

A CAUSAL-COMPARATIVE ANALYSIS OF
PERFORMANCE-BASED MUSIC CLASSES AND ACT SCORES

by

Russell Warren Courson

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

Educational leaders at the state and district level are struggling to provide adequate funding for schools due to the uncertainty of the economic outlook throughout the country. Although several states have requested and received waivers for the No Child Left Behind Act of 2001 (NCLB), many school systems still find themselves in the difficult position of providing enough instructional time dedicated to the four primary core content areas (language arts, math, science, and social studies) to allow students to be successful in high stakes standardized testing. While NCLB stated the fine arts, including performance-based music classes, such as band, choir, and orchestra are part of the core curriculum, music programs are dealing with cutbacks and even elimination. After years of debate in Congress, the Every Student Succeeds Act (ESSA) finally passed and was signed into law by President Barack Obama in December 2015. This legislation provides hope within the music education community these concerns will be addressed. This causal-comparative study measured the impact of performance-based music classes on academic achievement utilizing data provided by recent high school graduates from a high school in the Southeastern United States.

Keywords: music, music education, music instruction, music education philosophy, music education advocacy, cognitive development, performance-based music classes, band, choir, orchestra, academic achievement

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Dedication

This dissertation is dedicated to my parents, Ken and Thelma Courson. Looking back, I'm so thankful to have been raised in a Christian home by parents who lived for their kids and supported us in all of our endeavors. I couldn't begin to count the number of baseball games, PTA performances, football games, band concerts, and other activities they attended. They were ALWAYS there!!! They also involved their children in activities that allowed all of us to make memories for a lifetime. Many memories that would be insignificant to some, but precious to me.

Even though Daddy outran us to The Father's house way too young 24 years ago, we still have conversations about life just about every day. While Daddy never finished high school, I believe that was the catalyst that caused him to instill an appreciation of the importance and value of education. Likewise, Mama promoted reading as a fun activity and made sure to take us to the library on a weekly basis to check out books. Most likely, the greatest financial investment made by my parents on our behalf was the \$100.00 they spent in 1973 on a set of World Book encyclopedias. My brother David and I spent hours reading encyclopedias...for entertainment!

I've been influenced by so many over the years, but Daddy was the most influential, without question. He taught us that every person in this world has value, regardless of their role, title, or economic status. He also taught us that you should treat others the way that you want to be treated. As a lifelong educator, I've made every attempt to instill those ideals into all of the students that I've taught. Mama and I didn't always get along or see eye-to-eye, especially during my teenage years. I thought Daddy was crazy when he told me one day that the reason Mama and I didn't get along was because we were too much alike. At this point in my life, I'm proud to admit that he was right! There is never a question about where she stands on any issue, but I know that she is my biggest fan and always has my back. For that Mama, I am thankful!

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First of all, I would like to thank the members of my dissertation committee. Words can never express my deep appreciation for Dr. Grania Holman and Dr. Donna Jones, who agreed to step in as committee members when I suddenly found myself without a committee midway through this process. Your advice and encouragement throughout has been invaluable, and I thank you. Dr. Frank Buck, you have been a mentor and role model throughout my career as a music educator. As an educator with experience as a band director, local school administrator, and central office administrator, your advice has been instrumental (pun intended!) in the completion of this dissertation. In addition, I would be remiss if I didn't acknowledge and thank the first members of my committee, Drs. Gregg and Carol Mowen. Your experience as music educators allowed me to lay a solid foundation when I started the dissertation process, and without your help, I would have never reached this point.

I also want to thank Dr. Holman for referring me to my editor, Dr. Marilyn Newell. I have no doubt that I have you to thank for finally completing this process. I will never forget the copy of my dissertation that you returned after your initial review that took red ink to a new level! I had nightmares for weeks dreaming of every English composition teacher I ever had, and they were all armed with a red Bic Flair felt tip pen, lol. You took red ink to a completely different level through the use of the editing features in MS Word! I apologize if I seemed difficult after our initial meeting, but after I realized that you ARE the expert and I needed to rely on your experience to move to the next level, we were cooking with gas!!! Thank you SO MUCH to the friend and mentor that I affectionately referred to as "editor lady."

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List of Abbreviations

Adequate Yearly Progress (AYP)

Alabama Reading and Math Test (ARMT)

Alabama State Department of Education (ALSDE)

Analysis of Variance (ANOVA)

Early Childhood Longitudinal Study (ECLS)

Elementary and Secondary Education Act (ESEA)

Educational Resource Information Center (ERIC)

Every Student Succeeds Act (ESSA)

Grade Point Average (GPA)

Intelligence Quotient (IQ)

International Review Board (IRB)

National Association for Music Educators (NAfME)

National Educational Longitudinal Study (NELS)

No Child Left Behind Act (NCLB)

Scholastic Aptitude Test (SAT)

Science Technology Arts Engineering Math Education (STEAM)

Science Technology Engineering Math Education (STEM)

Statistical Package for the Social Sciences (SPSS)

Structural Equation Modeling (SEM)

Texas Music Educators Association (TMEA)

CHAPTER ONE: INTRODUCTION

Overview

Educators in the field of the fine and performing arts, and specifically performance-based music classes, such as band, choir, and orchestra, have been struggling for over a half-century to justify exactly where they fit in to the grand scheme of K-12 education (Allsup, 2003; Branscome, 2012; Earnhart, 2015; Eason & Johnson, 2013). One of the purposes of this dissertation is to assist music educators in providing validation for the contributions they make to the field of education. This chapter provides historical background linking the work of the great early philosophers through efforts taking place today in the 21st century.

Background

Historically, philosophers, such as Confucius (Wong, 1998), Plato (Wong, 1998; Woerther, 2008), and Aristotle (Mark, 1999; Woerther, 2008) promoted music as an integral part of their educational curricula. According to Mark (1999), other historical leaders of aristocratic and religious backgrounds, such as St. Augustine, Boethius, Charlemagne, Martin Luther, John Calvin, John Amos Comenius, John Locke, Johann Heinrich Pestalozzi, John Ruskin, and Herbert Spencer (p. 8) continued the quest to promote music education through their writings. Prominent early American educators also endorsed the inclusion of music as part of the educational curriculum. These pioneers include Horace Mann, John Dewey, and the father of music education in the United States, Lowell Mason (Catterall, 2009). Throughout the first half of the 20th century, music education thrived as it was used to promote the assimilation of immigrants into the American culture, enrich the lives of students, and to entertain those residing in their respective communities (Mark, 1999). However, the environment in the education community changed considerably after the conclusion of World War II as Americans began to

discover they were falling behind other industrialized nations in several measures of basic skills (Aprill, 2001).

Not long after efforts to bolster educational offerings in the math and science disciplines took place in the late 1950's (Daughtry, 2013; Rigden, 2007), advocates of the fine arts found themselves in a position of having to provide substantive reasoning for the survival of their programs (Aprill, 2001). Since that time, researchers in the music, education, and scientific communities have conducted many different studies in the attempt to link the benefits of music with improved test scores, cognitive development, and overall academic achievement (Eason & Johnson, 2013; Rauscher, Shaw, & Ky, 1993; Schellenberg, 2004, 2005, 2006, 2015).

An additional threat to arts education involves the financial restraints administrators find themselves in as a result of the current condition of the economy (Beveridge, 2010; Earnhart, 2015; Viglione, Amendola, & Oliver, 2015; Wilkins et al., 2003). Throughout the 20th century and into the 21st century, evidence indicates during an economic downturn, arts education was always among the first to be eliminated (Helig, Cole, & Aguilar, 2010). As a result, stakeholders in the music education community began an advocacy movement to promote the impact of their discipline concerning overall academic achievement (Branscome, 2012). When educators found themselves in a position where it was difficult to keep schools open, they made the necessary cuts to make that happen. This point was especially true during the Great Depression of the 1930s (Helig et al., 2010). While there were no threats of schools closing during the Great Recession of 2008, there were many examples of arts programs being cut. According to Winner and Cooper (2000), "When budgets are tight, the arts are almost always the first programs to be cut" (p. 11). During times of economic prosperity, arts education generally returned to the

classroom. However, that has not always been the case during the most recent economic downturn (Doyle, 2012; Major, 2013; Sabol, 2013; Slaton, 2012).

In a similar way, advances in technology often resulted in reductions and even elimination of arts education. One example of this trend is found in the early 1960s, as the United States found itself in a race to space with the Soviet Union, causing a greater emphasis to be placed on math and science education (Helig et al., 2010). As the United States moves into a technology-driven economy in the 21st century, a great deal of emphasis is being placed on science, technology, engineering, and math offerings. This is becoming widely known throughout the country as STEM education (Sabol, 2013). There is a great deal of concern within the scientific and education communities that the United States is falling behind other countries in these areas. While the movement in support of STEM education is strong, there is also growing support for STEAM education as well, which, of course, adds the arts component to science, technology, engineering, and math (Daugherty, 2013; Henriksen, 2014; Root-Bernstein & Root-Bernstein, 2010; Sabol, 2013; Watson, 2016).

Researchers within the last decade are discovering students exposed to the arts improve critical thinking skills as a result of study within the fine arts (Daugherty, 2013; Henriksen, 2014; Sabol, 2013; Watson, 2016). A number of research studies have broached the possible link between the study of fine arts and academic achievement (Kinney, 2008). An initially obscure report by Rauscher et al. (1993) provided the catalyst needed to focus on this possible relationship. The report determined college students listening to music composed by the Classical Period composer Wolfgang Amadeus Mozart for 10 minutes prior to taking the Stanford-Binet Intelligence Scale would increase their intelligence quotient (IQ) score as a result (Rauscher et al., 1993). These findings motivated researchers to conduct further studies to either

substantiate or refute those findings (Schellenberg, 2004, 2005, 2006, 2015; Schellenberg & Hallam, 2005; Taylor & Rowe, 2012). While researchers have continually discovered possible positive connections between music education and academic achievement, Federal funding of education has often had a negative impact on providing music classes to students because school administrators feel pressured to spend as much classroom time as possible in the core areas of language arts, math, science, and history (Earnhart, 2015).

The initial Elementary and Secondary Education Act (ESEA) was proposed by President Lyndon B. Johnson in 1965 as a component of his war on poverty. President Johnson, a former classroom teacher in a poverty-stricken area of Texas, felt this legislation would level the playing field. This law has had a profound effect on public school education as this legislation has been reauthorized on average every five years since that time (Darrow, 2016).

In 2001, Congress, under the leadership of President George W. Bush, passed the No Child Left Behind Act (NCLB), which was a reauthorization of ESEA. While the intentions of NCLB were to improve the education of all children, including those impacted by exceptionalities, the law was so restrictive that NCLB was greatly criticized throughout the education community because of the emphasis placed on high-stakes standardized testing (Gross & Hill, 2016). Standardized testing results were utilized to determine whether or not a school achieved Adequate Yearly Progress (AYP). The cost of implementation of the program, along with the fact that the curriculum ended up being narrowed to accommodate those areas being tested, caused dissatisfaction with stakeholders (Darrow, 2016).

As a result of the No Child Left Behind Act of 2001 (NCLB), many educators found themselves in the difficult position of trying to find every available minute of instructional time to address areas of the curriculum that determine whether or not a school made Adequate Yearly

Progress (AYP). Even though NCLB specifically named classes in the fine arts as a part of the core curriculum, music, drama and art classes have been severely curtailed or even eliminated altogether. The reason for the cuts is fine arts classes have not been subjected to standardized testing, the gauge used to measure AYP. These federal mandates involve high-stakes standardized testing in specific subject areas (language arts and math). Measurements were also utilized to determine the existence of a year-to-year improvement in high school graduation rates (Beveridge, 2010; Viglione et al., 2015; Wilkins et al., 2003).

In December 2015, President Barack Obama signed into law the current reauthorization of the ESEA, known as the Every Student Succeeds Act (ESSA) (Darrow, 2016; Gross & Hill, 2016). The ESSA indicates music classes are indeed part of the core curriculum and removes many of the restrictions placed upon educators at the federal level, leaving decisions on those guidelines up to the individual states (Gross & Hill, 2016). Those guidelines must be in place by the spring of 2017 (Cleveland, 2016; Woods, 2016). While arts educators are excited regarding the possibilities of integrations of arts disciplines into the classroom, there is still a great deal of angst and uncertainty regarding these decisions (Darrow, 2016). Arts educators are apprehensive ESSA will not be significantly different from NCLB as far as arts education is concerned (Darrow, 2016; Gross & Hill, 2016).

A number of research studies have established a significant positive correlation between arts education and academic achievement (Catterall, 2009, 2012; Respress & Lufti, 2006; Southgate & Roscigno, 2009). Several have specifically addressed the benefits of music education for both brain development and cognitive development, which comprise the theoretical framework for this study (Hetland, 2000a, 2000b; Rauscher et al., 1993; Schellenberg, 2004, 2005, 2006, 2015). Still others have found strong correlation between the study of music and

standardized test results (Eason & Johnson, 2013; Johnson & Eason, 2016; TMEA 2014, 2015; Winner & Cooper, 2000). While research has shown a positive relationship between music education, brain and cognitive development, and academic achievement, music and other arts programs that could contribute to brain and cognitive development are being removed from schools in favor of the focus on subjects that are measured through standardized testing under the NCLB Act and the more recent ESSA Act (Earnhart, 2015).

Performance-based music classes are comprised of students studying vocal or instrumental music in an ensemble setting, such as choir, band, or orchestra (Pellegrino, Conway, & Russell, 2015). Music programs and the quality of those programs have been shown to improve standardized test scores regardless of socioeconomic disparities among the schools or school districts (Johansen, 2007). The implications of this for the education system, community, and society-at-large are considerable, as eliminating music programs places the very thing that could improve student academic achievement at risk (Catterall, 1998; Earnhart, 2015; Johnson & Memmott, 2006, Kinney, 2008).

While Piaget (1952) never actually measured the impact of music on children in the work completed developing cognitive development theory, his work laid the foundation for the constructivist movement in education, eventually adopted and promoted by a number of music educators (Taetle & Cutietta, 2012). Piaget's cognitive development theory centered around four distinct stages of learning: Sensorimotor (age 0-2), preoperational (age 2-7), concrete (age 7-11), and formal operations (age 11-adulthood) (Piaget, 1955; Taetle & Cutietta, 2012). Piaget encouraged the concept of providing students with a learning environment that was stress-free and non-threatening (Burnett, 2010).

Although constructivism did not originate in the music classroom, the idea was quickly adopted by countless educators within the discipline as many of the behaviors promoted through the theory were already being utilized (Burnett, 2010; Freer, 2009; Myers, 2009). Constructivism promotes the theory that students learn, based upon the knowledge they have already acquired (Scott, 2006; 2011). In support of those ideas, Shively (2015) posits that learning is a holistic activity, and students are dependent upon interaction with others, including their peers and instructors. Shively (2015) also states that while constructivism is dependent upon learning based upon prior knowledge, the concept also is considered learner-center, as opposed to student or teacher centered. Therefore, teachers should be acquiring additional knowledge as they disseminate information to students (Shively, 2015). In a performance-based music classroom setting, teachers are facilitators, sharing knowledge based upon the experience level of the students they are interacting with. Beginning level students need much greater detail to be successful, while advanced students, building off the prior knowledge they have acquired, are better equipped to engage with the instructor through critical thinking skills and questioning (Scott, 2006; 2011)

Problem Statement

Because of budgetary constraints, performance-based music programs are being severely curtailed and even eliminated to provide additional time in the school day for areas of the curriculum subjected to high-stakes testing (Earnhart, 2015). It is possible the elimination of performance-based music classes could actually have a negative impact on student academic achievement as measured by high-stakes test scores (Earnhart, 2015). Multiple studies have attempted to determine the existence of a relationship between music education, brain development, cognitive development, and improved academic achievement (Catterall, 2012;

Eason & Johnson, 2013; Schellenberg, 2015). The education and scientific communities have had difficulty determining whether or not any causal effect exists (Catterall, 2009, 2012; Schellenberg, 2004, 2005, 2006, 2015; Winner & Cooper, 2000). While many researchers found a positive relationship between the study of music and academic achievement, many in the research community attributed those increases to other variables, such as socio-economic status and the overall intelligence quotient (IQ) of the participants (Kinney, 2008). According to Elpus (2013), one of the concerns addressed in previous research was that students considered high achievers are automatically drawn to music classes. Elpus (2013) conducted a meta-analysis of studies relating a positive relationship between the study of music and an improvement in academic achievement. Although Elpus (2013) found a positive relationship between the study of music and improved academic achievement, he also declared that previous researchers did not consider prior ability levels of the participants before controlling for participation in music classes.

Through the use of Structural Educational Modeling (SEM) techniques, Eason and Johnson (2013) identified a causal relationship between music participation and improved academic achievement, but stated that additional research needed to take place in order to further validate their findings. While previous causal-comparative studies have utilized traditional methods, such as *t*-tests and analysis of variance, SEM methods actually allow the researcher to conduct research with fewer assumptions than traditional methods (Johnson & Eason, 2016). SEM also allows researchers to utilize unobservable latent variables, such as musical talent, to assist with observable variables (Johnson & Eason, 2016). Eason and Johnson (2013) observed the following variables in conducting their research: Student characteristics, school characteristics, music participation, school engagement, and academic achievement. To control

for ability levels, Eason and Johnson (2013) utilized the fourth grade basic skills test scores of the participants as a pre-test. Academic achievement was measured by the ACT English and math scores of the participants, along with their high school grade point average (GPA) (Eason & Johnson, 2013).

Southgate and Roscigno (2009) utilized available data from two nationally recognized studies to conduct a meta-analysis in an attempt to determine the strength of a relationship between music instruction and academic achievement. These studies included the Early Childhood Longitudinal Survey (ECLS), with a sample size of 4,376 from approximately 1,000 schools after attrition, and the National Educational Longitudinal Survey (NELS:88), with a sample size of 7,781 from approximately 1,000 schools after attrition. Both ECLS and NELS:88 utilized students taking music classes in school, as well as students studying music privately outside of the classroom. Although Southgate and Roscigno (2009) found an increase in reading and math scores, they also determined that bias existed in the areas of controlling for prior academic achievement and socio-economic circumstances, as there were over 12,000 total participants from approximately 2,000 schools throughout the country. While Southgate and Roscigno (2009) declared a positive relationship between the study of music and academic achievement, they did not declare a causal relationship because of the bias they discovered, as available data did not control for the ability levels of participants in the study. However, they did indicate that additional research was needed to determine a relationship between the study of music and improvement in academic achievement (Southgate & Roscigno, 2009).

Purpose Statement

The purpose of this quantitative causal-comparative study is to examine whether students participating in performance-based music classes (the independent variable) demonstrate a

higher academic achievement (the dependent variable) in comparison to students who do not participate in such groups. Performance-based music classes, such as band, choir, and orchestra, allow students to work and rehearse in an ensemble setting with one or more directors, with the ultimate goal of performing the literature they have prepared in a concert or assessment venue (Pellegrino et al., 2015). Academic achievement is the measurement of learning objectives through the use of standardized test results (Hallam, 2010). This study, conducted at a suburban high school located in the Southeastern United States examined what effect performance-based music classes (IV) had on the academic achievement (DV) for students who engaged in performance-based music classes throughout their secondary school careers compared to the achievement of their peers who did not engage in performance-based music classes.

Eason and Johnson (2013) provided a model using fourth grade standardized test results to even the field “so all differences in variability stem from education activity” (Johnson & Eason, 2016, p. 26). This study design mirrors Eason and Johnson’s (2013) technique to level student achievement for participants. By directly comparing results of the ACT college readiness test for students who have participated in performance-based music education with those of students who did not participate in performance-based music classes, the researcher attempted to determine if there is a causal relationship between students’ participation in performance-based (band, choir, orchestra) music classes (IV) and academic achievement (DV) as measured by ACT scores.

Significance of the Study

Although a significant amount of research has been completed over the last fifty years attempting to find a correlation between the benefits of music instruction and academic achievement, the results of those studies have been inconclusive when considered collectively

(Elpus, 2013). As a result, the education and scientific communities are not in agreement (Coss, 2013; Eisner, 1998; Koopman, 2005; Phillips, 1993; Reimer, 1993, 2003; 2014; Sears, 2016).

There is even disagreement within the music education community as their philosophy regarding the inclusion of performance-based music classes began to splinter into different factions in the 1950s – philosophies that are still evolving today (Reimer, 2014). Each of these areas has an immediate impact on students in the classroom today and should also be considered important factors in the development of a worldview impacting students outside of the classroom and beyond (Sears, 2016).

Arts education faced threats of elimination 50 years ago because of the impending race to space (Daughtry, 2013; Rigden, 2007). Today, the concern centers around the emphasis placed on standardized testing and federal programs, such as NCLB, Race to the Top, and ESSA (Branscome, 2012). Another factor to consider is the negative impact of the economy during times of recession. During times of economic prosperity, arts programs are usually strong in the public schools; during an economic downturn, they are among the first to be eliminated (Doyle, 2012; Helig et al., 2010; Major, 2013; Sabol, 2013; Slaton, 2012; Winner & Cooper, 2000). With the threat of trimming and even eliminating fine arts programs, and more specifically, performance-based music classes, administrators must consider the possible negative consequences of these actions. Since many of the students participating in these programs are among the highest academic achievers in their schools, elimination of these programs could potentially trigger a negative reaction throughout the impacted schools (Major, 2013). By taking available archival data (the ACT scores of the participants), this study attempts to determine any impact performance-based music classes have on academic achievement.

Research Questions

RQ1: Is there a significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score?

Definitions

1. *Academic achievement* – Measurement of learning objectives through the use of standardized test results (Hallam, 2010).
2. *Adequate Yearly Progress* – Benchmarks established to determine the progress of individual schools and school systems based upon their standardized test scores (Viglione et al., 2015).
3. *Aesthetic Music Education* – A philosophy initially promoted by Bennett Reimer promoting the idea music education should be included in the school curriculum simply for the benefits provided by music as opposed to any correlational benefits provided to other educational disciplines (Mark, 1999).
4. *Elementary and Secondary Education Act* – Federal funding program for education established as part of President Lyndon B. Johnson’s war on poverty (Darrow, 2016).
5. *Every Student Succeeds Act* – Reauthorization of the Elementary and Secondary Education Act in 2015, under the leadership of President Barack H. Obama (Darrow, 2016).
6. *The Mozart Effect* – A study completed by Rauscher et al. (1993) determining a temporary increase in the I.Q scores of participants that listened to Mozart compositions for 10 minutes prior to taking the Stanford-Binet Intelligence Test.

7. *Music advocacy* – The promotion of music education in the classroom as a means of improving academic achievement across the spectrum in schools (Branscome, 2012).
8. *No Child Left Behind* – Reauthorization of the Elementary and Secondary Education Act in 2001, under the leadership of President George W. Bush (Viglione et al., 2015).
9. *Performance-based music classes* – Group music classes, such as band, choir, and orchestra (Pellegrino et al., 2015).
10. *STEAM Education* – The integration of arts classes into science, technology, engineering, and math disciplines (Watson & Watson, 2013).
11. *STEM education* – The promotion of science, technology, engineering, and math disciplines (Watson & Watson, 2013).
12. *Structural Educational Modeling* – Allows the use of latent variables to be utilized in conjunction with observable variables (Johnson & Eason, 2016).
13. *Visuospatial abilities* – Enables an individual to visually perceive an object and the spatial relationship among objects (Brochard, Dufour, & Despres, 2004).

CHAPTER TWO: LITERATURE REVIEW

Overview

The review of the literature focused on historical research completed over the past 50 years, which attempted to validate a positive relationship between the study of music through performance-based music classes (band, choir, and orchestra) and improvement in the areas of academic achievement. The literature review also includes information regarding the relationship between music and brain development, verbal memory, visuospatial ability, cognitive development, overall intelligence, and the study of music outside of the classroom. Information regarding the relationship between music and other academic disciplines, the impact of music classes on standardized tests, philosophies of music education, and the impact of the study of the arts on integration of technology in education are also discussed. Throughout the process of composing the literature review for this dissertation, this researcher spent countless hours searching academic databases, such as Academic Search Complete, the Educational Resource Information Center (ERIC), Lexis-Nexis Academic Universe, MasterFILE Premier, Professional Development Collection, ProQuest Education Journals, and ProQuest Dissertations & Theses Global. The researcher also used mainstream search engines, such as Google. In addition to these traditional sources for research, the writer also thoroughly covered available files of the National Association for Music Education, the professional organization for music educators and publishers of *Music Educators Journal* and the *Journal of Research in Music Education*.

Music Education

Most music scholars consider Lowell Mason to be the father of music education as it is known today (Mark, 2002). Mason persuaded leaders in Boston to include music as a curricular subject in the Boston public schools in 1838. Since that time, cities, towns, and boards of

education began adopting the philosophy of Mason and the Boston public schools, which promoted “music as intellectually, morally, and physically good for children” (Mark, 2002, p. 44). In fact, in his last journal article, actually published after his death, Reimer (2014) posits music educators need to return to the fundamentals of what music offers to the education community, as established by Mason.

Aesthetic Philosophy of Music Education

Bennett Reimer (Phillips, 1993; Winner & Cooper, 2000) is considered by many to be the father of the aesthetic philosophy of music education. However, according to Mark (1999), the movement actually started twenty years earlier, culminating with the initial publication of *A Philosophy of Music Education* in 1970. Reimer expressed music should be part of the school curriculum for the sake of music, and the vast majority of music educators adopted the philosophy as a result (Mark, 1999).

The National Association for Music Educators (NAfME) (then known as Music Educators National Conference) established national standards in the field of music education in the early 1990s and published a series of articles in their peer reviewed journals. As a result, Reimer (1993, 2003) responded in a subsequent publication his philosophy did initially lean in the direction of aesthetic music education as he was concerned music educators would only teach the areas of music that impacted other academic disciplines. As the situation had evolved, his philosophy changed because he realized there was indeed a need for advocacy in the music education community (Reimer, 2003).

Davis (2008), a long-time arts educator, also promoted aesthetic education and indicated other academic disciplines do not have to promote their field through a collaborative relationship to music. She quoted Eisner (1998), as he stated “Have they ever thought about how reading and

math courses contribute to higher performance in the arts?” (p. 7). Davis (2008) felt the arts should stand on their own merit and should not have to further advocate their values. She also shared children need an outlet to express themselves, and the arts allow those forms of expression visually and musically (Davis, 2008).

Advocacy of Music Education

Although Phillips (1993) felt the aesthetic music education philosophy promoted by Reimer was harmful to the overall worldview, he was somewhat complimentary of the research and groundwork established by Reimer. While Phillips (1993) was in agreement with those in support of aesthetic music education to a certain extent, he went further to state, “One thing is sure--we cannot return to the era of ‘The boy who blows a horn will never blow a safe’” (p. 17). Koopman (2005) expounded extensively on the performativity aspect of music education, as opposed to the aesthetic side, concluding, “I see two major functions of music education, which gain new significance and urgency in the light of aestheticization as well as performativity: life enhancement and furthering a critical attitude” (p.129). In essence, Phillips (1993) felt the philosophy needed to evolve after more than 20 years, and Reimer agreed (1993, 2003).

Along those same lines, Eisner (1998) posited while many of his colleagues were promoting music as the savior of the education community, he felt a great deal of the research promoted to advocate that movement was somewhat hollow and unfounded through academic circles. Just as Reimer stated earlier, Eisner (1998) felt that promoting the possible relationships between the arts and other academic disciplines (through either causal or correlational outcomes) arts for the sake of arts-based outcomes would get lost in the shuffle, and as a result, would hinder the advancement of music education.

Catterall (1998) counters there are many examples of theoretical justification for the relationship between the arts and other academic disciplines. He shared that just because Eisner did not agree with the end result of research, which had already been conducted did not mean it should automatically be discounted. Catterall (1998) conceded perhaps Eisner would actually like for the research indicating a positive relationship between the arts and other academic disciplines to be true, but he realized it is a difficult outcome to measure. Eventually, Eisner (1998) accepted there was a positive relationship between music studies and an improved SAT score. However, he found the same to be true for students who participated in four years of most any other activity as well. Although most of those promoting aesthetic education feel the arts should stand on their own, refusing to validate any idea of advocacy within the discipline, the majority of music educators intertwine each of the philosophies together in order to provide their students with the tools to achieve lifelong success through performance-based music classes, such as band, choir, and orchestra (Broomhead, 2005; Catterall, 1998; Eisner, 1998; Freer, 2009; Hallam, 2010; Johansen, 2007; Koopman, 2005; Major, 2013; McCarthy & Goble, 2002; Myers, 2009; Phillips, 1993; Reimer, 1993, 2003; Scott, 2006, 2011; Wiggins, 2007; Winner & Cooper, 2000).

Winner and Cooper (2000) completed a meta-analysis of all published studies over a period of approximately 50 years to determine whether or not there was a causal explanation between music education and improved academic achievement. They found there was a positive correlation between music education and academic success but no causal relationship. This point held true across socioeconomic lines and other measures. Because of Eisner's findings in regard to the positive relationship between four years of participation in any activity and an improved SAT score, Winner and Cooper were initially hesitant, but eventually declared an overall

correlation between multiple years of music study and an increase in the SAT score of those students (Winner & Cooper, 2000).

According to Earnhart (2015), “If we believe that music for music’s sake *is* important, we must develop the appropriate vocabulary, explanations, and metaphors to effectively communicate with the administrators who control school district resources” (p. 1). Likewise, Major (2013) stated “Music advocacy must also attack the problem at the root, offering administrators solutions for the difficult dilemmas they must solve regarding public policy and a finite budget” (p. 22). The music education community has been in disagreement over the proper reasoning and methodology to justify the rationale for the existence of their programs for more than a half-century (Broomhead, 2005; Catterall, 1998; Eisner, 1998; Freer, 2009; Hallam, 2010; Johansen, 2007; Koopman, 2005; Major, 2013; McCarthy & Goble, 2002; Myers, 2009; Phillips, 1993; Reimer, 1993, 2003; Scott, 2006, 2011; Wiggins, 2007; Winner & Cooper, 2000). Through the efforts of a new generation of advocates such as Major (2013) and Earnhart (2015), it appears that perhaps the music education community has finally arrived at an equitable solution that will be beneficial to all stakeholders.

The Future of Music Education

Cangro (2016) presented a literature review researching the history of music education in order to determine the direction the music education community should take regarding standards-based music learning. While the literature indicates music educators are actually doing an outstanding job addressing full ensemble teaching (full band, choir, and orchestra), the general consensus was that more should be done with creativity and learning by the individual student as opposed to the standard music classroom setup where the teacher facilitates all learning through directing in an ensemble setting (Allsup, 2003; Cangro, 2016; Reimer, 2014). Cangro (2016)

further stated that “studies support the premise that students may need opportunities for interactive thinking as well as to facilitate the creative process in expressing musical ideas and opinions” (p. 65). The general consensus of the literature, according to Cangro (2016) is music educators need to promote small group learning, such as chamber music, listening opportunities (where students would have to opportunity to discern how they actually feel about the music they just listened to), and composition, as those activities are actually outlined in the music education standards as established by NAFME in 1994.

The last article written by Reimer (2014) was actually published after his death in 2013. Through this article, he still struggled with a philosophy of music education. While Reimer is considered one of the foremost experts on music education in the United States, even he was continually conflicted and shifted his position on numerous occasions. In his last journal article, he basically stated that in some respects, the music education community needs to revisit the days of Lowell Mason. Reimer (2014) also stated “We have done very well in a single dimension of our obligations-the provision of experiences to perform in ensembles” (p. 31). However, he immediately follows with music educators have been woefully inadequate in areas such as composition and creativity. While Reimer felt the education community fell short in that respect, he also stated he believed that with advances in technology only recently available within the 21st century, perhaps music educators will finally figure it out (Reimer, 2014, p. 29).

Music educators promoting aesthetic education believe music is a strong discipline within the education community, just as important as language arts, math, science, and history. As a result, they are offended they should have to justify what they do in the classroom by promoting a link establishing a positive relationship between music instruction and learning in general (Allsup, 2003; April, 2001; Catterall, 1998; Catterall, 2009; Eisner, 1998; Mark, 1999; Reimer,

1993, 2003; Vaughn, 2000; Vaughn & Winner, 2000). Reimer (1993) states "While music may not be a universal language, it, like reading, writing, and speaking, conveys thoughts, ideas, and feelings among peoples" (p. 10).

STEM vs. STEAM

Since the turn of the century, the greatest movement taking place in the education community has evolved around science, technology, engineering, and mathematics (STEM) (Daugherty, 2013; Watson & Watson, 2013). Promoters of STEM have implied the United States is falling behind other industrialized nations in fields that are necessary to promote the technology component of STEM. The idea of a STEM curriculum is being encouraged not only by educators within these fields but has quickly been picked up by various factions of the government including politicians at national, state, and local levels (Daugherty, 2013).

At this point, according to Daugherty (2013), there is some uncertainty in the education and scientific communities as to whether or not stakeholders are considering the merits of each component of STEM individually or together as a unit. Daugherty (2013) stated, "To be fair, there are some efforts under way, including a Promising Practices study at the National Academies, where researchers are attempting to explore whether education can benefit when the four disciplines are linked" (p. 10).

While many proponents of STEM education feel the future of our nation depends upon making gains in these disciplines previously considered scientific in nature (Daugherty, 2013), many stakeholders are beginning to realize it is difficult for those that benefit from STEM to truly be proficient in their field without the influence of the arts as well (Watson & Watson, 2013). According to Root-Bernstein & Root-Bernstein (2010), one of the greatest scientists of all time, Albert Einstein, was a huge proponent of the arts and an outstanding amateur violinist and

pianist. Einstein actually stated: “If I were not a physicist, I would probably be a musician. I often think in music. I live my daydreams in music. I see my life in terms of music...I get most joy in life out of music” (p. 3).

While STEM is a relatively new phenomenon in the education community, research is already beginning to support a connection between the logic driven functions of the left hemisphere of the brain and the creativity-centered right hemisphere of the brain (Daugherty, 2013; Sabol, 2013). This, in effect, seems to be the driving force behind the movement from STEM education to STEAM education. STEAM, of course, adds the arts to science, technology, engineering, and math (Daugherty, 2013; Root-Bernstein & Root-Bernstein, 2010; Sabol, 2013). Although a great deal of emphasis is placed upon the skills needed to be successful within STEM disciplines, the importance of possessing creative abilities to complement those skills has not always been emphasized in the past (Daugherty, 2013; Lichtenberg, Woock, & Wright, 2008; Sabol, 2013).

According to Lichtenberg et al. (2008), educators and potential employers agree that studying arts education is most likely the best way to develop skills in creativity, yet these classes are offered only as electives and reach a limited number of students. According to Byrd (2006, as cited in Lichtenberg et al., 2008), “We need people who think with the creative side of their brains—people who have played in a band, who have painted, been involved in the community as volunteers” (p. 3). Those in the scientific community, along with engineers and architects, definitely need math and science skills, but they also have to be able to explore the aesthetic side of issues as well (Daugherty, 2013).

Theoretical Framework

The relationship between music education and the positive impact on improved cognitive development has been established through a number of recent research studies (Abrams et al., 2013; Brochard et al., 2004; Chan, Ho, & Cheung, 1998; Cole, 2011; Concordia University, 2013; Hallam, 2010; Hetland, 2000a, 2000b; Ho, Chung, & Chan, 2003; Hudziak et al., 2014; Jakobson, Cuddy, & Kilgour, 2003; Jakobson, Lewycky, Kilgour, & Stoesz, 2008; Jaschke et al., 2013; Kraus et al., 2014; McMullen & Saffran, 2004; Peterson, 2011; Schellenberg, 2004, 2005, 2006, 2015; Skoe & Kraus, 2012; Stoesz, Jakobson, Kilgour, & Lewycky, 2007; White-Schowoch, Carr, Anderson, Strait, & Kraus, 2013). As a result of the work of these researchers, a relationship has been established between music and brain development, verbal memory, and visuospatial abilities. Therefore, a solid foundation has been established in brain-based learning theory, providing a defined framework for this study.

Brain-Based Learning Theory

Brain-based learning is a relatively new phenomenon linking the education and scientific communities (Hart, 1978; 1989) and can actually be linked to the work of Piaget, who studied the effects of the environment surrounding children on their ability to process learning throughout his professional career (Burnett, 2010). Piaget's work, which eventually became known as the constructivist approach to education, has been validated through the research of the scientific community over the last forty years (Burnett, 2010). The intertwining of the philosophy of constructivism from the education community and the ability of neuroscientist to utilize technology, such as Positive Emission Tomography scans (PET) and Magnetic Resonance Imaging (MRI) to actively view the reaction of the human brain through the process of learning has established the brain-based learning theory (Burnett, 2010; Jensen, 2005).

While constructivism did not originate in the music classroom, the idea was quickly adopted by countless educators within the discipline as many of the behaviors promoted through the theory were already being utilized (Freer, 2009; Myers, 2009; Scott, 2006, 2011). Although there were many components to Piaget's philosophy of learning, he contended that in order to maximize the opportunity for students to retain knowledge, it was imperative that teaching had to take place in an environment that would allow students to be comfortable and stress-free (Burnett, 2010). In the performance-based music classroom, the teacher acts as a facilitator, disseminating information based upon the experience level of the students involved. In other words, directors working with music students at the beginning level have to provide much greater detail as students are just beginning to learn basic skills, while advanced students are able to engage in higher level questioning and problem-solving skills (Scott, 2006; 2011).

Brain-Based learning takes the idea of a constructivist approach to educating children to a new level, as the research of the science community has provided additional validation to the concept (Burnett, 2010; Caine & Caine, 1994; Levitan, 2008). According to Caine and Caine (1994),

Brain-based learning is usually experienced as joyful, although the content is rigorous and intellectually challenging; and students experience a high degree of self-motivation.

It acknowledges and encourages the brain's ability to integrate vast amounts of information. It involves the entire learner in a challenging learning process that simultaneously engages the intellect, creativity, emotions, and physiology. (p. 9)

This concept allows the student learner to retain information they have learned through critical-thinking activities that promote brain stimulation, as opposed to traditional call and response

activities that may not support the retention of the material being presented by the educator (Caine & Caine, 1994).

Music and Brain Development

To determine if listening to or studying music has any impact on brain development, several studies have been conducted comparing the brains of individuals subjected to music instruction as opposed to those that have not studied music (Abrams et al., 2013; Brochard et al., 2004; Chan et al., 1998; Cole, 2011; Concordia University, 2013; Hallam, 2010; Ho et al., 2003; Jakobson et al., 2003; Jakobson et al., 2008; Skoe & Kraus, 2012; Stoesz et al., 2007). According to Chan et al. (1998), students studying music have improved verbal memory. For those under the age of 12, improvements are even more evident. A study by Hallam (2010) indicated that the interaction required of musicians as they perform induces cortical reorganization. According to Skoe & Kraus (2012), “Our results suggest that a limited period of music lessons (~3 years) during childhood fundamentally alters the nervous system such that neural changes persist in adulthood after auditory training has ceased (~7 years later)” (p. 1).

Improvement in verbal memory. Ho et al. (2003) conducted an additional study to further validate their work with Chan et al. (1998) concerning memory improvement among children. Their study was comprised of two groups: An experimental group that had studied music for a year and the control group that did not study music at all. Through testing prior to the study and afterwards, they determined the students benefitting from music instruction exhibited a marked improvement in verbal memory, with little or no change in their visual memory (Ho et al., 2003). Jakobson et al. (2003), agreeing with previous researchers that participants benefit from temporary increases in intelligence as related to listening to music, made the determination that other factors may need to be taken into consideration. However, their work is consistent with

Ho et al. (2003), indicating there is a definite increase in verbal memory for musicians when comparing to non-musicians (Jakobson et al., 2003).

Improvement in visuospatial abilities. Brochard et al. (2004) sought to determine what effect the study of music had on visuospatial abilities. They determined that musicians performed at a much higher level on spatial visual testing than their non-musician counterparts. Further testing concluded that music reading between novice and expert musicians determined a faster rate of success on spatial visual testing than text reading between novice and expert readers (Brochard et al., 2004).

An additional study conducted by Hudziak et al. (2014) determined that musical training actually has an impact on the physical development of the brain. Their longitudinal study determined “Playing a musical instrument was associated with more rapid cortical thickness maturation within areas implicated in motor planning and coordination, visuospatial ability, and emotion and impulse regulation” (Hudziak et al., 2014, p. 1153). According to Schellenberg (2015), “Associations between music training and speech perception appear to be a consequence of enhanced auditory perception in general” (p. 171). While Schellenberg (2015) infers that genetics, higher aptitude, and higher IQ’s respond well to musical training because of variables such as background and environment, it is important to note he also stated it is possible that “children with lower aptitude and/or lower IQ would benefit more because they have more to gain” (p. 174). With that being stated, it is important to take into account the research of Brochard et al. (2004), which determined imaging studies indicate the neural networks of musicians are much larger than those of non-musicians (Brochard et al., 2004). According to Kraus et al. (2014),

Two years of music lessons improved the precision with which the children's brains distinguished similar speech sounds, a neural process that is linked to language and reading skills. One year of training, however, was insufficient to spark changes in the nervous system. (p. 11917)

In association with Harmony Project, Kraus et al. (2014) provided instrumental music lessons over a period of two years to underprivileged children residing in areas where gang influence was incredibly prominent in Los Angeles. While prior studies involved students who benefitted from music study through private lessons, this research is incredibly important as it deals with disadvantaged students who were provided music instruction in a community setting and supports neurological development of children through the teaching of music (Kraus et al., 2014).

On the other end of the spectrum, a study by White-Schowoch et al. (2013) provided encouraging news for long-term cognitive support of older adults who had a minimal to moderate amount of musical training early in life. White-Schowoch et al. (2013) determined ability levels in auditory discernment inevitably decline with older adults, which did not seem to be the case with those that studied instrumental music from 4 to 14 years. Even after a number of decades had elapsed, this study seemed to indicate there is a positive impact on cognitive development as a result of music instruction.

Improvement in cognitive development. McMullen & Saffran (2004) conducted studies to determine any similarities or differences in cognitive development occurring between music and spoken languages. As previously indicated by Brochard et al. (2004), their work also provides further evidence of significant differences between the brains of musicians and non-musicians (McMullen & Saffran, 2004). While research indicates data stored in the brain for

music and language are found in different parts of the adult brain, their study of the development of the brain with children, some as young as infants, indicating where that information is stored is somewhat fluid. In other words, the utilization of musical activities, even to include listening skills, can assist in the development of the brain (McMullen & Saffran, 2004).

While most individuals would agree that consonant sounds are determined to be more pleasing than dissonant sounds with the average adult, research has determined that is actually not a learned trait because infants seem to be born with that distinction as well (McMullen & Saffran, 2004). In their research of severe brain traumas, they found these processes are stored in different areas of the brain, providing further validation of the relation between the two (McMullen & Saffran, 2004; Peterson, 2011).

The research teams of Jakobson et al. (2008) and Stoesz et al. (2007) conducted two additional studies identifying a connection between higher order thinking and musicians. According to Jakobson et al. (2008), "Given the similarity in the processes that could support efficient learning and memory for music and spoken language, it may not be surprising that past research has demonstrated a link between music training and superior verbal memory" (p. 42). The findings of that study showed that while most people show a global bias when processing music, musicians developed both globally and locally (Jacobson et al., 2008). Through extensive testing, Stoesz et al. (2007) determined that musicians consistently performed higher than non-musicians on local processing ability. Stoesz et al. (2007) went further to state "The fact that this enhancement was demonstrated in adult musicians is significant, as it suggests that benefits in this domain that are associated with music training that begins in childhood may be maintained in later life" (p. 162). Therefore, those making decisions regarding curriculum and instruction at

the elementary and secondary level should take these findings into consideration when formulating educational policy (Stoesz et al., 2007, p. 162).

Improvement in overall intelligence. An additional study conducted by Jakobson et al. (2003) sought to determine if training as a musician had any effect on overall intelligence. Data gathered by the researchers indicated musicians possess a higher level of higher order thinking, even when taking into account differences in IQ scores prior to data recording (Jakobson et al., 2003). Previous research indicated there was a short-term memory increase attributed to music performance (Jakobson et al., 2003). The latter study suggested there was superior long-term memory for visual design for musicians as opposed to non-musicians. “The results of the present study are consistent with the idea that training related functional and/or structural changes may affect the way the brain stores and retrieves many kinds of information” (Jakobson, et al., 2008, p. 52). Hallam (2010) hypothesized that all of the studies that have taken place regarding the relationship between music education and learning indicate there is a strong relationship between the two, although further research is needed to determine the best practices to enable the connection to function.

Related Literature

According to Sloan (2009), “people that are in the arts are four times more likely to achieve academically” (p. 3) as opposed to students who do not participate in arts classes. Unfortunately, so many in the education community feel tremendous pressure to concentrate their efforts in those academic areas that face the scrutiny of standardized testing (Črnčec, Wilson, & Prior, 2006). Likewise, many educators in the music community feel obligated to provide validation to the classes they teach through improvement in standardized test scores. Prior research has shown mixed results at best, especially when factoring in variables such as

demographics, use of time, and prior academic achievement (Elpus, 2013). However, Sloan (2009) further stated,

Dwindling school resources, as well as pressure to meet the demands of the No Child Left Behind Act, have led many schools to narrow the curriculum, leaving behind arts instruction. But, through carefully designed integrated curricula, educators can still provide students with arts education. (p. 3)

Fortunately, some states are becoming somewhat innovative in regard to arts education.

Although many states find it difficult to hire full-time teachers in the areas of music, visual arts, and dance, especially in rural areas, North Carolina and Alabama have both developed methods allowing educators to utilize outside resources to integrate the arts into the schools, through A+ Schools in North Carolina and the Alabama Institute for the Arts (Sloan, 2009).

The Positive Effect of Arts Classes on Academic Achievement

According to Fitzpatrick (2006) and Kluball (2000, as cited by Helmrich, 2010), there is an encouraging relationship between music education and standardized test results. However, it is important to note the reasoning for that positive relationship is often attributed to other variables, such as environment, parental support, and socio-economic status. Recent studies conducted by Catterall (2009) and Southgate and Roscigno (2009) provide validation to the positive relationship.

The positive influence of arts classes on academic achievement was the topic of a study completed and published by Catterall (2009). The researcher analyzed data taken from the National Education Longitudinal Survey (NELS:88). NELS:88 collected data on approximately 25,000 students over a four-year period. Southgate and Roscigno (2009) also utilized data available through NELS:88. The initial study by Catterall (2009) concluded there was significant

evidence of a connection between study in the arts and academic success. However, Catterall (2012) obtained 10 years of additional data on the same 25,000 students, which further validated the earlier study.

In addition, evidence indicated not only was there a connection between study in the arts and academic success, but participants in the study also indicated an increased level of giving back to their communities through volunteer participation. Catterall (2009) also found evidence students of low socio-economic status benefited academically from exposure to the arts. Considering that economically-disadvantaged students generally suffer from poor test results and academic achievement issues, providing classes in the arts could be a potential solution to the concern (Southgate & Roscigno, 2009).

While the following study took place in an after-school program setting, the work of Respress and Lutfi (2006) definitely should be considered a positive contribution to the research conducted to determine a connection between the study of arts classes and academic achievement. Through participation in classes in music, visual arts, drama, or dance, researchers sought to determine an increase in the grade point averages (GPA) of the students. Researchers found significant increases in self-esteem and a commitment to furthering their education from participants in the treatment group. Students in the treatment group also saw an increase in their GPA (57%) as opposed to those in the control group that did not participate in arts classes (11%). While there was no significant difference in their math scores, there was a significant increase with spelling because students increased their score by one entire grade level (Respress and Lutfi, 2006).

The Mozart Effect and Academic Achievement

A study by Rauscher et al. (1993) is now considered the catalyst for a great deal of the research that has taken place regarding music and improvements in academic achievement over the past two decades (Nantais & Schellenberg, 1999). The study consisted of a control group that did not listen to music prior to taking the Stanford-Binet Intelligence Scale, along with an experimental group that listened to recordings of Mozart compositions for 10 minutes prior to taking the test. While the study did suggest at least a temporary increase in the IQ score of the participants (Rauscher et al., 1993), there were no long-term effects or increases in spatial ability (Demorest & Morrison, 2000).

However, the media quickly embellished the findings, making outlandish claims far beyond that of Rauscher et al. (1993). Politicians, including then Governor Zell Miller (D-Ga.), responded with offers of free compact discs to every baby born in the state (Husain, Thompson, & Schellenberg, 2002; Nantais & Schellenberg, 1999). Those outside of the scientific and education communities would eventually start calling the report *The Mozart Effect* (Demorest & Morrison, 2000; Hetland, 2000a, 2000b; Husain et al., 2002; Nantais & Schellenberg, 1999; Schellenberg, 2005; Schellenberg & Hallam, 2005; Winner & Cooper, 2000).

Providing validation to the Mozart Effect. Although the initial study provided by Rauscher et al. (1993) only played a small role in the link between music and improved academic achievement, several subsequent studies conducted by others provided validity to their work (Husain et al., 2002; Nantais & Schellenberg, 1999; Schellenberg, 2005; Schellenberg, 2015). The work by Nantais and Schellenberg (1999) not only validated the work of Rauscher et al. (1993), it also indicated the music provided for the study did not have to be Mozart. Any Classical or Romantic Era composer would work just as well. In essence, participants in the

study would best respond to music with which they could easily identify (Nantais & Schellenberg, 1999).

According to Hallam (2000, as cited in Schellenberg & Hallam, 2005), research conducted by Rauscher et al. (1993) was invalid when using a sample of 8,000 ten- and eleven-year old students in a study funded by BBC-TV. They looked at the data provided by the initial Hallam study and determined children might have some difficulty in identifying with Mozart (Schellenberg & Hallam, 2005). As previous research indicated, a relationship between the tempo and mode of a song and the music used for the study did not have to be a Mozart composition. Therefore, they decided to use music considered to be popular among children in the United Kingdom (Husain et al., 2002; Schellenberg, 2004, 2005). The students in this new study were split into two control groups: One listened to popular music and one listened to Mozart as had been the case with the previous study.

Students listening to Mozart saw no significant change while those listening to popular music saw a tremendous increase (Schellenberg & Hallam, 2005). Additional work by Schellenberg (2006) indicated that the positive effect varies among different age groups. Pre-school aged students experienced the effect when subjected to children's songs while elementary and secondary aged students experienced a greater impact with music performed by popular artists. College-aged students, as well as adults, were most impacted by composers from the Classical and Romantic Eras (Schellenberg, 2006).

Music Study Outside of the Classroom

An additional study involving the instruction of music with children and the effect on their academic achievement was presented by Costa-Giomi (2004), who took 117 students from throughout the City of Montreal and split them into different control groups. In the first control

group, students and their families were given a piano, and students were provided with weekly piano lessons while the second group received no music instruction at all. These students had no prior exposure to music training, either individually or in a classroom setting. Through pre- and post-testing, as well as testing taking place throughout the duration of the study, students were measured for self-esteem, motor abilities, academic achievement, music abilities, and cognitive abilities. This research was conducted over a period of three years (Costa-Giomi, 2004).

Costa-Giomi (2004) determined students receiving music instruction had experienced slight gains in academic achievement in comparison to students in the control group who did not receive music instruction. Students receiving music instruction also saw significant increases in music ability and self-esteem. Students taking music lessons saw gradual and consistent gains in their overall school grades while those not participating in the weekly music lessons saw inconsistent fluctuations, indicating a positive impact on those in the music lesson control group (Costa-Giomi, 2004).

Wilkins et al. (2003) compiled a study in the State of Virginia to determine the impact of the amount of time students spent in art, music, and physical education classes on their state test scores. As a result of their correlational study, Wilkins et al. (2003) determined there was no relationship between the time devoted to classes in the arts and physical education and the resulting standardized test scores of the students participating in the study. Therefore, eliminating those classes would not, as a result, increase the standardized test results of those students (Wilkins et al., 2003).

The Relationship between Music and Other Academic Disciplines

In addition to research concerning the relationship between cognitive development and music, extensive research has also taken place attempting to establish a correlation between

music and learning in other content areas as well. Koelsch et al. (2004) conducted research establishing a relationship between the use of sentences and words. This relationship is known as the *semantic priming effect*. While this relationship is a key feature of spoken language, research also indicated four different connection between semantics and music:

1. Meaning that emerges from a connection across different frames of reference suggested by common patterns or forms (e.g., sound patterns in terms of pitch, dynamics, tempo, timbre, etc. that resemble features of objects)
2. Meaning that arises from the suggestion of a particular mood
3. Meaning that results from extramusical associations (e.g., any national anthem)
4. Meaning that can be attributed to the interplay of formal structures in creating patterns of tension and resolution (Koelsch et al., 2004, p. 302)

Their research indicates a stronger relationship between music and language than previously believed (Koelsch et al., 2004).

Music and reading. According to Butzlaff (2000), there is a relationship between reading and music instruction. He stated there are four possible theories why students who took music lessons might also subsequently benefit in improved reading skills: (a) music is technically a written language; (b) there is a connection between phonological distinctions (reading) and tonal distinctions (music); (c) students participating in vocal music are actually reading text from the music; and (d) students who participate in group activities such as band, choir, and orchestra have to work as a group. As they are motivated to work together, Butzlaff (2000) hypothesized that because of the motivational skills acquired through the performance group those same ideals will carry over into other areas. Butzlaff (2000) conducted extensive research over a period of 50 years, compiling a meta-analysis of his findings. Correlational

findings indicate a relationship between the study of music and improved reading skills.

However, Butzlaff (2000) does concede while the correlational findings of his study are valid, those findings could be affected by other variables.

Later studies by Standley (2008) and Hallam (2010) further validated the work of Butzlaff (2000). According to Hallam (2010), “The role of music in facilitating language skills contributes to the development of reading skills” (p. 273). Hallam (2010) indicated that while the relationship between music and reading skills is a positive one, the prior musical development of the child does have an impact on the development of reading skills.

Music and spoken language. An additional connection exists between music and spoken language as music is also considered to be a written language that is accepted universally as written through standard Western notation methods (O’Herron & Siebenaler, 2007). According to Patel and Daniele (2002), “Speech and music are universal among human cultures. Both involve organized acoustic sequences and engage complex cognitive and motor processes” (p. 36). The study conducted by Patel and Daniele (2002) purposely utilized British English and French, because the rhythms and patterns utilized in both languages are considered to be completely different. Researchers determined that while musicians may speak different languages, they are also able to communicate through their music, regardless of their native tongue (Patel & Daniele, 2002).

A later study conducted by Gromko (2005) studied kindergarten students to determine if teaching music would help students gain a better understanding of phonemic awareness, which is the concept allowing a reader to understand there are different sounds associated with a particular word. Results pre- and post-test indicated that two of the three areas were equal, while the area indicating phonemic awareness was considerably higher with the group of students who

took music classes (Gromko, 2005, p. 207). In a previous study, Gromko (2004) determined that when students sight-read music in instrumental music classes, “they may mentally represent the sound as an image with spatial and temporal dimensions” (p. 12).

Music and mathematics. According to Vaughn (2000), there has been a connection between music and math for centuries. Musicians routinely use general math concepts, such as counting and ratios on a daily basis. As a result of the use of these mathematical ideas, even non-musicians would see a relationship between math and music (Church, 2001; Hallam, 2010). “To borrow a phrase from popular culture, kids come for the music, and stay for the math” (M. Downey & P. Smagorinsky, personal communication, April 17, 2017). In addition, Vaughn’s (2000) research indicated a relationship between the visual-spatial reasoning demonstrated in music instruction including geometry and proportional reasoning. While the sample used in the study was small, there is a definite indication of a statistical increase of the understanding of mathematical concepts among music students (Vaughn, 2000).

Henriksen (2014) takes things a step farther by stating “it is clear that the boundaries between art and science or music and math are more fluid than conventional learning paradigms suggest” (p. 1). In addition, Churchill (2004) believed there is a definite connection between music instruction and improved achievement in math. A dismal 27% of all students at the Tenth Street School in Marysville, Washington passed the math portion of the Washington Assessment of Student Learning exam, but after school administrators started requiring all students to take band, that number increased to 71%, which was the highest growth rate in the state (Churchill, 2004).

Jones and Pearson (2013) are music and math educators who are currently working to develop curriculum assisting teachers in the process of integrating music and math instruction

through differentiated instruction. In the past, students have been exposed to music through listening exercises or through participation in various ensembles. While their work is currently in progress, they are seeking to develop curriculum exposing students to math instruction through the use of popular music (Jones & Pearson, 2013).

Music and science. According to Conderman and Woods (2008), music educators teach across the curriculum regularly. Sound, for example, travels through waves. Voices, along with each of the families of instruments, use vibrations of some sort to establish the initial waves that are produced. The voice utilizes vocal chords while woodwinds blow air across a reed, brass players produce vibration by buzzing their lips into a mouthpiece, string players manipulate a string in some form or fashion, and percussionists strike or shake an instrument. Musicians also study the science of acoustics, frequencies, dynamics, pitches, melodies, and harmonies (Conderman & Woods, 2008; Monk & Poston, 1999).

Some of the great philosophers promoted the idea of a relationship between music and science, such as Pythagoras, Galileo, and Newton (Rogers, 2016). The music of the spheres has long been utilized as a method of linking the concept of musical intervals and the orbits of the planets. While cross-curricular education may be considered a relatively new concept, these theories were promoted for centuries by philosophers throughout both the Western and Eastern worlds. For example, the study of acoustics could utilize the relationship between intervals and vibrating frequencies. Many instrumental music students, especially brass students, already have a perception of this idea because they have to change the frequency of the vibration of their lips in order to produce different pitches (Rogers, 2016).

While many scientific concepts of the great philosophers have amazingly stood the test of time, even those ideas that have been disproven by improvements in technology over the years

still provide important correlational teachings for young people. For example, Newton is most famous for his theory of relativity. Newton also discovered a relationship between gravitational pull and the tension of a string in relation to pitch on string instruments. This theory, known as the inverse square law, states “objects twice as far apart experience only one-fourth the gravitational attraction, and doubling the frequency of a pitch requires four times the tension on a string ($2^2 = 4$)” (Rogers, 2016, p. 46).

Music and history. Music educators regularly discuss composers and artists from a historical perspective (McConnell, 2005). According to Schustik (2005), historians have used music to pass historical facts on to the next generation for thousands of years. Music has been utilized in the Western world to pass oral histories from one generation to the next (Forney & Machlis, 2015). While students might consider a history lesson from a textbook dull and boring, a lesson discussing history based on a musical perspective could be much more palatable to students and teachers alike (McConnell, 2005).

One idea researchers are just beginning to explore is the idea of popular music as utilized for social change (Haycock, 2015). While there are examples of popular music that are utilized in school settings, such as marching band and show choir, Haycock (2015) stated this music is applied as a real-world form of pedagogy to share ideas of social consciousness. Haycock (2015) stated this movement began with the protest music promoted in the 1960s regarding the civil rights movement, the Vietnam Conflict, and women’s liberation and implies this is also the case with the gangsta rap movement starting in the late 1980s.

Available literature supports the perception that music classes are beneficial to developing the entire child (Earnhart, 2015). Several research studies have indicated music is one of the few academic disciplines claiming roots in each of the four core content areas of language,

math, science, and social studies (Butzlaff, 2000; Eady & Wilson, 2004; Gouzouasis, Guhn, & Kishor, 2007; Gromko, 2005; McMullen & Saffran, 2004; Patel & Daniele, 2002; Vaughn, 2000; Vaughn & Winner, 2000; Wetter, Koerner, & Schwaninger, 2009).

Peripheral Issues in Music Education

While performance-based music classes impact other academic disciplines, cognitive development, and academic achievement (Butzlaff, 2000; Conderman & Woods, 2008; Churchill, 2004; Forney & Machlis, 2015; Gouzouasis et al., 2007; Gromko, 2005; Hallam, 2010; Haycock, 2015; Heriksen, 2014; Jones & Pearson, 2013; Koelsch et al., 2004; McConnell, 2005; McMullen & Saffran, 2004; Monk & Poston, 1999; Patel & Daniele, 2002; Rogers, 2016; Schustik, 2005; Standley, 2008; Vaughn, 2000; Vaughn & Winner, 2000; Wetter et al., 2009), there are other peripheral areas impacted as well. Hallam (2010) mentions “the benefits of discipline, teamwork, co-ordination, development of skills, pride, lifetime skills, accomplishment, cooperation, self-confidence, sense of belonging, responsibility, self-expression, creativity, performance, companionship, building character and personality, improving self-esteem, social development and enjoyment” (p. 279).

Additional studies have shown students participating in performance-based music classes have increased grade point averages (GPA), higher attendance rates, fewer discipline referrals, improved self-esteem, and a higher level of motivation to succeed. Likewise, performance-based music students benefit from an ability to work with others, mature into well-adjusted, productive members of society, and have the ability to think creatively (Costa-Giomi, 2004; Cox & Stephens, 2006; Earnhart, 2015; Eason & Johnson, 2013; Hallam, 2010; Schmidt, 2005). According to Eason and Johnson (2013), “Self-discipline and self-control were the most common characteristics mentioned, but others such as teamwork, respect, following instruction,

confidence, persistence, helpfulness, attentiveness, commitment, responsibility, were frequently mentioned by students as well” (p. 27). Although music educators are often most concerned with teaching music because of the benefits provided, the education community often becomes so concerned with meeting standards established by others for accountability purposes, that as a result, the overall education of the child is often overlooked (Earnhart, 2015; Eason & Johnson, 2013).

Improved Grade Point Averages

According to Eason and Johnson (2013), students participating in performance-based music classes had higher GPA's than students who never participated in a performance-based music class at a statistically significant rate of $p > .01$. Likewise, Cox & Stephens (2006) compared the GPA's of students who had taken music classes to students who had not taken any music classes, finding the GPA's of the music students higher than the non-music students. As outlined in Figure 1, students with at least one year of a performance-based music class had a higher GPA than students without a music class.

The results for students with more than one year of a performance-based class were even higher. According to Eason and Johnson (2013), “across all ethnic groups, students with the highest music participation levels also earned the highest GPA's. The differences between non-music and music students for all ethnicities are statistically significant at the $p > .01$ level” (p. 22).

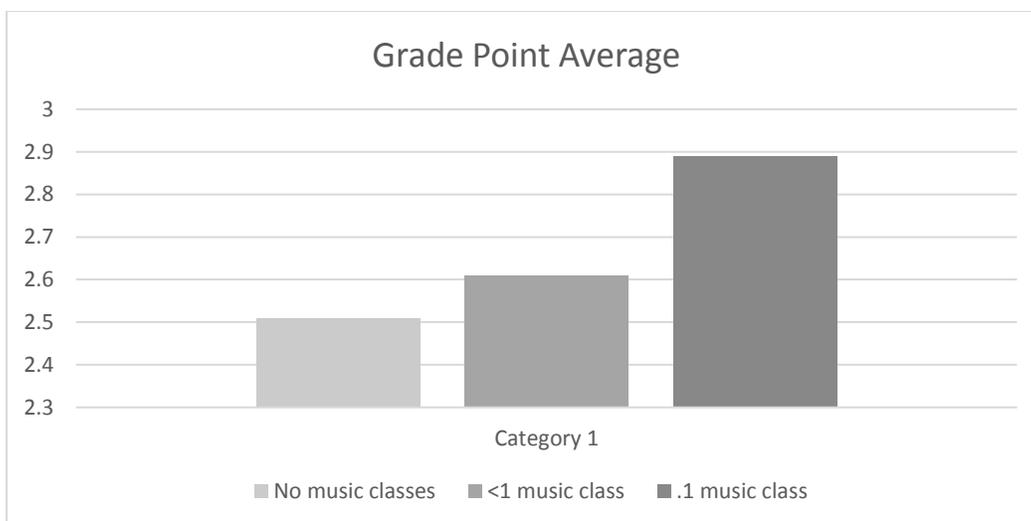


Figure 1. Nashville Public Schools Study (Eason & Johnson) 2013 Study Results. This graph represents the difference between GPA's for students with no music, < 1 year of music, and >1 year of music.

Positive Impact on Attendance and Discipline

Research published by the Texas Music Educators Association (2014) indicated students participating in music classes have a much higher attendance rate than students who do not participate in music classes. This is further validated by research published by Eason and Johnson (2013) and Waller (2007). According to Eason and Johnson (2016), the attendance rate for participants in music classes is 6% higher than that of non-participants. While participants in music classes have better attendance rates, they also have a better behavior record than their non-music counterparts. Eason and Johnson (2013) found students participating in music classes also experienced “the benefits of discipline, teamwork, co-ordination, development of skills, pride, lifetime skills, accomplishment, cooperation, self-confidence, sense of belonging, responsibility, self-expression, creativity, performance, companionship, building character and personality, improving self-esteem, social development and enjoyment” (p. 32).

Increased Graduation Rates

According to Earnhart (2015), students who participate in music classes have a much higher graduation rate than their non-music counterparts. Data provided to TMEA (2014) by the Texas Education Agency validated that statement, as indicated in Figure 2. Likewise, data disseminated by Eason and Johnson (2016) from their Nashville study also validated the claim made by Earnhart (2015), as students who took more than one year of music classes graduated at an astounding rate of 31% higher than students who did not take a music class. Data from the Nashville study is shown in Figure 3.

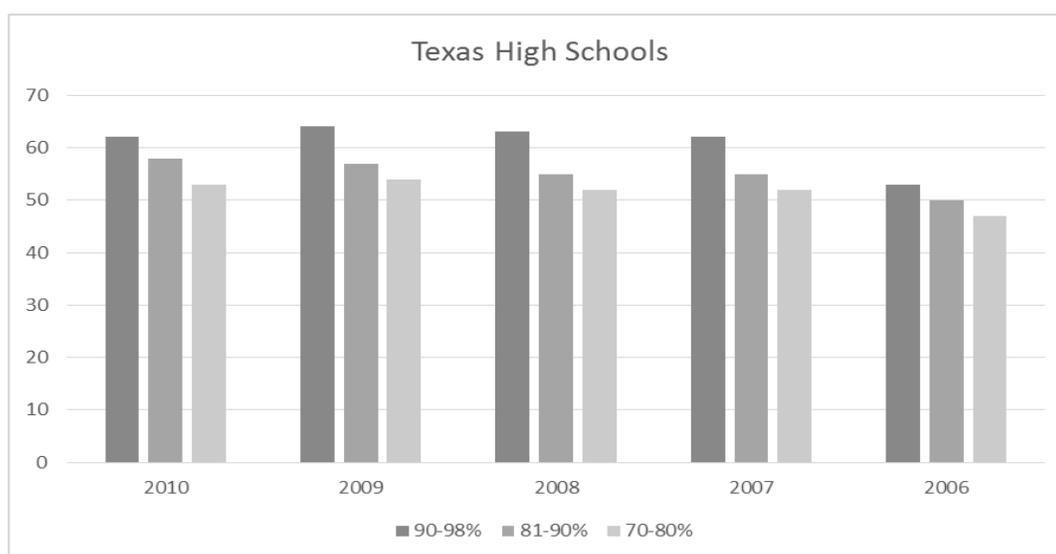


Figure 2. Texas Music Education Association (TMEA) 2014 Study Results. This graph represents the increases in graduation rates in association with participation in arts classes.

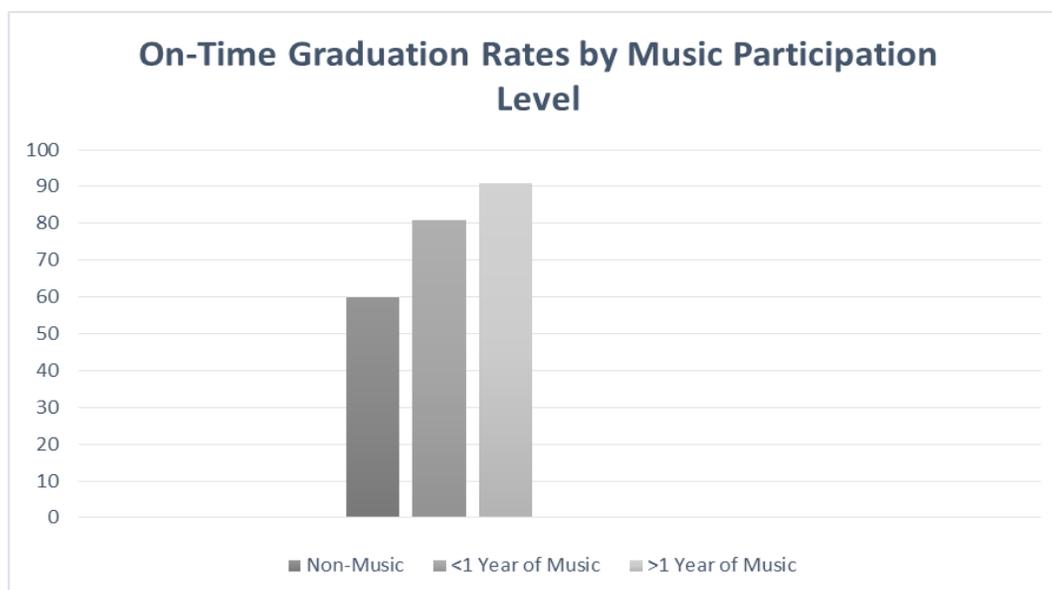


Figure 3. Nashville Public Schools Study (Eason & Johnson) 2013 Study Results. This graph represents the increases in graduation rates in association with participation in arts classes.

Self-Esteem and Motivation

Costa-Giomi (2004) found that students who took music lessons benefited from improved self-esteem. This is also supported by the research of Hallam (2000; 2005; 2010), who has discussed the benefit of improved self-esteem and motivation through the study of music in multiple studies. According to Hallam (2005), “Playing an instrument can lead to a sense of achievement; an increase in self-esteem; increased confidence; persistence in overcoming frustrations when learning is difficult; self-discipline; and provide a means of self-expression. These may increase motivation for learning in general” (p. 2). Eason and Johnson (2016) found that not only were students motivated to be successful musicians, but the motivation gained from participation in performance-based music classes carried over into their other studies as well.

Creativity

According to Hallam (2010), music instruction provides students with the opportunity to develop their creative side. The positive influence of creativity through music classes is directly impacted by the number of classes the student actually takes, along with the particular activity

planned by the teacher. Hallam (2005; 2010) cited several different studies that have taken place advocating a strong relationship between music education and creativity.

McMillan (2009) posits students studying instrumental music have many opportunities to develop creatively through the rehearsal and performance of various styles of literature. Learning the art of improvisation through jazz studies is definitely an important activity to allow students to develop their creative side, but the expressiveness required by so much of the classical literature is also an important activity to consider. Learning to display various styles through performance, utilizing skills such as tone, intonation, dynamics, and articulation enable the student to relate the emotions of the literature at hand to the audience as intended by the composer (McMillan, 2009).

Learning to develop the ability to think and create is crucial for students in the 21st century (Watson & Watson, 2013). In addition to assisting with the development of critical thinking skills (Hallam, 2010), music is the tool that can allow educators to develop the ability to think about how to best develop and utilize those skills learned in science, technology, engineering, and math. This, of course, transforms STEM to STEAM, as discussed earlier in the chapter (Watson & Watson, 2013).

Music and Standardized Testing

Although a great deal of research has sought to determine a link between music instruction and the cognitive development of preschool and elementary aged children, a study by Vaughn and Winner (2000) centered on high school-aged children and their test scores on the Scholastic Aptitude Test (SAT). The College Board provided the team with 12 years of data in order to conduct this significant and important research. While the scores of students who took between one and three years of arts classes saw a gradual increase in their composite SAT score,

upon further scrutiny they discovered there was a significant jump in the composite SAT scores of students who took four years of arts classes (Vaughn & Winner, 2000). However, Winner and Cooper (2000) obtained data from multiple studies and conducted a meta-analysis, determining while there is a positive relationship between music education and academic achievement, the relationship is purely correlational, as they found no evidence of a causal link.

Other studies conducted over the past decade have shown a positive relationship between music instruction and other content areas (Eason & Johnson, 2013; Nielsen, 2008; Johnson & Memmott, 2006; TMEA, 2015). The work of Vaughn and Winner (2000) was further validated by two different studies conducted by the Texas Music Education Association (TMEA) (2015) and the Metro Nashville Schools (Eason & Johnson, 2016). TMEA analyzed SAT participation data provided by the College Board from 2011 through 2015 and determined students participating in fine arts classes scored significantly higher than those that did not participate in fine arts classes.

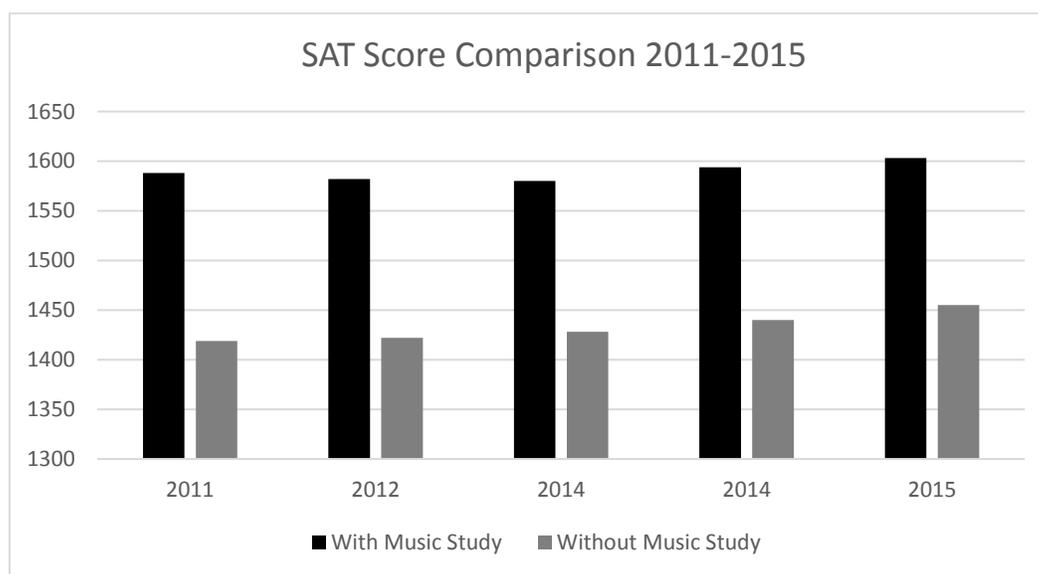


Figure 4. Texas Music Education Association (TMEA) 2015 Study Results. This graph represents the difference between SAT scores from 2011 to 2015 for students with and without music study.

As outlined in Figure 4, SAT scores are overwhelmingly higher for students who took music classes. Therefore, data indicates that participation in performance-based music classes, such as band, choir, and orchestra does have a positive impact on academic achievement (TMEA, 2015).

The Metro Nashville Schools have established a public/private partnership with the music industry and other community leaders establishing an initiative called Music Makes Us (Eason & Johnson, 2016). According to Eason and Johnson (2013), “With a focus on music literacy and student participation, Music Makes Us is strengthening traditional school music-chorus, band and orchestra-while adding a contemporary curriculum that embraces new technologies and reflects and diverse musical landscape” (p. 5). Partnering with music researchers at the University of Kansas, an extensive amount of data was collected to determine the benefits of performance-based music classes and the direction needed for the future of the school system in order to secure optimum educational benefits for students (Eason & Johnson, 2016).

The research team at the University of Kansas, led by Eason and Johnson (2013), using four years of data from the class of 2012, determined students who took at least one year of a performance-based music class scored higher on both the English and math sections of the ACT than students who did not take part in music classes. This increase was even greater for those students who took more than one year of music classes (Eason & Johnson, 2013).

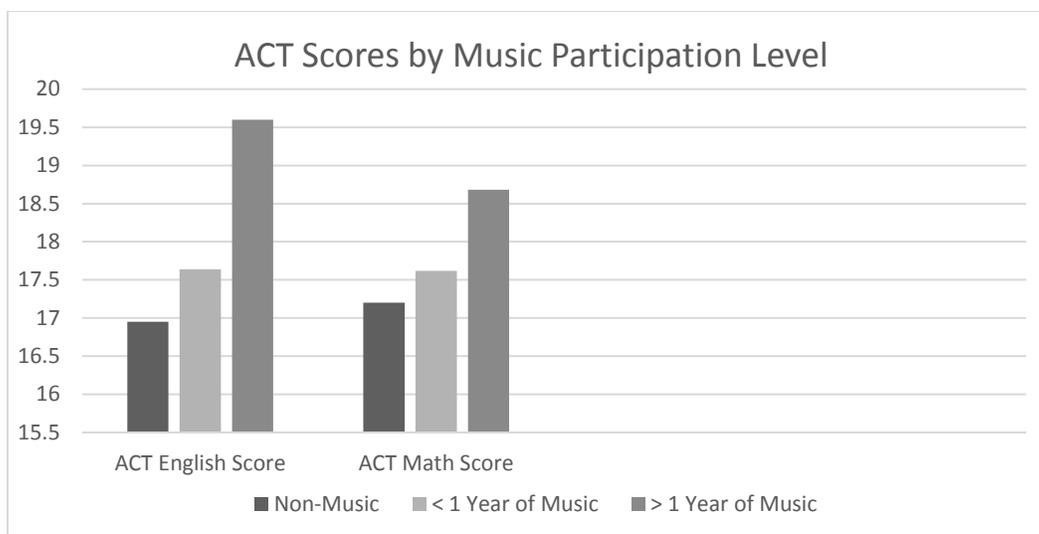


Figure 5. Nashville Public Schools Study (Eason & Johnson) 2013 Study Results. This graph represents the difference between ACT Scores for students with no music, < 1 year of music, and >1 year of music.

According to Eason and Johnson (2013), “These increases are statistically significant at the $p > .01$ level” (p. 23). As indicated in Figure 5, there is a noticeable difference between the students in the left column who did not take any music classes, the students in the center column who took at least one year of music classes, and the students in the column on the right, students who took more than one year of music classes.

Summary

Music has been included as part of the education curriculum in the United States since at least 1838, thanks to Lowell Mason and the Boston Public Schools (Mark, 2002). Throughout the remainder of the 19th century and well into the 20th century, school systems throughout the country began to follow the lead provided by Mason and the schools in Boston, adopting an educational curriculum that included music education (Mark, 2002). Over the last half-century, however, music educators have found themselves in the position of needing to provide validation for their discipline, causing a great deal of disagreement within the field (Broomhead, 2005; Catterall, 1998; Davis, 2008; Eisner, 1998; Freer, 2009; Hallam, 2010; Johansen, 2007;

Koopman, 2005; Mark, 1996, 2002; Major, 2013; McCarthy & Goble, 2002; Myers, 2009, Phillips, 1993; Reimer, 1993, 2003, 2014; Scott, 2006, 2011; Wiggins, 2007; Winner, 2000; Winner & Cooper, 2000).

While many music educators, led by Reimer (1993), felt that music should be included in the educational curriculum solely because of the benefits available through the study of music, others, led by Phillips (1993) and Catterall (1998), agreed with the philosophy established by Reimer (1993), but felt that establishing a strong correlation between the study of music and other academic disciplines would actually be beneficial to music educators. Fortunately, a new generation of music educators such as Earnhart (2015) and Major (2013) have established a solid foundation of music advocacy between the two philosophies in the 21st century.

Extensive studies have taken place establishing a positive relationship between the study of music and cognitive development (Abrams et al., 2013; Brochard et al., 2004; Chan et al., 1998; Cole, 2011; Concordia University, 2013; Hallam, 2010; Ho et al., 2003; Hudziak et al., 2014; Jakobson et al., 2003, 2008; Kraus et al., 2014; McMullen & Saffran, 2004; Orsmond & Miller, 1999; Peterson, 2011; Schellenberg, 2015; Skoe & Kraus, 2012; Stoesz et al., 2007; White-Schwock et al., 2013). While a study by Rauscher et al. (1993) determined a temporary increase in the IQ score of students listening to the music of the Classical Period composer Mozart for 10 minutes prior to taking the Stanford-Binet Intelligence Scale, the news media overstated the findings, calling the study The Mozart Effect. Fortunately, the Rauscher et al. (1993) study triggered subsequent studies which did provide validation to their work (Hussain et al., 2002; Nantais & Schellenberg, 1999; Schellenberg, 2005; Schellenberg, 2015).

Research has also taken place establishing a positive relationship between music and other academic disciplines, such as language (Koelsch et al., 2004; Patel & Daniele, 2002;

O'Herron & Siebenaler, 2007), reading (Butzlaff, 2000; Hallam, 2010; Standley, 2008), math (Churchill, 2004; Hallam, 2010; Heriksen, 2014; Jones & Pearson, 2013; Vaughn, 2000), science (Conderman & Woods, 2008; Monk & Poston, 1999; Rogers, 2016) and history (Forney & Machlis, 2015; Haycock, 2015; McConnell, 2005; Schustik, 2005). A number of studies indicate a positive relationship between music and the four content area disciplines of language, math, science, and social studies (Butzlaff, 2000; Earnhart, 2015; Gouzouasis, et al., 2007; Gromko, 2005; McMullen & Saffran, 2004; Patel & Daniele, 2002; Vaughn, 2000; Vaughn & Winner, 2000; Wetter et al., 2009) supporting the concept that music education can provide a better education for the entire child.

While a limited number of studies have taken place to determine a causal relationship between the study of music and improved academic achievement, questions still remain. The work of Vaughn (2000) and Vaughn and Winner (2000) concedes a correlational relationship between music and improved academic achievement, but did not find a causal relationship. The work of Eason and Johnson (2016) does establish a causal relationship between the study of music and ACT scores through Structural Equation Modeling (SEM). According to Eason and Johnson (2016) "SEM is a valuable tool for prediction when variables are considered appropriately, and should likely be limited to conditions where true experimental designs are not possible, which is the case with this descriptive baseline study" (p. 30). Therefore, an experimental study establishing a causal relationship between music and improved academic achievement would be significant.

CHAPTER THREE: METHODS

Overview

The purpose of this causal-comparative study was to determine if there is a statistically significant difference on the academic achievement of students who participate in performance-based music classes as opposed to students that do not take performance-based music classes. The control group was comprised of students who have never taken a performance-based music class, while the experimental group was comprised of students who have taken performance-based music classes throughout their secondary school careers. The researcher utilized a *t* test to analyze the ACT composite score from the eleventh grade administration of the ACT test to determine if any significant difference existed between the control and experimental groups.

Design

The study was quantitative and based upon a causal-comparative design. The causal-comparative design was an appropriate research method to analyze and draw conclusions based upon the data collected on two groups of students: the control group (those who have not taken performance-based music classes) and the experimental group (those who have taken performance-based music classes) (Gall, Gall, & Borg, 2007). The causal-comparative design was also appropriate in this case because the independent variable (participating in performance-based music classes) was not manipulated (Rovai, Baker, & Ponton, 2013). The researcher sought to determine if there was any significant impact on the academic achievement of students participating in performance-based music classes as opposed to students that have never participated in performance-based music classes.

This study utilizes the ACT scores of participants to measure academic achievement (Hallam, 2010). Performance-based music classes are ensemble-oriented courses, such as band,

choir, and orchestra, providing students with the opportunity to study music in preparation for concerts and other performance situations, such as state assessment (Pellegrino et al., 2015). The dependent variable (academic achievement as measured by 11th grade ACT scores of the participants) provided a standardized measure of student competency through a composite score (Hallam, 2010), while the independent variable is participation in a performance-based music class, such as band, choir, or orchestra (Pellegrino et al., 2015). This study attempted to determine whether there is a difference in academic achievement between the two groups (one that has and one that has not participated in the independent variable (performance-based music classes)).

Research Questions

RQ1: Is there a significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score?

Null Hypotheses

The null hypotheses for this study are:

H₀1: There will be no significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score.

Participants and Setting

The archival data for the study was drawn from a convenience sampling of the 2016-17 senior class at a suburban high school located in the Southeastern United States. Students whose data was utilized were juniors in the 2015-16 school year when the ACT test was administered. The control group was comprised of students who never took a performance-based music class,

while the experimental group was comprised of students who took one or more of the following performance-based music classes every semester of their secondary school career: beginning band, intermediate band, concert band, symphonic band, marching band, beginning choir, mixed choir, advanced choir, chamber choir, or orchestra. The researcher utilized cumulative records of potential participants to ensure that members of the control group never took a performance-based music class, while members of the experimental group took at least one performance-based music class per semester throughout their secondary school careers. Cumulative folders for all participants contain hard copies of all school records, including transcripts with classes taken and grades earned, along with all standardized test results through grades K-12. All cumulative folders are stored in file boxes in the records room, located in the counseling suite at the school where the study took place.

The cumulative folders of all potential participants were checked to ensure that they had a sixth grade ARMT scores. In addition, transcripts were checked to confirm enrollment in performance-based music classes. Of 427 members of the senior class of 2016-17, 143 potential participants were automatically eliminated because they were not enrolled in school as sixth graders. There were also 89 students eliminated that had taken some performance-based music classes, but were not enrolled in at least one performance-based music class per semester in grades 7-12. There were 53 students enrolled in a minimum of one performance-based music class each semester of their secondary school careers, comprising the experimental group. The control group, comprised of 53 students, was formulated through convenience sampling.

Participants

Archival data was collected from the 2016-17 senior class of a suburban high school located in the Southeastern United States. The total population of the 2016-17 senior class was

427. Only students with a sixth grade ARMT score and eleventh grade ACT scores were included in the sample. Potential participants in the study had a sixth grade ARMT score, along with transcripts indicating enrollment within the school system through grades 6-12. Enrollment data was gathered from the entire senior class to determine participants that had taken a performance-based class every semester of their secondary school career to determine members of the experimental group. Likewise, members of the control group were comprised of students that had never taken a performance-based music class. The pool of students was assigned to the control group if they had not taken any music classes and to the experimental group if they had taken music classes throughout the remainder of their schooling. The study compared the 11th grade ACT test results of the two groups to determine if students who did take performance-based music classes scored higher than students who did not. After each group was established, the ACT scores of students in each of the groups were analyzed to determine whether there were any statistically significant differences in academic achievement between the students in the experimental groups who did take music classes and those in the control groups who did not.

Gall et al. (2007) stated there should be a minimum of 15 participants in the experimental group as well as the control group when conducting causal-comparative research. After utilizing enrollment data to determine eligible participants, there were 53 students in the experimental group and 53 students in the control group, for a total of 106 participants in the study. Therefore, according to Gall et al. (2007), with 106 participants, the study exceeded the minimum requirements of a medium effect size with statistical power of .7 at an alpha level of .05.

Setting

The school that was utilized for the study is located in a county school system containing 14 schools with an approximate enrollment of 9,500 students spread throughout four different attendance areas. Each attendance area contained schools in various configurations of K-12 enrollments based upon the needs of the communities served. The attendance area for this particular school included seven different schools: Four K-6 elementary schools, one 7-8 junior high, one 9th grade freshman academy, and one 10-12 high school. There were approximately 1,500 students enrolled in grades 10-12 at the high school. The approximate population of the community was 22,000, with a demographic breakdown of 84% Caucasian, 13% black, 2% Latin, and 1% from other races (ALSDE, 2018).

Instrumentation

Permission to access archival data for this study was obtained from the Superintendent of Schools. At the study's site, academic achievement was measured through the composite score of the ACT, which is administered to all 11th graders in the state where the study took place. Archival data from the senior class of 2016-17 was collected from the two different standardized tests: The Alabama Reading and Math Test (ARMT) and the ACT. The ARMT was utilized to assist in determine enrollment in the school system from grades 6-12. The ARMT (2005), designed by Harcourt Assessment, was a criterion-referenced test aligned with state requirements in reading and math (ALSDE, 2018). The test was administered by the Alabama State Department of Education (ALSDE) from 2005 through 2014 and used in grades three through eight to measure reading and math achievement. The sixth grade ARMT assessment was the last such test the 2016-17 senior class would have taken before participating in any performance-based music class (ALSDE, 2018).

The ACT is an internationally administered test to determine college readiness used as an admission tool for many colleges and universities (ACT Test Technical Manual, 2014) that is administered to all eleventh graders in the state where the study takes place. Likewise, the ACT test is a globally respected assessment designed and written in respect to validity and reliability by ACT, located in Iowa City, Iowa. According to the ACT Test Technical Manual (2014), “The ACT tests are designed to measure students’ problem-solving skills and knowledge in particular subject areas” (p. 64). Eason and Johnson (2013) utilized ACT scores in their recent study.

Procedures

The researcher asked for and received written approval to conduct the study and to access archival student ARMT, ACT, and enrollment data in student cumulative folders from the Superintendent of Education. After receiving approval of the superintendent and the researcher’s dissertation committee, the researcher secured the approval of the Liberty University Institutional Review Board (IRB) (2016). See Appendix A for IRB approval.

A student’s cumulative folder contains all student records including quarterly/annual grades, enrollment records, and all test results including the 6th grade ARMT and 11th grade ACT results comprising the data for this study. Potential participants were initially identified by the presence of sixth grade ARMT results. If there was a sixth grade ARMT result present, the researcher checked transcripts to identify students that had taken at least one performance-based music class per semester throughout their secondary school career (grades 7-12). Those students were identified with a Y. Likewise, students that had never taken a performance-based music class were identified with a N. Students taking any performance-based music classes less than the full six years of secondary school were excluded from the study. Student records were assigned a random number identifying them as part of either the control or experimental group

(e.g., C105 for a control group member and E112 for an experimental group member), so no individual students were identified in the study. There are no electronic records of student ARMT or ACT scores, or enrollment records. Therefore, all hardcopy records, located in the cumulative folders of potential participants, were accessed by the researcher and viewed in the school's records room where a spreadsheet of the data was created to include ARMT participation in sixth grade; the ACT composite, reading, and math scores; and the students' enrollment history in performance-based music classes in any of the following classes after grade six: beginning band, intermediate band, concert band, symphonic band, marching band, beginning choir, mixed choir, advanced choir, or chamber choir. The spreadsheet is password protected on the researcher's laptop and a back-up portable hard drive which is locked in the researcher's home safe.

The researcher identified students who participated in performance-based music classes throughout their secondary school career and those who did not. After establishing a control group and an experimental group based on the presence of sixth grade ARMT scores and participation or non-participation in performance-based music classes in grades 7-12, the researcher gathered the ACT composite scores, reading scores, and math scores of the participants. All data needed for this study was included in the cumulative folders of the selected participants.

Data Analysis

Statistical Package for the Social Sciences (SPSS) software was used to conduct all data analysis associated with the study. After determining the control group and experimental group, data from the ACT composite scores for each group was analyzed to determine descriptive statistics, such as the mean and the standard deviation. The ACT composite scores were

measured on an interval scale, which is customary for standardized tests in statistical analysis (Gall et al., 2007). Assumption testing for normality of distribution was conducted through the Shapiro-Wilk Test. The researcher also printed boxplots, probability plots, and histograms utilizing this data, allowing the researcher to visually examine the data for extreme outliers, linearity, and normality. To test for the assumption of equal variances, the researcher utilized Levene's Test for Equality of Variances. Upon the completion of all assumptions testing, the researcher conducted an independent samples t test, based upon academic achievement as measured by the ACT composite scores of the participants to determine whether there was a difference between the control group (students who never took a performance-based music class) and the experimental group (students who took performance-based music classes throughout grades 7-12). All data was analyzed at an alpha level of .05. According to Gall et al. (2007), the utilization of the independent samples t test is appropriate when analyzing the means of a dependent variable to determine if a significant difference exists between groups.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this study was to determine if a positive relationship existed between students taking performance-based music classes and improved academic achievement. The researcher utilized archival data from the 2015-16 senior class of a suburban high school located in the southeastern United States. Potential participants had to meet the following criteria: 1) 2009-2010 ARMT scores, and 2) No participation in performance-based music classes (control group) or constant participation in performance-based music classes (experimental group). The researcher also recorded the ACT composite scores of all potential participants. Of 427 potential participants, 53 students qualified for the experimental group, and an additional 53 students were selected through convenience sampling for the control group, for a total of 106 participants. Data was gathered, disseminated, and analyzed as follows.

Research Questions

RQ1: Is there a significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score?

Null Hypotheses

The null hypotheses for this study are:

H₀1: There is no significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score.

Descriptive Statistics

Archival records from the 2016-17 senior class of a suburban high school in the southeastern United States were initially analyzed to determine whether or not potential participants had taken the Alabama Reading and Math Test (ARMT) in sixth grade. The researcher also checked enrollment records, along with student transcripts, to determine participation or non-participation in performance-based music classes. While there were 427 members of the senior class of 2016-17, two factors impacted the number of potential participants: the proximity of a large military base, along with a state line in the immediate vicinity. Because of these factors, 143 potential participants were automatically eliminated because they were transfer students that did not attend the local school system as a sixth grader. Therefore, they did not have a sixth grade ARMT score.

Only students that participated in band and/or choir throughout their secondary school career (grades 7-12) were utilized for the experimental group. Students who participated in band and/or choir less than the full six years of secondary school (grades 7-12) eliminating 89 potential participants. As a result, there was a total of 53 students included in the study that participated in band and/or choir for the full 12 semesters of their secondary school career. These students comprised the experimental group. Through the use of convenience sampling, the researcher selected 53 students from the remaining 142 students for the control group. There were 106 total students utilized as participants.

After determining participants, the researcher gathered their ACT composite scores to analyze any differences between the control and experimental groups. All data was initially entered into Microsoft Excel, then SPSS software (version 24) was utilized to analyze this data to

determine descriptive statistics. The sample size, means, and standard deviation for the control and experimental groups are found in Tables 1 and 2.

Table 1

ACT Scores for the Control Group

Descriptives				
	N	Mean	Std. Deviation	Std. Error
Composite	53	16.92	2.716	0.373

Table 2

ACT Scores for the Experimental Group

Descriptives				
	N	Mean	Std. Deviation	Std. Error
Composite	53	23.40	4.529	0.622

The bar graph in Figure 6 provides a visual contrast of the differences between the means of the control group and experimental group, as the raw data indicates a 6.48 point difference between the control and experimental groups in ACT composite scores.

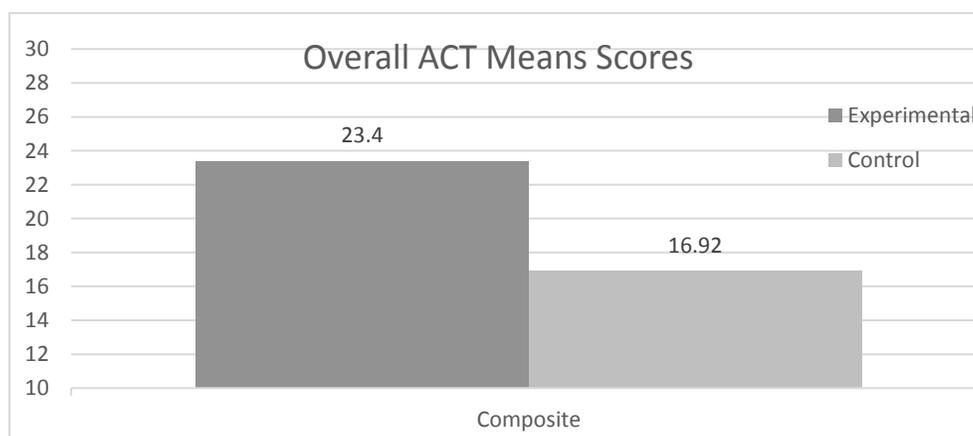


Figure 6. Overall ACT means scores comparison of control and experimental groups.

Results

After determining participants, establishing the control and experimental groups, and analyzing the ACT data to determine the descriptive statistics, assumption tests for the proposed statistical analysis were needed. The ACT composite scores were measured on an interval scale. To test for normality of distribution, the researcher utilized the Shapiro-Wilk Test. The Shapiro-Wilk Test indicated normal distribution for the ACT composite scores. In addition, to visually check for normality, the researcher printed histograms. To check for extreme outliers, the researcher utilized boxplots, and to check for linearity, the researcher utilized probability plots. To test for the assumption of equal variances, the researcher utilized Levene's Test for Equality of Variances, which indicated significance at .18. Therefore, the researcher ran an independent samples *t* test to determine whether or not significance existed between the control and experimental groups.

Null Hypothesis One

H₀1: There will be no significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score.

This hypothesis compared ACT composite test scores of all participants between the control group, who never took any performance-based music classes, and the experimental group, who took performance-based music classes throughout grades 7-12. There were 53 participants in the control group and 53 participants in the experimental group, creating a sample size of $N=106$. An alpha level of .05 was established for all statistical tests. The Shapiro-Wilk Test of normality indicated the assumption of normal distributions to be held tenable. The researcher also utilized SPSS to create a histogram with a normal distribution curve, to visually

examine normality, as seen in figure 7 below. To visually check for extreme outliers, the researcher created a boxplot, found in figure 8 below.

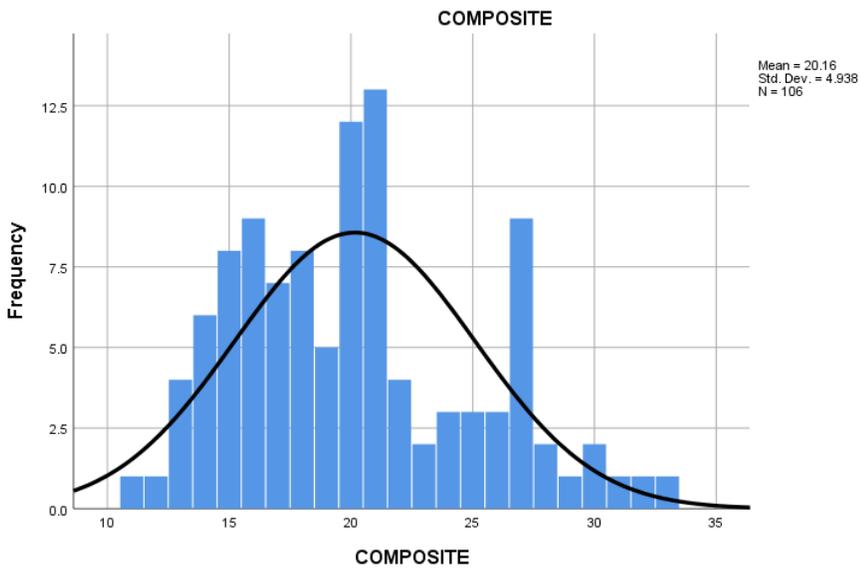


Figure 7. Histogram of ACT composite score data, with normal distribution curve.

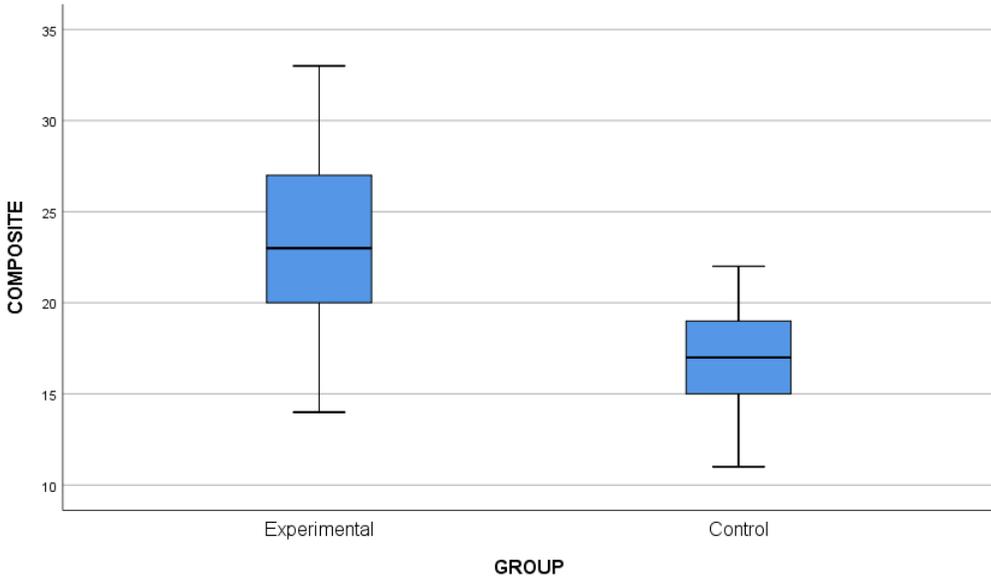


Figure 8. Boxplot of ACT composite score data.

After determining normal distribution of the data, the researcher ran an independent samples *t* test, comparing ACT composite scores between the control and experimental groups.

There was a significant difference between the control group ($M=16.92$, $SD=2.72$) and the experimental group ($M=23.40$, $SD 4.53$); $t(104)=8.92$, $p=.01$. Therefore, the researcher rejected the null hypothesis (**H₀1**).

CHAPTER FIVE: CONCLUSIONS

Overview

Chapter five details the methodology of this causal-comparative study and how the study relied upon existing literature in determining a practical and useful approach that could be helpful to the music educators in the field and the education and scientific communities in general. The discussion section provides specifics regarding the findings of the data as they related to the study, along with the implications of the study, the limitations of the study, along with recommendations for future research.

Discussion

The purpose of this causal-comparative study was to determine if there is a relationship between participation in performance-based music classes, such as band and/or choir, and improved academic achievement. Music has played a role in shaping the overall educational curriculum since the early days of the great philosophers, such as Confucius, Plato, and Aristotle (Mark, 1999; Woerther, 2008; Wong, 2008). Unfortunately, music educators have struggled to determine their role in the education community over the past half-century (Allsup, 2003; Branscome, 2012; Earnhart, 2015; Eason & Johnson, 2013). An extensive review of the literature determined that while researchers are in agreement that there is a positive relationship between the study of music and improved academic achievement, there is a great deal of disagreement within the educational and scientific communities regarding the cause of that improvement (Kinney, 2008). Data collected at a suburban high school tried to determine whether or not a causal relationship exists. All participants were either never exposed to performance-based music classes, or always exposed to performance-based music classes through grades 7-12, and were selected from the 2016-17 senior class of a suburban high school in the Southeastern United

States through convenience sampling. The sample size included 53 students in the control group and 53 students in the experimental group, for a total of $N=106$. This constituted 25% of the senior class of 427.

Research Questions

RQ1: Is there a significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score?

Null Hypothesis One

H₀1: There will be no significant difference in academic achievement between students who took performance-based music classes and those who did not as measured by the ACT college readiness test composite score.

There was a statistically significant difference between the ACT composite scores of the control group and experimental group, suggesting a positive impact on the ACT composite scores of students participating in band and/or choir in grades 7-12. With an alpha level of $<.05$, significance was established at $.001$. The mean ACT composite score of the control group was 16.92 and the mean ACT composite score of the experimental group was 23.4, representing a difference of 6.48 in the raw score between groups. Since the analysis of the data indicated a much higher ACT composite score for the experimental group as opposed to the control group, the researcher rejected the null hypothesis (**H₀1**). This finding mirrors Winner and Cooper's (2002) meta-analysis conclusion correlating multiple years of music study and increased SAT scores, and also aligns with other studies linking the benefits of music education with improved test scores, cognitive development, and overall academic achievement (Eason & Johnson, 2013; Rauscher et al., 1993; Schellenberg, 2004, 2005, 2006, 2015).

Implications

While this was a small study, conducted at one suburban high school located in the Southeastern United States, the data clearly established a positive relationship between students participating in performance-based music classes and improved academic achievement. As a result of an analysis of the available archival data from the senior class of 2016-17, the researcher was able to reject the null hypothesis of the research question. While the ACT composite score for the control group was 16.92 and the experimental group was 23.4 (a significant difference of 6.48), the researcher also found that the experimental group scored significantly higher than the statewide ACT composite score average for the class of 2016-17, which was 19.2, and the nationwide ACT composite score average for the class of 2016-17, which was 21 (Edwards, 2017).

Multiple recent studies have found a positive relationship between participation in arts classes and improved academic achievement. Catterall (2009; 2012) indicated that students from a low socio-economic background benefit from exposure to participation in arts classes, such as performance-based music classes. Likewise, Southgate and Roscigno (2009) posit that participation in classes grounded in the performing arts could be a potential solution to less than adequate test results among students from a low socio-economic background. Additional studies discovered a positive relationship between increased brain development and exposure to the study of music (Abrams et al., 2013; Hallam, 2010; Skoe & Kraus, 2012).

Consideration should also be given to previous studies that have indicated a positive relationship between the study of music and other academic disciplines, such as language arts, math, science, and history. Butzlaff (2000), Hallam (2010), and O'Herron and Siebenaler (2007) each found that the study of music enhanced the facilitation of language arts abilities in children.

Henriksen (2014), Jones and Pearson (2013) and Vaughn (2000) each declared a positive relationship between the study of music and an increase in math abilities. While many students may consider studying history a boring task, utilizing the study of music as an interdisciplinary tool allows educators to facilitate the teaching of historical facts in a setting that is more palatable to most students (Haycock, 2015; McConnell, 2005; Schustik, 2005). A similar relationship exists in the science discipline, which is growing exponentially in importance within the education community because of the phenomenon known as STEM (Conderman & Woods, 2008; Monk & Poston, 1999; Rogers, 2016).

While STEM (science, technology, engineering, math) education has played an important role in the overall curriculum of schools throughout the nation in the 21st century, a number of studies have found that STEM is much more productive with the addition of courses that place an emphasis on creative thinking, and creativity in general (Daugherty, 2013; Hallam, 2010; Watson & Watson, 2013). According to Sabol (2013) and Watson (2016), exposure to the arts, through classes such as performance-based music classes, promotes creative thinking among students, allowing for an improved overall educational experience. Hallam (2010) also found that participation in performance-based music classes, such as band, choir, and orchestra, promoted self-esteem and leadership qualities among participants.

Eason and Johnson (2013) found significant increases in both GPA (grade point averages) and standardized test results across all ethnic groups, regardless of the socio-economic status of participants. A number of recent studies also found a positive relationship between participation in performance-based music classes and an increase in graduation rates (Earnhart, 2015; Eason & Johnson, 2013; TMEA, 2014). At the very least, the results of this study provide

additional support to validate an increase in student achievement through participation in performance-based music programs.

For the past 50 years, music educators have found themselves in the position of having to defend the importance of their programs, while promoting the significance of their discipline within the overall school curriculum (Aprill, 2001; Kinney, 2008). When school administrators at the local and district levels have been faced with financial constraints, programs in the arts, including performance-based music classes, have been among the first to be cut (Doyle, 2012; Major, 2013; Sabol, 2013; Slaton, 2012). Helig et al. (2010), conducted an extensive study of the history of fine arts programs in the United States, finding that two factors had a negative impact on arts education: A less than stellar economy and an upswing in technological development. Within the last decade, the emphasis placed on STEM education has caused the demise of many music programs in the education community (Sabol, 2013). However, additional research has found that the addition of the arts to STEM, creating STEAM, has been much more effective to school curriculums (Daugherty, 2013; Sabol, 2013; Watson, 2016).

The last two renewals of the Elementary and Secondary Education Act (NCLB, 2001 and ESSA, 2015) have each included music programs, along with other fine arts classes, as part of the core curriculum. Unfortunately, administrators are often faced with making very difficult decisions regarding school finances, curriculum choices, and scheduling. Superintendents, and more specifically, principals, struggle to schedule classes around a finite amount of time in the school day. In many cases, classes in the fine arts, including performance-based music classes, are often eliminated to save money, time, or both. This study confirms that student participation in performance-based music classes does have a positive impact on improved academic achievement, so administrators eliminating these classes could inadvertently lower academic

achievement at their respective schools. Although this was a small study at one school, enough data driven evidence of improved academic achievement is available that should convince school administrators to reconsider prior to eliminating performance-based music programs from their school curriculum.

Consideration should be given to researching methods to provide opportunities to more students to participate in performance-based music classes. According to Lichtenberg et al. (2008), educators and potential employers agree that studying arts education is most likely the best way to develop skills in creativity, yet these classes are offered only as electives and reach a limited number of students. However, a study conducted in Washington at the Tenth Street School in Marysville found that when school administrators started requiring all students to take band, the passing rate on the math portion of the Washington Assessment of Student Learning increased by 71% in one year, which was the highest growth rate of any school in the state (Churchill, 2004). While some financial considerations would have to be given to provide instruments for students taking band or orchestra without the means to pay for them, the increase in academic achievement, especially among students living in a low socio-economic situation, could definitely pay dividends in a short period of time (Catterall, 2009; 2012; Southgate & Roscigno, 2009). As noted by Earnhart (2015) and Wetter et al. (2009), music instruction provides for the education of the entire child, unlike any other academic discipline.

Limitations

Due to the proximity of a state line, along with a nearby major military installation, a large number of students regularly transfer into and out of the school system. In concept, the methodology of establishing a starting point was thorough, and probably would be much more effective under different conditions that would allow a greater number of participants, but under

the circumstances, the number of students moving in and out of the school system would have to be considered a limitation. The fact that this study was based on one single class would also have to be a limitation. While the population of this class was representative of the entire population of the school, and of the school system as a whole, a larger sample size that included multiple school systems or an entire regional area of schools would probably produce a more representative population. In addition, utilizing a school, school systems, or a regional area of schools would allow researchers to analyze additional demographics, such as gender, race, and socio-economic concerns. Although there are some limitations to the study, the positive results are too important to overlook or ignore, as this study helps to fill the gap in the current literature.

Recommendations for Further Research

A great deal of the research that has taken place over the last half-century has indicated a positive correlational relationship between academic achievement, the study of music in general, listening to music, and studying music privately through one-on-one lessons, but a limited number of studies exist that have studied the relationship between participation in large group performance ensembles and academic achievement. Likewise, a tremendous amount of research has taken place studying the reaction of studying or listening to music and brain development. Unfortunately, the music education and scientific communities have greatly disagreed over the interpretation of those findings. While the majority of scholars agree that students choosing to study music have an increase in academic achievement, many have suggested that students who do well academically are led to participate in performance-based music classes, implying that those students would be successful with or without the study of music.

For this reason, the researcher would recommend following the methodology for this study with multiple schools, school systems, or regional areas to allow the analyzation of larger

sample sizes. Even though this study indicated a positive relationship between students at every ability level, the sample size was so small that the researcher hesitates to declare a causal effect. With that being stated, the data definitely supports a strong, positive relationship between the study of music and academic achievement, which is difficult to ignore and worthy of additional research.

While the data for this study indicated a positive impact on academic achievement for those students participating in performance-based music classes throughout grades 7-12, it would be interesting to see if the same impact was present with students that participated in band, choir, and/or orchestra for a shorter amount of time. As mentioned previously, research should take place to determine the effect of participation in performance-based music classes when taking into consideration gender, race, and socio-economic status. Increasing participation in performance-based music classes could very well be the catalyst that provides students that are weak academically with the surge they need to improve their academic performance.

Through the addition of a qualitative component, researchers could further explore the positive impacts that the study of music has on self-esteem, motivation, leadership, and the ability to work with others as a team. Each of these qualities plays a very important role with not only students that choose to further their education at a post-secondary institution after graduation from high school, but they would also be helpful to students that end up entering the workforce at the blue-collar or white-collar level, as well as the military. Another interesting perspective to consider would be a complete qualitative study, including individual case studies indicating the impact of performance-based music classes on different students.

Research to determine how to increase enrollments in performance-based music classes could also be beneficial. Some students might be interested in participating in a performance-

based music class, but their family might find it cost prohibitive (this is especially true for band or orchestra, where students often have to rent or purchase an instrument). Research to determine whether or not other music classes might offer the same benefits could also be valuable tools for educators, such as class piano or class guitar, because the school system would provide those instruments as a class set at no cost to the student. While the initial investment in a classroom set of guitars or a piano lab would be expensive, that outlay could pay dividends relatively quickly through an increase in academic achievement.

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APPENDIX A

Liberty University IRB Approval Letter

LIBERTY UNIVERSITY
INSTITUTIONAL REVIEW BOARD

October 27, 2017

Russell Warren Courson
IRB Approval 3026.102717: A Causal-Comparative Analysis of Performance-Based Music
Classes and ACT Scores

Dear Russell Warren Courson,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,



G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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