towards engaging in such activities outside the classroom. For example, he has them comment on *YouTube* recordings he has posted of choirs performing literature they are learning. This includes the students posting comments in which they are required to think critically through comparing and contrasting their own performances with those of the recordings. Albert (2015) also suggests that a teacher might post a blog for students to which they might comment and react (and excellent tool for engagement outside of class), in a manner similar to presenting a lecture and having students respond and discuss.

Furthermore, Albert proposes uses of social media as a communication tool outside of class. He cites Pew (2013, cited in Albert, 2015) who showed that 81% of students aged 12-17 years use social media. The researcher has found social media to be useful in extending communication with students outside of class in administrative and promotional aspects related to learning. Established social media platforms like *Edmodo* allow for easy communication of deadlines, fundraiser due dates and concert announcements (Raths, 2014). (The researcher suggests that these concepts may also be applied in established social media platforms like *Facebook*, *Twitter*, and *Tumblr*.) Many colleges are using social media and blogs to promote themselves with online brochures and digital tours of their campuses (Greher, 2011). Similar promotional ideas might be used to advertise school choir concerts and fundraisers.

However, Albert (2015) proposes that, while social media might be a great tool for communication, teachers might also be wary about using it, specifically concerning privacy and cyberbullying issues that might arise using social media. Albert specifically recommends that teachers should demonstrate and explain the expectations of social media interaction and moderate all social media posts connected to their class. Furthermore, if using established sites like *Facebook*, Albert suggests that teachers need to be aware of changes in their privacy settings that may open up personal information on their own *Facebook* account to students whom they may not want to have that access. He advocates education-specific social

networking sites such as *Edmodo* or *Google Classroom* for educational use which have much less ambiguity in privacy settings. Albert further elaborates that the downside to using educational specific sites is that students may not already have established profiles on these sites and therefore may not tend to interact with them as often as other, more frequentedly-visited social media sites. Finally, he warns that teachers should be aware of the social networking policies of their school and district and be sure to follow all guidelines to deter inappropriate contact between students and staff.

Wise, in an interview with several teachers using *Garageband* in their classroom reported a higher rate of composition being done outside the classroom because of the notation barrier being removed (2010). Raths continues that these compositions can then be posted to different social networking sites to share with the rest of the class. These examples indicate valuable ways in which students can engage in music learning outside the classroom.

Independent Practice Motivation

There are links indicated between motivation and musical achievement (Schmidt, 2005) and motivation to practice is clearly a contributing factor in that success. Braun (2007) found that orchestra students had a strong positive attitude towards practicing with recordings. However, it has been seen that, even when students are highly motivated to practice, they may not necessarily exhibit a high degree of skill in managing that practice (Austin & Berg, 2006). Students experience

many positive and negative factors influencing the practicing they do outside of the scheduled class time, as shown by Perez (2012). Perez conducted detailed surveys of the practice habits of middle school music students, finding that some students experience support when practicing at home, whereas others receive no support or are even discouraged from practicing at home.

Briskey (2006) reports that her students have a strong increase in enthusiasm for practicing before and after school when technology is involved in their learning. Similarly, Upitis (2014) determined that, by integrating lessons into other musical practices on digital devices, students become more engaged with their formal music studies. In their study of piano students, Birch & Woodruff (2017) found that by turning piano rehearsals into a game of sorts with trophies for meeting certain goals and students creating their own avatars have a positive impact on student motivation to practice. It has been indicated that students employing multiple practice strategies (including technology) have a higher success rate when practicing (Rohwer & Polk, 2006).

Technology in Independent Practice

Technology serves as a tool to enhance music learning both in- and outside of the classroom. "Music learning is taking place across physical and virtual life spaces within home, school, local and online communities, and (mostly through the Internet) the wider world" (O'Neill, 2014, p. 2). For example, using different programs like *Edmodo*, a teacher is able to create rehearsal recordings for students

and allow access to them online so students have the ability to practice their music from home (Raths, 2014). Braun (2007) has also used recordings in practice for her instrumental students, although she has found the lack of ability to alter a recording's tempo as a hurdle to targeted independent practice. Access to recordings gives students without the ability or means to play their part on a keyboard to have the part available anywhere with internet access. Students can use web-based software and computer software to provide guidance in independent practice, allowing students to make some of their own decisions in their independent music making (Stephens-Himonides & Hilley, 2017). Using cloud storage, students have access to recordings, reference materials, digital scores, or any paperwork that might be delivered electronically (Doebele, 2012). Using websites like *YouTube,* a director might find recordings of literature for student reference and review that haven't been previously recorded on an album (Doebele, 2012; Stowell & Dixon, 2014). Many teachers use audio and video playback for modeling purposes (Stephens-Himonides & Hilley, 2017). Through *YouTube*, the researcher has accessed many valuable recorded performances of choral literature, successfully passing them on to students. This procedure of having students listen to various *YouTube* recordings in their independent practice time was designed in order to see if it would help students become familiar with the literature they are singing. As part of their homework assignments, students are tasked with finding songs similar to those they are currently rehearsing. Students might use programs such as *Pandora* for this purpose.

This program involves the use of algorithms and crowdsourcing information to discover other songs that are similar in genre to an identified song (Doebele, 2012). Perez & Jaworski (2011) suggest that *Audacity*, a free multitrack recorder, may be used to record and playback rehearsals and performances for students to conduct self-evaluation out of class. They state that *Audacity* may even be used to take recordings and slow them down without changing the pitch of the initial recording, providing a useful tool for writing transcriptions of a difficult or fast passage. An example in the choral setting would be the transcription of an instrumental jazz solo to be used for a vocalese. The researcher has used a similar program to slow recordings down in the past, aiding success in student transcription activities outside of class. Perez & Jaworski also recommend *Band in a Box* for creating rhythm section accompaniments in several styles, simply by entering different chord symbols. They explain how the program creates a backing track with the chord symbols, which is especially helpful for encouraging young soloists to practice at home. Perez & Jaworski further note that while the interface might be a bit daunting, it is worth taking the time to decode it. Computer programs and MIDI sequencers may be used to play instruments with accompaniment tracks for both rehearsal and performance (Deutsch, 2009). While not ideal, Deutsch suggests that this might be especially helpful in rural areas where a live accompanist might not be found for a performance. Digital practice logs can provide students with a further practical means to support their home practicing (Perez, 2012). These provide a means for

students to set practice goals and record their achievement of those goals during their practice sessions.

Finding Technology that is Adaptable for Practicing Choral Literature

While the literature exposes many technology tools to help with student learning and assessment of learning in the classroom, it offers little specific adaptation of those tools for engaging singers in practicing their choral literature outside of the classroom. Many technological tools in education were designed for uses outside of the context of education and have been adapted to use in the classroom (Savage, 2018). Henry (2015) states that when educators implement new technology they must be intentional and thorough to establish trust in the tool being introduced. The researcher provides several examples here where valuable programs in music education might be considered for adaptation to suit the needs of choral student independent practice.   MIDI technology has been paired with computer-assisted instruction technology for independent practice in piano students (Stephens-Himonides & Hilley, 2017). It is possible this type of technology might be adapted for a singer with the right amount of time and resources, although details on the computer-assisted technology are not apparent in this publication. A software program designed to help independent vocal practice is *Practice Perfect* where accompaniments are played from various operas so that the singer can practice and memorize with the aid of the recording during independent rehearsal (Davis, 1999). The researcher suggests that this tool for opera singing might provide a valuable aid

if adapted for the practice of choral literature. Merrick (2017) describes uses of technology in the secondary classroom in order to promote popular music education, assess student outcomes, and specifically teach notation and aural skills. While Merrick provides no direct information on how the technology is specifically helping students practice their literature outside the classroom, the researcher points out that each of these procedures might be well-adaptable for supporting independent choral practice. In their study of piano student independent practice, Birch & Woodruff (2017) state that turning at-home rehearsal into a game with different achievement levels and avatars showed a positive impact on students in mastering piano skills during at-home practice. The researcher believes that it is feasible that, with significant time and resource investment, something of this nature might be adapted for choral students.

One of the most popular music practice software programs currently available is *SmartMusic*. This program is a web-based music education program where students can practice while being "heard" by a computer program and receiving immediate feedback (Music Learning Software, n.d.). The program has been used extensively by band directors, in both high school and middle school settings (Zuke, 2012). Zuke states that *SmartMusic* helps his instrumental students keep on track with required achievement schedules for the learning of the musical notes. Zuke finds that this allows them to spend time in class working on the musicality rather than learning to play the right notes. The researcher points out that

he has found *SmartMusic* to have a vast repertoire of festival band music

programmed into the software, but little (if any) festival choral literature. As an

alternative, the researcher spent extensive hours using *Finale* software to program

choral music, which must be accurate down to the slightest detail. He found that his

students encountered some problems with the program in the registering of their

voices, particularly when they had a large natural vibrato in their voice, resulting in

erroneous feedback on the accuracy of their vocal pitches. Nevertheless, *SmartMusic*

has been found to be helpful in teaching sight reading to vocal students in an

intermediate-level class (Henry, 2014). Most importantly, Henry's vocal students

reported practicing more due to the use of this technology. However, accessibility

trouble with *SmartMusic* impacted some students' preference for a live scorer.

Theoretical Basis

The study of integrating technology into students' music practice time at

home is in its infancy. Brook & Upitis's 2014 study on several piano students from

varying studios involved a tool named *iSCORE* with piano students to help them

create goals; keep a practice journal; and record and annotate their work. They

found that most students used the goal-setting feature; and many used the recording

feature; whereas many students did not take advantage of the tools available for

improvisation or composition. In a different study, those same researchers noted that

one of the big struggles in using this tool is showing educators how to actually use it

(Upitis & Brook, 2016). Tobias's 2014 case study found that a positive connection

was made between technology use and students working on their songwriting music outside of class. The theory provided by Tobias (2014) that technology integrated into a class has the ability to provide connections from student's in-school learning to their out-of-school learning provides the theoretical basis of this study.

Conclusion

As human technology develops, so does the potential for its impact on the development of education and, specifically, music education (Macedo, 2013). Through the use of digital technology, students are being supported and enabled in self-regulated practice in ways they have not been before (Stephens-Himonides and Hilley, 2017). Technology is aiding students to work more independently (Wise, 2011). Technology has the ability to aid a teacher in management allowing them the freedom to move about the classroom (Wise, 2011). Furby (2013) elaborates how technology may be a wonderful assessment tool allowing teachers to assess students individually in a practical manner in a large ensemble classroom setting. Technology has the ability to give access to composition for students who lack a basic knowledge of notation using accessible notation software (Beckstead, 2001; Webster 2016). Through the use of *iPad* technology Nelson (2013) suggests that students of varying ability levels will become more engaged in class through an ease of communication. Technology may also help students manage their practice better (Austin & Berg, 2006) as well as the possibility of finding resources to help them practice on sites such as *YouTube* (Doebele, 2012; Stowell & Dixon, 2014).

Merrick (2017) writes that "The emerging opportunities [of technology] are endless, but the subsequent shift required to develop appropriate pedagogy that incorporates [technology] highlights the challenges [for] music education" (p.175). Where there is substantial published research that investigates the integration of technology into many aspects of teaching, the researcher has noticed a lack of information and research on how technology might impact current expectations of students in the areas of standard choral rehearsal and student practice outside of rehearsal. Pignato (2017) states that sometimes the promotion by vendors for the pursuit of technology in education is a guise for financial gain and the selling of products. Savage (2018) also states that many companies work to sell products to the educational field without an explicit educational rationale in their work. Stephens-Himonides and Hilley (2017) highlight that "there is a shortage of evidence about how committed music teachers integrate technology into music instruction and the development of a philosophy of technology use".   It is important to ensure that integration of technology also supports the development of a quality music education (Merrick, 2017).

The research reviewed here leads to questions of how technology might be specifically applied in the choral classroom and to the rehearsing of that learning outside of the classroom. Research might investigate possible roles of technology in rehearsing choral musical literature in the classroom and adapting traditional teaching practices to integrating current technology. Furthermore, questions arise of

how the independent practice of choral students might benefit from various tools of

technology.

Chapter 3: Methodology

Introduction

This chapter provides a detailed description of the methodology of this research. It presents research site selection, study population, research instrument, participant recruitment, data collection, and analysis

Research Site Selection

This study took place at an Inland Northwest high school where the researcher was currently employed.

Study Population

Participation in this study was made available to all 89 high school choral students at the school, of which 45 elected to participate. Students participated from a variety of age and grade levels, aged 14 to 18 and grades 9 to 12.

Research Instrument

The research instrument for this study was an anonymous survey with open-ended questions. The digital surveys were completed using the software program *Google Forms*. The questions were designed using language appropriate for high school students.

Population Recruitment

Students were recruited for participation in the study by the researcher during their usual choral classes taking place on one regular school day. The purpose and procedures of the study were explained in full to the students. The researcher

explained that the anonymous study was completely voluntary and that participation or non-participation would have no effect on their grade. He emphasized that they were welcome to withdraw at any time. All students were then given consent forms and were instructed to bring back signed copies by the end of the week if they elected to participate. Students were instructed that those who were minors needed to have the consent form signed by a parent, but that those of 18 years or older should sign it themselves. Students were informed that, if they elected not to participate in the survey and/or did not return a consent form, they would be instructed to quietly study their music scores while the rest of the class filled out the survey. Out of the 89 students in the choral department, 45 returned their consent forms and were included in the study.

Data Collection

Human subjects research approval was provided by Eastern Washington University. Signed permission was given by the school administration to administer the survey. The surveys were completed during the students' usual choral class times on one regular school day. Students providing signed consent forms were reminded of the procedures explained previously and were given the entire class period of 55 minutes to fill out the survey. If students requested more time it would have been given, but no students reported needing this option. Students not participating in the survey were instructed to sit quietly and review the music score to be learned in class that day. Students were asked to work independently and

answer all questions as fully and honestly as they were able. All surveys were taken using a school supplied *Chromebook* while the researcher was in his office out of view of what the students were writing. Surveys were collected digitally using the *Google Form* software program and were collected anonymously. This digital platform avoided any possibility of the researcher identifying students' handwriting.

Data Storage

Because the surveys were administered on-line, the responses were automatically made available to the researcher in digital format, using the *Google Form* program and stored on the researcher's password-protected cloud storage. They were also backed up onto the researcher's personal password-protected computer.

Data Analysis

Data were analyzed looking for themes and differences among answers. There were no preconceived categories for the analysis and emergent categories were utilized based on findings. The report on the results was prepared in a narrative style with tables to assist in clarification.

Chapter 4 - Results

Introduction

This chapter presents the results of the analysis of data collected in this action research investigation. Using survey technique, the empirical descriptive design of the study aimed to elicit answers to the main research question: "What are high school choral student perceptions of the role of technology in their independent choral practicing? The specific type of technology being investigated involved recordings of vocal parts and of full choirs that were distributed to students by the teacher for use in their independent choral practicing. To provide some background information on the general nature of their practicing habits, the study also aimed to answer the sub question "What are high school choral student perceptions on the nature of their independent choral practicing?" Although 45 surveys were collected, not every student elected to complete every answer, so in some results, the total numbers are less than the total amount of surveys completed. In others, the total number of results is greater than the number of students, as some students wrote multiple answers to the open-ended questions, and all of their answers were taken into account in the analysis. There were no pre-determined categories for the analysis. Instead, the researcher searched the data for emergent categories that are reflected on tables in this chapter.

Background Information on Independent Student Choral Practicing

In the survey, the research participants were asked background questions about their perceptions of their independent practicing habits for high school choir classes and their use of technology in those practices. As regards the frequency of practices each week, much of the data was specific. However, other data could not be assigned to a category of frequency, for example, "Not enough there is no such thing as too much practicing" and "occasionally" which is ambiguous. The most commonly-reported response on frequency of practices (34.8%) was one to three times a week (see Table 1).

Table 1
Average number of weekly practices

Practices	Student Responses
6 to 7 times a week	7
4-5 times a week	9
1-3 times a week	16
Vague response indicating some practice	10
Once every other week	1
Never	3

Data on the usual length of these practice sessions was mostly quantifiable. Again, some vague answers were unable be categorized in terms of a time value, such as, "The entire time if I am by myself" and "My practice sessions depends on how fast I can get my part down. If it's easier, not as long, harder- especially if I'm singing second soprano, it's going to take quite a bit longer." Most

easily fell into one of three categories (see Table 2). However, one answer's range

fell outside of the defined categories as it was very broad "anywhere from 10

minutes to 40 minutes" and is not included on the table. The most common time-

length reported (61.9%) fell into the 10 to 30-minute category.

Table 2
General length of practice sessions

Practice length	Student Responses
Above 30 minutes to 1 hour	15
10 to 30 minutes	26
Don't Practice	1

Analysis of the data on student goals during these practices indicates that

students most commonly (66.6%) referred to learning their notes/improving their

part confidence, and to becoming a better singer/improving their singing (25.8%)

(see Table 3).

Table 3
Goals in practice

Goals	Student Responses
Learn notes/improve part confidence	30
Become a better singer or musician/improve singing skill	16
Learn lyrics/pronunciation	5
Memorize literature	7
Improve sight singing ability	2
Have fun	1
Prepare for parts tests	1

Data on motivation to practice most commonly (37.8%) indicated the desire to be a better singer/musician or improve singing skill (see Table 4). One of the four student responses pertaining to liking the music was "If I like the music then I will listen to it more often. If I don't like the music then I don't have as much motivation to work on it.".

Table 4
Motivation to practice

Motivators	Student Responses
Need to know music better for class	9
Desire to be a better singer/musician	17
Pleasing others (audience/class/teacher)	6
For fun/love of singing	7
Deadlines/tests	2
Boredom	3
Liking the music	4
Career goals	1
Family tradition	1
Nothing	1

Analysis of data on what makes it difficult for students to practice indicate that this question elicited the highest variety of answers on the survey questions, with students providing many reasons as to why it is difficult to practice. The most frequent answers pertained to space issues (21.8%), either a lack of space in which to practice or specifically spaces being too noisy to practice properly (see Table 5).

Table 5
Practice difficulties

Difficulties	Student Responses
No need to practice	2
Too difficult to practice	5
Lack of piano/keyboard skill	8
Lack of space/space too noisy	12
Busy with job/schoolwork/activities	7
Distractions	8
Illness	1
Practicing alone	3
Disability	1
No desire	2
No ability to use recordings	1
Don't like literature	2
Insecurity in practicing	3

The data analysis on where students practice indicated that most students (57.8%) reported practicing in their bedroom. A number of students reported practicing in a car or bus (37.8%) and in the bathroom or shower (33.3%) (see Table 6).

Table 6
Where students practice outside of class

Location	Student Responses
Choir room/practice rooms at school	9
Other rooms at school	5
In the bedroom	27
In the bathroom/shower	15
Unspecified place at home	19
In the car/riding the bus	17
Friend/relative's house	1
Church	2
In a tree	1

Students reported on their use of keyboard instruments during practice with more students indicating not using a piano or keyboard (60%) than doing so (35.6%) (see Table 7). One comment on the negative side was "i would [use] the piano but i don't know how to play notes on the song [sic]". Another on the affirmative side wrote "Yep- don't know how I would have survived choir- especially jazz without it [sic]."

Table 7
Piano or Keyboard use in Practice

Use of Keyboard	Student Responses
No ability to play	11
Don't have a piano or keyboard	1
No (unspecified)	15
All the time	4
With basic skill	11
Starting note only	1

Analysis of data pertaining to students practicing any differently when the literature was new to them indicated that 22.2% of students reported not practicing any differently, while most reported doing things differently at first, with 33.3% using the recordings more than they would normally do (see Table 8).

Table 8
Ways of practicing new literature differently from familiar literature

Way of Practicing	Student Responses
No Difference	10
Practice at the piano	1
Take more time to practice	4
Go over the words/pronunciation more	8
Review smaller sections	2
Review bigger sections	1
Practice the easy parts from class	1
Listen more to distributed recordings	15
Listen to recordings found independently (YouTube)	3

Students also reported on how an upcoming class assessment on their part singing would typically impact their practicing habits. Somewhat similar numbers of responses were negative (20%) as were affirmative in terms of impacting the length of time spent practicing (26.7%) immediately before an assessment. In terms of using the provided recordings, 17.8% reported an assessment resulting in their using the recordings more frequently (see Table 9).

Table 9
Practicing with an upcoming assessment

Way of Practicing	Student Responses
No Difference	9
Focus on singing against other voice parts	4
Focus on just the relevant part	4
Only practice the section being tested	5
Spend more time practicing	12
Focus more on dynamics/breathing	1
Practice for confidence on the test	2
Listen more to distributed recordings	8
Record individual practice for self-assessment	1

Analysis of the data pertaining to differences in practicing when facing an

upcoming concert indicated that most students reported no difference (40%), while

some reported spending more time practicing before a concert (22.2%) and others

less (15.6%) (see Table 10).

Table 10
Practicing before an upcoming concert

Way of Practicing	Student Responses
No Difference	18
Work on memorization	2
More time spent practicing	10
Less time spent practicing	7
Work towards confidence in part	1
Try to practice with others	1
Focus on vowels/dynamics/nuance	4
Listen to recordings more	1
Listen to recordings less	1

Use of Technology in Independent Practicing

Students described what devices they use for listening to the recordings. The majority of responses indicated the use of cell phones (77.8%) and personal computers (44.4%) (see Table 11.). Four responses did not pertain to devices but provided some interesting information about why they use the recordings: "I use those tools to help me with the genre of music so I know how to sing it and in what way"; "i use recordings to practice holding my part against them"; "I use them to listen to how I can convey the emotion when I sing"; and "I use YouTube or google classroom if they are posted on there and listen to it through my phone or *Chromebook* and listen to the recordings usually while I am doing something else such as doing homework because if I listen to it as background noise it usually gets stuck in my head subconsciously and it won't get annoying to listen to it on repeat". Another student explained, "I don't use recordings but rather finale playback of the tones. I'll listen to the recordings in my car every once in a while."

Table 11
Recording playback devices

Device	Student Responses
Don't use recordings	1
Cell Phone	35
Tablet	3
Computer	20
CD player	1
Amazon Alexa	1
Finale MIDI playback	1

Students further explained how they use the vocal part recordings. More responses indicated students finding the recordings helpful (88.6%) with very few indicating them not being helpful (11.4%) (see Table 12). Most of the positive responses involved recordings providing a tool to hear their own part better (48.9%), with one student stating "Parts recordings are the best thing that have ever happened to me." Of the negative reports one student explained "I believe recordings are helpful for people that don't know piano or another instrument well, but I feel that they don't fully let you figure out what is going on in the music on your own. Anyone can listen to a recording and sing the words without the music score in front of them but knowing what happens in the music score is much more beneficial, and I feel that playing your part on an instrument is much more beneficial".

Table 12

The Value of Part Recordings

Value	Student Responses
Positive	
Helps because can't play piano	4
Helps to hear pitches/notes	22
Helps understand part	2
Helps rhythm	1
Helps find mistakes	5
Helps establish the tempo	1
Helps memorization	3
Ease of access	1
Negative	
Doesn't help	1
Lacks the full choir	1
Can differ from class	1
Can create dependence	1
Doesn't help in understanding the music	1

The data suggest that students find the full performance recordings more helpful (78.8%) than not helpful (21.2%). Most answers (48.9%) revealed that recordings are most helpful in establishing the overall feel of a song and what it should sound like when it is performed (see Table 13). The most common negative response (13.3%) was not being able to hear their own part (see Table 13). One response regarding the recordings being helpful was "Helps understand what the whole song will sound like. It helps me personally because it lets me go at a quicker pace rather than waiting around for the rest of my peers to catch up with me." Another student wrote "I think full performance recordings are helpful as a framework for those who cannot play all the parts at once on piano (myself

included). I don't think they should be used extensively however, as I tend to start to

rely on the recording to help me sing my part, which won't be what happens at a

concert."

Table 13
The Value of Full Performance Recordings

Value	Student Responses
Helpful	
Establishes overall feel/what it should sound like	23
Opportunity to critique	5
Can sing against other parts	9
Helps sing part correctly	4
Not Helpful	
Can't hear my own part	6
Some recordings incomplete	1
Some recordings poor quality	2
Not as helpful as part recordings	1
Don't use them	1

Data shows that 22.2% of students did not report a change in their recording

usage as they became more familiar with their literature. Responses that did indicate

a change reported that they used the recordings less as they knew their part better

(31.1%) (see Table 14). Two answers providing more detail are "No, I love to listen

to the recordings once or twice a day once I am fully comfortable with the songs

because I feel like there is always something to improve on or to point out. I can

always use a little help and the recordings are amazing for that"; and "Once I know

my music well, listening to the recordings makes it easier to practice so I use them more frequently than playing my part on the keyboard."

Table 14
Effect of familiarity of literature on recording use

Effect	Student Responses
None	10
Yes	3
Use recordings less	14
Use recordings more	2
Use full recordings more and part recordings less	5
Use recordings for retention	3
Listen for more details and cutoffs	4

Summary of Results

The results of the data analysis indicate student perceptions on the role of technology in their independent choral practice and (as background information) on the general nature of their independent choral practicing. Most students reported practicing each week for a reasonable length of time, with common goals and motivations being learning their parts and becoming better singers. Main challenges to practicing were perceived to be the lack of suitable practice spaces and a lack of keyboard skills. Students mostly reported practicing in their bedrooms and in cars or busses travelling to and from school. Results indicated students using the distributed recordings more when the literature was new and if they had an assessment approaching, but not practicing any differently if they had an upcoming concert.

Students mostly reported using cell phones or computers for listening to the recordings. Most students reported the part recordings and full performance recordings being helpful with the part recordings helping students hear their pitches and the full performance recordings helping students establish how the song should sound. Finally, most students reported using the recordings less as they became more familiar with the literature.

Chapter 5: Summary and Conclusion

Summary

This action research aimed to determine high school choral student perceptions on their use of technology during independent choral practicing and background information on the general nature of their choral practicing habits. The study involved an empirical, descriptive design using survey technique. The research was conducted at the high school in the Inland Northwest of the USA where the researcher currently teaches, with 45 of the total 89 choral students agreeing to participate. Through examining the results of the study, it was the researcher's aim to improve how he guides his students towards optimizing their independent practicing activities in regular preparation for class.   Results indicated that most students reported practicing one to three times a week (34.8%) with most practice sessions being 10 to 30 minutes (61.9%). The most common goals when practicing for choir were indicated to be learning their part (66.6%) and becoming a better singer/improving singing (25.8%). Similarly, students reported being motivated by their desires to become better singers (37.8%) and wanting to know their music better for class (17.6%). The main reasons for not practicing were perceived by students to be the lack of a suitable practice space (21.8%), followed by a lack of keyboard skill (14.5%). Students mostly reported practicing in their bedrooms (57.8%). Most students reported not using a keyboard or piano to practice (60%). Results indicated students using the distributed recordings more when the literature

was new (33.3%); spending more time practicing if they had an assessment approaching (17.8%) but not practicing any differently if they had an upcoming concert (40%). Students mostly reported using cell phones (77.8%) or computers (44.4%) for listening to the provided recordings. More students reported the part recordings and full performance recordings being helpful (88.6%,78.8%) than not (11.4%, 21.2%) with the part recordings helping students hear their pitches (50%) and the full performance recordings helping students establish how the song should sound (44.2%). Finally, most students reported using the recordings less as they became more familiar with the literature (34.1%).

Discussion of Procedure

On reflection, the researcher found that the use of a survey with open ended questions elicited rich information. It provided interesting points that were helpful to the researcher in his capacity as a teacher wanting to support his students better. Having predetermined categories for days per week and time of practices would have made establishing categories in the analysis easier. For example, when asked how many times a week students practice, some responses said 1 to 2 times a week where others said 2 to 3 times a week. Therefore, it felt best to group those together. This made some results feel a bit vague, but it accurately reflected what students were reporting. The open-ended questions had room for rich commenting. Therefore, doing a similar survey in the future, the researcher would leave a place for comments

alongside those predetermined categories. Overall, the survey provided a valuable instrument for determining student perceptions regarding practicing.

Discussion of Outcomes

It was encouraging to the researcher to see that the majority of students reported practicing one or more times weekly for a reasonable amount of time, with only three having stated that they never practice. Had students mostly not been practicing, the study would have had little value and the major task for the researcher would have been addressing that problem going forward. It was further encouraging to learn that motivations for practicing were directly related to the singing itself, as students expressed goals and motivations related to knowing their parts and becoming better singers/improve their singing. While one question asked about goals and another about motivation, it was good to see the results confirm each other in the student responses. The apparent lack of suitable practice space being a deterrent from practicing is something that needs further focus in terms of how to support students in this regard. This result pertaining to venues is similar to the findings of Perez (2012) regarding his middle school band students. The high numbers of students claiming to practice in the shower/bathroom and in the car/bus on the way to school was surprising to the researcher, as he was unaware these would be common venues. On reflection, this is understandable, because the singing instrument is within the human body, providing an advantage to the flexibility of venues for

practicing, and an ability to practice while doing other activities such as bathing or traveling.

The results of this study, in which students find technology helpful in independent rehearsal, support the theory on which this study was based, where Tobias (2013) claimed that technology integrated into a class may provide connections from students' in-school learning to their out-of-school learning. Having students practice their vocal part and come to the choral class prepared makes a big difference in student productivity during in-class work. The results also align with the studies by Brook & Upitis (2014) and Upitis and Brook (2016) where technology was shown to help with independent instrumental practice. Positive student reports on the helpfulness of part recordings and full performance recordings reinforce the researcher's practice of distributing recordings. Because the researcher used *YouTube* to find some of the full performance recordings to distribute to students, there is a connection of ideas to Doebele (2012) and Stowell & Dixon (2014) in how *YouTube* may be utilized in education. Most students reported accessing the recordings through their cell phone or personal computer, indicating that most of these students are at a socioeconomic level to either own or have access to technological devices. Most students reported not using a piano/keyboard to practice, which is a viable option for the learning of new vocal parts. However, the lack of student ability to play the keyboard and to have access to a keyboard appeared to be reasons for not doing so. This reinforces the researcher's idea that

providing recordings might offer a valuable alternative to keyboards, being more accessible to the majority of students by not needing specific keyboard skills. It was reported that recordings were used more when new literature was being learned and that students would practice more with an upcoming assessment. However, they reportedly wouldn't be practicing any different if a concert was approaching. The researcher theorizes that as the concert draws closer, students are more familiar with the literature, therefore need the assistance of the recordings less to practice. It is also interesting to see that out of the 45 students who responded, only one (2.2%) said that they did not use the recordings that are provided to them. There were also three students (6.6%) who said they didn't practice but would use the recordings to listen. These students reported not practicing but they did use the recordings. Although the students may not have been aware of this, listening to the recordings can be defined as a method of practicing their music.

The results of the data analysis are encouraging to the researcher because he learned that his students mostly appear motivated to practice outside of the classroom. This aligns with results cited in Austin & Berg (2006), whose study also indicated the helpfulness of recordings, specifically in bridging any gaps in keyboard skills. The results especially reinforce the researcher's practice of distributing part and full choral recordings when starting new repertoire. It was encouraging to the researcher to have confirmed that students are apparently motivated enough to fit practicing into their busy schedules (when he is aware that these possibly include

extra-mural activities, homework and, for the older children, employment). The statement "If I like the music then I will listen to it more often. If I don't like the music then I don't have as much motivation to work on it" makes the researcher think about the importance of repertoire selection. The researcher wants to explore ways to motivate students to practice even if they don't find some literature as desirable as others. Seeing students comment "i would [use] the piano but i don't know how to play notes on the song" and "Parts recordings are the best thing that have ever happened to me." show the researcher that students may have a desire to practice but don't always enter a choir program with the skills to practice in a traditional sense.

 A concern of the researcher was the availability of technological devices for students to access recordings. Albert (2015), Stowell & Dixon (2014), and Wise (2011) all discussed the need to be aware if students have technology if a teacher is going to use it. In this case, the researcher was pleased to find no issues for students accessing devices to listen to the recordings. Where some responses were short, in some cases they were long and revealing, showing how some students expressed a strong desire to be challenged in practice, such as: "to see where i can put myself when it comes to challenges way above my way of thinking, to be able to reach higher and higher goals set every day, and when those challenges are done, set even higher goals, reach higher ranges within my vocal profession, and to be better in my way of thinking for music in general."

Implications

Based on the positive findings of this action research, the researcher will continue to encourage his students to practice outside of class time. Clearly, most students are practicing and are finding the recordings helpful, therefore the researcher will make special effort to reinforce these actions. Seeing that one of the common struggles was an appropriate, quiet place to practice, the researcher will highlight the need for student access to practice rooms at the school. He will also prepare a letter to send home for parents, educating them on supporting student access to a suitable practice environment and explaining what that entails. Considering that part recordings and full performance recordings are seen as most helpful to students in their independent practicing, the researcher plans to continue to make individual vocal part and full recordings when appropriate in the future. Finding full performance recordings through sources such as *YouTube* and constructing part recordings by recording a part being played on the piano take time, but the results seem to be worthwhile. The results might inform other high school choral teachers making decisions about their own guidance of students on independent practicing. It might also encourage them to conduct their own action research in this area. The researcher has heard of other teachers in his field rejecting the use of recordings as a practice tool in their teaching. However, this study has shown them to most helpful to his own students.

Recommendations for Further Research

It would be informative to see the results of similar studies at other secondary schools, and especially to see if student socio-economic status impacted results. The researcher recommends investigations on the many roles that other aspects of technology might play in practice habits of choral students at schools.

The researcher also thinks it would be informative to explore whether practice using technology is any different from the quality of practice without it. This might be difficult to measure, as students who don't use technology might have well-developed music literacy skills. However, it would be enlightening to know if practicing the use of technology has a specific benefit over the traditional practice of reading notation.

Finally, conducting research into how other technologies might aid choral rehearsal and assessment procedures might be informative to the broader choral music community.

Conclusion

Results of this research show that most students in this particular high school choral program are practicing outside of class time and are motivated intrinsically to be a better singer and to know their part better. Where a proper practice space and lack of the use of a piano may be a hindrance to the students in this study, the provided recordings appear to have helped students learn their vocal parts and be able to practice without the use of a keyboard. The researcher will continue to seek

out new and unique ways that help students rehearse in an ever-changing world where technology is becoming more prevalent and students are being asked to do more than they ever have before, in hope that they will continue to rehearse for class and grow as musicians towards a lifetime of musical enjoyment.

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VITA

Author: Matthew K. Johnson

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Degrees Awarded: Bachelor of Arts in Music, 2010, Western Washington University

Professional Experience: Teacher, Central Valley School District, Spokane Valley,
     Wa. 2010

Appendix A:
Site Permission Letter

University
High School

12420 E. 32nd Avenue, Spokane Valley, WA 99216 • uhs.cvsd.org
(509) 558-6040 • Fax 558-6049 • Counseling Center 558-6046 • Attendance Office 558-6055

CENTRAL VALLEY
SCHOOL DISTRICT

To Whom It May Concern,

Matthew K Johnson, acting as an agent of Eastern Washington University, has University High School's consent to conduct an anonymous survey at our institution in relation to his Master's thesis work at EWU. It is acknowledged that the survey includes an assent and consent form for students and without this form, students will not participate. The questions of the survey have been reviewed by UHS administration.

Keven Frandsen
Principal
University High School

Appendix B:
Parents' Informed Consent Form

Department of Music, Eastern Washington University

INFORMED CONSENT FOR NON-MEDICAL RESEARCH

PARENTAL PERMISSION

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Technology and its effect on Secondary Choral Students' reported practice time

EWU Institutional Review Board for Human Subjects Research
Consent Form
Survey on Technology and its effect on Secondary Choral Students' reported practice time

Principal Investigator – Matt Johnson, Graduate Student, Music Education, 509-558-6106
Responsible Project Investigator – Dr. Sheila Woodward, Director, Music Education, 509-359-7073

Purpose and Benefits
       The purpose of this research is to see if technology has an effect on secondary choral student's practice time outside of class. This research is being conducted to fulfill a graduate degree requirement.

Procedures
    Students will be asked during their class time with Mr. Johnson to complete an anonymous survey asking about their practice habits outside of the classroom. The survey will include questions similar to the following:

- What are your goals when you practice for choir?
- What motivates you to practice?
- What makes it difficult to practice?
- In what ways do you find part recordings helpful and/or not helpful?
- In what ways do you find full performance recordings helpful and/or not helpful?
- Describe in detail the places where you practice outside of class. If in multiple places, please describe all of them.

 Individuals are free not to answer any questions which they find objectionable.

Risk, Stress or Discomfort

This study is considered less than minimal risk and is not expected to exceed the risks encountered in daily life. In the unlikely event that your child becomes emotional as a result of their participation they may stop taking the survey and the researcher will refer them to the school counselor if necessary.

Other Information

Student information will remain completely anonymous and the survey will have no effect on their choir class grade. Students who do not turn in the consent form or elect to not participate will be given an alternate score study assignment not related to the research.

Principal Investigator   3-15-18

Subject's Statement

The study described above has been explained to me, and I voluntarily consent to participate in this survey. I have had an opportunity to ask questions. I understand that by signing this form I am not waiving my legal rights. I understand that I will receive a signed copy of this form.

Signature of Subject   Date

If student is not 18,
Signature of Parent/Legal Guardian   Date

If you have any concerns about your rights as a participant in this research or any complaints you wish to make, you may contact Ruth Galm, Human Protections Administrator, at (509) 359-7971 or rgalm@ewu.edu.

Appendix C:
Participant Recruitment Script

Department of Music, Eastern Washington University

Information Script for Recruiting Participants

Page 1 of 1

ANNOUNCEMENT SCRIPT FOR PARTICIPANT RECRUITMENT

Technology and its effect on Secondary Choral Students' reported practice time

Students,

As most of you know I have been taking graduate courses at Eastern Washington University for the last few years. As a culmination of those studies, I want to do some field research on the practice habits of students outside of class time. So, as part of the research, I am looking for volunteers who would be willing to fill out a survey that asks about your practice habits outside of class time.

These surveys will not be very long and questions pertain only to your practicing outside of class. You will not be identified on your survey and no names will be written on them, they are completely anonymous. The surveys will not be tied to your grades in any way, shape, or form and we will complete them during class time. It is estimated they will take about 30 to 40 minutes to complete. Participation in this study is voluntary. If you don't feel comfortable participating, you are not required to do so by any means. The only task that will be asked of you is to fill out this survey. If you elect to not participate, you will be asked to study your choir music independently while sitting at tables in the library.

It is important that you are completely honest as you fill out the survey. I will not be upset with any results, as long as they are truthful. Even if you do not practice at all outside of class time, that data is useful to this study and is an important part of this research. Lies on the survey would make it invalid and invaluable to this study. Please don't write answers that you think I want to hear but write honest responses.

Since most of you are under the age of 18 we will need to get a consent form signed by your parent or guardian and returned to me in order to participate. If you happen to be 18 you can sign the form yourself, with no parental signature required. If you or your parents have any questions about this survey, they are more than welcome to ask. Thank you for listening and I hope you are willing to participate.