Differences in Achievement Based on Fifth- and Sixth-Grade Student Enrollment in Pull-out Instrumental Music

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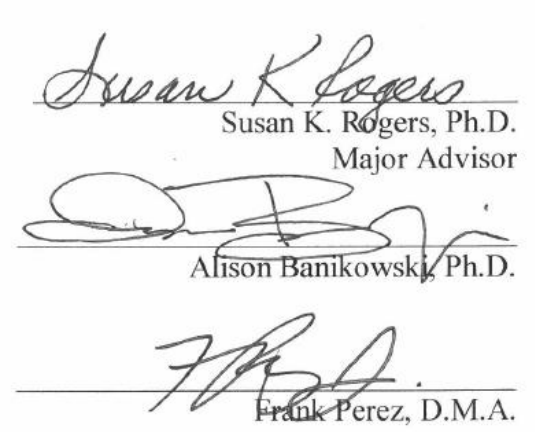

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Abstract

The purpose of this study was to determine if there was a difference in the academic achievement, as measured by the Northwest Evaluation Association (NWEA) Measurement of Academic Progress (MAP) Mathematics and Reading Assessment score growth, between all fifth- and sixth-grade students, low SES students, or students identified as learning disabled who were enrolled in pull-out instrumental music instruction and students from those groups who were not enrolled. An additional purpose of this study was to determine if there was a difference in the academic achievement, as measured by the Kansas Mathematics and ELA Assessment scores between all fifth- and sixth-grade students, low SES students, or students identified as learning disabled who were enrolled in pull-out instrumental music instruction and students from those groups who were not enrolled. A quasi-experimental design was utilized for this study because archival data from previously administered tests were used, and a comparison of two independent groups took place. The independent variable was participation in pull-out instrumental music instruction. The dependent variables were NWEA MAP Mathematics and Reading Assessment score growth (fall to spring) and the Kansas Mathematics and ELA Assessment scores. The sample for this study included fifth- and sixth-grade students in District S, a Midwestern suburban school district during the 2018-2019 school year. The results of the analysis indicated that there were no significant differences in NWEA MAP growth scores for fifth- and sixth-grade students, low SES students, or students identified with learning disabilities enrolled in pull-out instrumental music instruction. Fifth-grade students identified as learning disabled not enrolled in pull-out music instruction showed more growth on the NWEA MAP mathematics assessment.

The results of the analysis of the Kansas Mathematics and ELA Assessment scores indicated significant differences between scores for all students and for low SES students who were enrolled in pull-out instrumental music instruction and their peers who were not pulled out for instrumental music instruction. The scores of fifth-grade students identified as learning disabled who took the Kansas Mathematics Assessments were different between students enrolled in pull-out instrumental music instruction and those who were not enrolled in pull-out instrumental music instruction, with one exception. The scores of fifth-grade students identified as learning disabled were not different between those enrolled in pull-out instrumental music instruction and those not enrolled in pull-out music instruction. This information should prove helpful to parents, teachers, and administrators when trying to decide whether involvement in instrumental music is a wise choice for a student who may be categorized as low SES or learning disabled.

Dedication

I want to dedicate this research to all the students and parents I have encountered in my thirty years of teaching from Dodge City to Wichita and to Shawnee Mission. When I began my teaching career, I thought music was fun, and I wanted to share that excitement with as many students as possible. Along the way, students and parents showed me that while music is fun, students are amazing. When I realized that I got to spend so many hours with you, and many times even years, I became another father-figure to many of you. I hope that all my students have learned to keep working until you are out of time, good enough is never good enough, and excellence is always possible. I am thankful for the students who remember me, and the good times we shared. I am grateful for the friendships I have developed with former students. It is fun to hear you talk about the "life lessons" you learned in band that you are passing on to your children.

Acknowledgements

I want to thank my parents Ralph and Joan Thomas, for raising me in a caring home and supporting my aspirations. The piano lessons and learning the trumpet were not terrible, but when I decided I wanted to march in a Drum and Bugle Corps, they never balked but found a way to help me attain my dream. My band director at Field Kindley High School, Marc Webster, and wife Dianna, thank you for inspiring me to reach for the stars and asking what I was going to do with my life. I had never thought of being a band director until you asked; then, it seemed like the most obvious choice. I am eternally grateful. To my first college band directors, Gary Corcoran and Bob Kehle, thank you for helping me find my voice as a teacher and giving me a great foundation from which to begin my career. Ken Stith, Jean Smoot, and Bill Jenkins made my first years of teaching an adventure. You taught me how to be a teacher. To this day, I still think about and use the lessons you taught me. The most important one being that I do not teach music, but I teach children about music and life through music.

To Vic Markovich and Larry Blocher, thank you for stretching me musically during my master's program at WSU. To Chuck McLean, Dick Kramer, Steve Loe, Grant Dreiling, and Connie Springfield, principals, friends, and mentors, thank you for encouraging and believing in me to write this chapter of my life. Bill Shifflet and Justin Pedigo, you have taught me how to lead and laugh in the kindest, gentle, and thoughtful ways. Thanks for the continual encouragement. Thank you, Susan Rogers, Peg Waterman, Alison Banikowski, Frank Perez, and the rest of the Baker staff for developing an incredible leadership program that is shaping so many lives in the region.

Most importantly, I thank God every day for giving me an incredibly supportive wife, Becky, and two remarkable children, Preston and Brianna. Not only do we share an incredible life, but we also share the love of teaching the performing arts together. There is no greater joy than to see my family be successful, love each other, and help others find their passion. Thank you all for investing in me.

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Chapter 1

Introduction

Sputnik changed everything in education (Bracey, 2007). When Russia put a satellite into space before the United States in 1957, schools received the blame, and educational reform began. Immediately, Congress passed The National Defense Education Act of 1958 in hopes of bolstering the education of children in schools, especially in the areas of mathematics, science, and foreign languages (Iorio & Yeager, 2011). President Lyndon Johnson made education a priority during his administration. He believed that being well educated was important if citizens were to achieve the so-called "American dream" (Iorio & Yeager, 2011). Thus, the Elementary and Secondary Education Act (ESEA) was created in 1965. Congress continued to enact legislation aimed at strengthening education between 1965 and 2001 such as Title IX prohibiting discrimination based upon sex in all aspects of education and Public Law 94-142 requiring free and appropriate education for all children, which was later revised and known as the Individuals with Disabilities Education Act (IDEA) (Iorio & Yeager, 2011). It was later amended to Individuals with Disabilities Education Improvement Act (IDEIA) of 2004. A critical report came out in 1983 from the National Commission on Excellence in Education titled *A Nation at Risk*. In that document, the use of time in the school day was carefully studied (Iorio & Yeager, 2011). The commission suggested that students' time was not allocated adequately and, thus, the cause of low-test scores (National Commission on Excellence in Education, 1983). In 2001, the passage of No Child Left Behind (NCLB) was another indictment of education (Booker, 2009; English, 2010; Iorio & Yeager, 2011). Within its legislation was language calling for adequate

yearly progress. The intent was that each year, the achievement level of the students would be increased until test scores indicated that 100% of students were proficient. Funding was tied to the percentage of students' in each school meeting that year's goal (Iorio & Yeager, 2011). If the goals were not attained, the school was threatened with the loss of funding (Klein, 2015).

Reinforced by subsequent legislation, *A Nation at Risk* focused on the back-to-basics curriculum of math, science, and reading (Cox, 2001). The performing arts were not recognized as part of the "Back to Basics" curriculum and thus were continually pushed to the side to make time for the tested curriculum (Walker, 2014). The report *A Nation at Risk*, the NCLB, and current ESSA legislation made mention of arts instruction; testing was not mandated nor used in the arts to determine school funding. Therefore, the arts were deemed expendable to increase the time for coursework in areas that were evaluated (Abril & Gault, 2006). It became easy for administrators to overlook the decades of studies proclaiming the importance of music and its effect on the brain and students' ability to learn (Kerns, 2019; Moore, 2012).

Background

Music is the universal language (Ludden, 2015). Every culture known has shared some form of musical thought and creation. Music is used to share stories, thoughts, intentions, and emotions. It often gives meaning to societal norms (Schneider, 2000). It has been said that music can convey thoughts and emotions that the written word cannot, thus becoming an important method of communication.

Before the 1800s, the teaching of music to students was primarily left to churches and religious institutions. Throughout the 1830s, Lowell Mason lobbied the Boston

Massachusetts school board for the inclusion of music in the curriculum of their schools (Mark & Gary, 2007). On August 28, 1838, The Boston School Committee passed a resolution to appoint the first teacher of music in the public schools with Lowell Mason as the first Superintendent of Music (Mark & Gary, 2007). Music was placed alongside reading and mathematics to receive school funding by providing instructors, course materials, and classroom space; its relevance to continue in the curriculum has been debated at various times since its inclusion (Cardarelli, 2003; Davenport, 2010; Dryden, 1992; Gillespie, 1992; Heninger, 2017; Robitaille & O'Neil, 1981; Schneider, 2000).

The National Association for Music Education (NAfME, 2019) established 20 reasons why the study of all forms of music, including general, choral, and instrumental music, is important. Musical training helps develop language and reasoning. Music aids in the mastery of memorization while helping improve student work. The study of music increases coordination and discipline and provides a sense of achievement. Music training helps students stay engaged in school while providing success in society and emotional development. Music training develops finely-tuned auditory skills, imagination, and intellectual curiosity. The study of music can enhance creative thinking preparing students for a creative economy while building self-confidence, responsible risk-taking, and teamwork. Students of music can develop pattern recognition and spatial reasoning skills and tend to score better on standardized tests (NAfME, 2019). While all music study is deemed important, instrumental music provides enhanced academic achievement benefits (Guhn, Emerson, & Gouzouasis, 2019).

According to Sanders (2001), group instruction of instrumental music began in 1911 when Albert Mitchell began teaching violin classes to students after school. Joseph

Maddy assembled a national student orchestra to play at the 1927 meeting of the National Organization of School Superintendents (Sanders, 2001). Those in attendance were impacted to create a resolution to make music and art part of the fundamental education of American students (Mark & Gary, 2007). Various approaches to scheduling have been utilized for instrumental music instruction at the elementary level, such as meeting before or after school, over lunch periods, or pull-out instruction. By far, the most widely accepted scheduling practice in elementary schools has been the pull-out program (Sanders, 2001). Pull-out instruction occurs when a small group of students is removed from the regular classroom to receive specialized lessons in a subject such as instrumental music, remedial reading, or special education assistance. When a student or group of students are pulled out of the regular classroom, the teacher must decide to continue with the lesson, provide a study time, or stop instruction for those remaining. If the lessons continue, the teacher then must provide assistance and instruction to the student or group of students who were gone during the pull-out (Sanders, 2001).

Statement of the Problem

District S is a suburban public-school district serving 14 cities in Northeast Kansas. At the time of this study, students were enrolled in 34 elementary schools (grades K-6), five middle schools (grades 7-8), and five high schools (grades 9-12). According to the Kansas State Department of Education (KSDE, 2019), approximately 64% of the student population were classified as White, 9% African American, 19% Hispanic, and 9% as other. Approximately 35% of the student population were considered economically disadvantaged, and nine percent of the students were identified as having a disability (KSDE, 2019).

Since the 1950s, the common teaching methodology for beginning fifth- and sixth-grade instrumental students in District S elementary schools was to pull-out students from their regular classroom for instrumental music instruction twice a week (D. Circle, personal communication, July 12, 2018). Some regular classroom teachers and building principals have argued that students are negatively impacted by missing regular classwork and have felt that their academic progress lagged behind their non-instrumental music peers (Cox, 2001; Engdahl, 1994; Moore, 2012). Because of the emphasis placed on test scores, classroom teachers have been concerned that students who are pulled out for music instruction are missing valuable learning and will not achieve as well as their peers who are not pulled from regular class instruction (Engdahl, 1994). There has also been a concern that low socioeconomic status (SES) and students with disabilities were placed at a disadvantage when being pulled from regular classroom instruction. There seems to be little evidence regarding students designated as low SES or learning disabled involved in instrumental music. Engdahl (1994) and Hash (2011) noted there was a need for further study of the effects of pull-out instruction on students identified as low SES and learning disabled. Results of studies have shown that instrumental music students' academic achievement is not negatively impacted by missing regular classroom instruction. (Cardarelli, 2003; Guhn et al., 2019; Heninger, 2017; Little, 2015; Moore, 2012; Zanutto, 1997).

Purpose of the Study

The first purpose of this study was to determine if there is a difference in mathematics score growth and reading score growth (fall to spring), as measured by the Northwest Evaluation Association (NWEA) Measure of Academic Progress (MAP)

assessment, between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The second purpose of this study was to determine if there is a difference in NWEA MAP mathematics score growth and reading score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The third purpose of this study was to determine if there is a difference in NWEA MAP mathematics score growth and reading score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled and enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled and not enrolled in instrumental music during the 2018-2019 school year. The fourth purpose of this study was to examine if there is a difference in Kansas Mathematics Assessment scores and English Language Arts (ELA) scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The fifth purpose was to determine if there is a difference in Kansas Mathematics Assessment scores and ELA scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The final purpose was to determine if there is a difference in Kansas Mathematics Assessment scores and ELA scores between fifth- and sixth-grade students identified as learning disabled and enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled and not enrolled in instrumental music during the 2018-2019 school year.

Significance of the Study

In most beginning instrumental music programs, students are pulled out of regular classroom instruction to receive band or string instruction two or more times per week (Cox, 2001). Despite vast research over the past thirty years validating that students are not harmed by missing regular classroom instruction (Balsinger, 2004; Engdahl, 1994; Hash, 2011; Kvet, 1985), classroom teachers are still concerned (Gillespie, 1992). In the current study, NWEA MAP Reading and Mathematics score growth and Kansas Mathematics Assessment and ELA Assessment scores were compared between students enrolled in instrumental music and students not enrolled in instrumental music. Measuring the student's growth from previous years, one could determine if the academic development of students pulled from regular classroom instruction for instrumental music lessons was lower in comparison to students not pulled from instruction. If the rate of growth was lower for instrumental music students but not for non-instrumental music students, one could argue that missing classroom instruction was related to a lack of growth. Engdahl (1994) and Hash (2011) suggested that the academic achievement of low SES students, as well as students identified as learning disabled be observed, to see how they performed in comparison to students not identified as low SES and students not identified with learning disabilities. The results of this study contribute valuable and current information to administrators, classroom teachers, and instrumental music teachers regarding the effect of pull-out instrumental music instruction on academic achievement of fifth- and sixth-grade students who are involved in instrumental music instruction in the public school.

The results of this study contribute to a growing body of research surrounding classroom pull-outs for instrumental music instruction. Most researchers during previous decades have used state or national derived achievement tests to support their findings that missing regular classroom instruction is not detrimental to instrumental music students' achievement. This study used similar state and national achievement tests for comparison and correlation to the previous studies. However, with the growing use of computer-assisted testing solutions such as the NWEA MAP Assessment, growth in mathematics and reading during a school year can be compared for students who participate in pull-out music programs and those who do not participate.

A similar study was performed in District S in the late 1980s, so this researcher determined it would be advantageous for District S to discover if achievement has changed in the district regarding instrumental music students at the elementary beginning level by comparing current findings to those of thirty years ago. It was also deemed important to expand upon the research as requested by numerous other researchers (Engdahl, 1994; Hash, 2011; Heninger, 2017). As was explained above, there is also value in conducting local research to inform educators and administrators about current trends.

Delimitations

Lunenburg and Irby (2008) defined limitations as "self-imposed boundaries set by the researcher on the purpose, and scope of the study" (p. 134). This study was focused on achievement scores reported through the NWEA MAP in mathematics and reading and Kansas State Assessments in mathematics and ELA only. Mathematics, reading, and ELA were chosen to replicate the 1980s Circle study most closely. Another delimitation

was using a sample of only fifth- and sixth-grade students in one suburban school district in the Midwestern United States. Finally, in this study, scores from the 2018-2019 school year were compared.

Assumptions

For this study, it is important to understand that "assumptions are postulates, premises, and propositions that are accepted as operational for purposes of the research" (Lunenburg & Irby, 2008, p. 135). The following assumptions were made while conducting this study.

1. The student participants completed the assessments to the best of their ability.
2. Students involved in instrumental music were consistent in their attendance of music instruction classes.
3. The students pulled-out for fifth- and sixth-grade instrumental music were absent from regular classroom instruction the same amount of time each week.

Research Questions

Research questions provide a focus and a framework from which a study should evolve, identifying concepts that have yet to be definitively answered (Lunenburg & Irby, 2008). The research questions can be broken into four groups, and within each group is an overall comparison, followed by an assessment of students considered low SES, followed by students identified as learning disabled. The first three research questions in the study involve the NWEA MAP mathematics scores. Research questions four through six focus on NWEA MAP reading scores. Research questions seven through nine are based upon the Kansas Mathematics Assessment, and research questions 10 through 12 focus on the Kansas ELA Assessment.

RQ1. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ2. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ3. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

RQ4. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ5. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ6. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth- and sixth-grade students identified as learning

disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

RQ7. To what extent is there a difference in Kansas Mathematics Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ8. To what extent is there a difference in Kansas Mathematics Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ9. To what extent is there a difference in Kansas Mathematics Assessment scores between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

RQ10. To what extent is there a difference in Kansas ELA Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ11. To what extent is there a difference in Kansas ELA Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

RQ12. To what extent is there a difference in Kansas ELA Assessment scores between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

Definition of Terms

To provide clarity and a common frame of reference, key terms are identified for the reader. Lunenburg and Irby (2008) stated that key terms should be defined so the reader has a firm grasp of the concepts central to the study as well as providing a common basis of understanding. The following terms are defined for this study:

Instrumental Music. The Harvard Dictionary of Music (1970) defined instrumental music as "music performed with instruments rather than voices" (p. 413). In the context of this study, band, strings, orchestra, and instrumental music may be used interchangeably.

Kansas Assessment. According to the University of Kansas Achievement & Assessment Institute (2019), the "Kansas Assessment Program (KAP) includes a variety of tests aligned to Kansas' content standards, which help educators and policymakers evaluate student learning and meet the requirements for federal and state accountability" (para. 1).

Learning disability. The Kansas Department of Education (KSDE, 2018) defined a "learning disability" to mean

> a disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to

> do mathematical calculations, including perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term shall not include learning problems that are primarily the result of any of the following: (1) Visual, hearing, or motor, disabilities; (2) Intellectual Disability; (3) emotional disturbance; or (4) environmental, cultural, or economic disadvantage. (p. 19)

Northwest Evaluation Association (NWEA) MAP assessment. The computerized tests are adaptive and offered in reading, language usage, science, and mathematics. The difficulty of the test is based on how well the student answers the previous questions. As the student answers correctly, the difficulty is increased. As questions are missed, the difficulty becomes easier. A student's score is an estimate of the student's achievement level (Fleming, 2017).

Pull-out instruction. According to Engdahl (1994), pull-out programs are ones that allow the movement of elementary school students from their self-contained classrooms for specialized instruction.

Socioeconomic Status (SES). A student whose combined family income is below a state-determined cut off is indicated to be of low SES (Dietrichson, Bog, Filges, & Klint Jorgensen, 2017). For this study, a student qualifying for free or reduced lunch was considered to be of low SES.

Organization of the Study

This study is presented in five chapters. Chapter 1 included a background of music education in the United States, the statement of the problem, purpose, and significance of the study. It also included the 12 research questions addressed and the

definition of terms. Chapter 2 contains a review of relevant literature about the academic achievement of instrumental students as well as related studies surrounding low SES and learning-disabled achievement. Provided in Chapter 3 is information regarding research design, participant selection, and measurements employed. Chapter 3 also includes data analysis and hypothesis testing procedures and the limitations. Supplied in Chapter 4 are the results of the data analysis. Chapter 5 contains the study summary, the findings related to the literature, and the conclusions.

Chapter 2

Review of Literature

In modern society, people are surrounded by music, whether by listening to it, singing, or playing an instrument. Music permeates our world from grocery stores, to movies, or in homes for relaxation. The study of music is essential as an art form as well as communication of emotion, humanity, and a commentary of current society, but it also enhances and benefits other areas of education (Kurt, 2010; Schneider, 2000).

It seems like the fight for justification of music education in the public-school setting has never waned. Through budget cuts and the desire to provide as much time as possible to core subjects of math, science, English, and social studies, the study of music is still in jeopardy of being removed from public schools (Cardarelli, 2003; Gillespie, 1992; Heninger, 2017; Kerns, 2019; Robitaille & O'Neil, 1981). Therefore, in trying to justify the study of music, educators have moved from discussing the benefits of music as a form of art, to how music can enhance other curricula or at the very least how the study of music does not harm learning in other areas of education (Kurt, 2010; Robitaille & O'Neil, 1981). Still, others are attempting to draw correlations between high academic test scores and the amount of time one studies music (Guhn et al., 2019; Schneider, 2000). Included in this chapter are a history of band and orchestra programs in the school curriculum, impact of pull-out programs on academic achievement, academic achievement implications for low SES students involved in pull-out programs, and academic achievement implications for students identified as learning disabled in pull-out programs.

History of Instrumental Music Instruction in Schools

While music education has been in public schools since the 1830s, the early existence was only as "singing schools" in which children were taught to sing hymns and spiritual songs (Mark & Gary, 2007). The addition of string and full orchestra curriculum to the public schools began in the early 1900s, augmenting the typical reading, writing, and mathematics instruction. Due to the Western European influence of orchestral music of the Classical and Romantic periods, some teachers started to teach private string lessons after school. As this trend blossomed, instrumental music became part of the standard curriculum, much like vocal music in Boston. With the advent of military bands and famous figures such as John Philip Sousa and Patrick Gilmore, town bands sprung up throughout the country. These bands entertained their audiences with their artistry and showmanship, providing popular music while orchestras maintained the tradition of the Western European culture (Mark & Gary, 2007). At the turn of the century, dramatic urbanization of schools took place. With this increase came the desire for activities and programs that were not traditionally offered. It was with this movement that the "Sunday school orchestra" and the "firehouse bands" began to move into the school curriculum (Rhodes, 2007). It was not long after that bands began to be used to provide entertainment at football games as well as an outlet for boys who did not feel comfortable singing in the choirs. As the popularity began to increase in Illinois, it was said that town bands outnumbered towns.

After the first world war, many military bandsmen were looking for jobs and were hired to begin bands in public schools (Rhodes, 2007). Throughout the Midwest, contests began to form so that local communities could show off their school pride through their

school band. By 1926, several states developed state band competitions prompting instrument manufacturers to sponsor a national band competition. These competitions helped usher instrumental music to a place of prominence in public schools as well as provided standardization of instrumentation and raised the quality of teaching by promoting college curricula for instrumental music teachers (Rhodes, 2007).

In the 21st century, instrumental music instruction at the elementary level is taught by a music specialist, not the classroom teacher who teaches the core subjects such as math, science, reading, and social studies. Some schools schedule instrumental music instruction before or after school, but this has been found to limit availability to some students and is often abandoned due to equal access issues. Alternatively, some schools attempt to offer instruction during lunch or recess times with mixed results. Over time, many administrators have gravitated to the practice of excusing students from regular classroom activities for specialized instruction that has become known as a pull-out program since it involves only a portion of the students being taken from or "pulled" from their regular classroom (Hash, 2004, 2011; Kvet, 1985). Therefore, pull-out scheduling has become the primary model used in elementary instrumental music programs across the country (Kvet, 1985; Robitaille & O'Neil, 1981). Thus, schedules must be developed in which students receive music instruction. This scheduling typically falls on the shoulders of the elementary principal (Kvet, 1985; Robitaille & O'Neil, 1981).

Impact of Instrumental Music on Overall Academic Achievement

Robitaille and O'Neil (1981) compared elementary school students in Albuquerque, NM who took the Comprehensive Test of Basic Skills (CTBS). The

comparison was between 5,154 fifth graders, of which 910 were involved in band and 357 in orchestra. In both areas of language and reading, students enrolled in instrumental music outscored their non-instrumental music counterparts in the district. Also, after two years of instrumental music instruction, band students scored 10 percentile points higher than their non-music peers in reading and 12 points higher in language. Orchestra students scored 16 percentile points higher in reading and 20 percentile points higher in language than their non-music peers (Robitalle & O'Neil, 1981). The results of the study indicated that instrumental music students suffered no loss of skills as borne out by the results despite missing instructional time in the regular classroom. These results were consistent for schools scoring well above the national norm to well below and with varying student ethnic populations.

Zanutto (1997) studied differences in the academic performance of instrumental and non-instrumental music students over five years in grades 7-11 in Clovis, California. The Clovis School district had a population of approximately 30,000 students. The study design tracked grade point average and district testing to identify significant differences in academic performance between the instrumental students and their non-instrumental music counterparts. During that period, the instrumental students averaged 9.6% higher mathematics GPAs than their non-music counterparts. Over the same five-year period, the instrumental students averaged a 10.3% higher GPAs in science than their non-instrumental music counterparts. The GPA for English was 9.5% higher for instrumental music students versus their non-music counterparts. The results of the study also showed instrumental music students continually increased their grades versus the non-

instrumental music group as the population progressed from seventh through eleventh grade.

Schneider (2000) studied students in three categories: musicians, athletes, and non-musician/non-athletes from a large school district in the Southeastern United States. He compared test scores using the California Achievement Test (CAT) in the areas of total battery, reading, language, and mathematics to determine if there were differences between those enrolled in music classes, those who participated in school sports, and those who did not participate in either activity. The tests were administered in Grades 5, 6, 7, 8, and 9. Schneider (2000) determined that students enrolled in music classes achieved higher mean scores in reading, language, and math than their athletic peers in seventh through ninth grades. Although there was a difference in the means, the results of the study showed that these groups were statically equal. The mean scores for the musician group remained stable while the other groups, athletes and non-musician, and non-athletes mean scores showed a tendency to drop.

Davenport (2010) sampled students from six schools in the Baltimore County Public Schools in Maryland. Sixty students from each school were randomly selected. Thirty were enrolled in instrumental music, and 30 were not. Scores from the Maryland School Assessment (grades 6-8) and the Maryland High School Assessment (grades 9-12) were compared along with attendance data. Davenport's results indicated that in middle school, there were no significant differences between reading or mathematics scores of students enrolled in instrumental music and those not enrolled in instrumental music. There was also no significant difference in attendance rates for students enrolled or not enrolled in instrumental music. Although not statistically significant, the middle

school instrumental music students did score higher than their peers not enrolled in instrumental music by six points in both English and mathematics. However, in high school, though it does not use a pull-out model, instrumental music students scored higher than their peers in all three areas of daily attendance, English scores, and Algebra scores. Music students outscored their no-music counterparts by an average of 15 points in the English portion of the test and 16 points on the Algebra portion.

Moore (2012) studied students from a Midwestern school district comprised of three high schools and 471 students to determine if there was a positive correlation between participation in instrumental music and student accomplishment as measured by the ACT composite score. The study utilized a non-experimental, ex post facto design since the comparison was of archived data from the 2010-2011 school year to examine the difference in ACT scores between instrumental music participants and non-instrumental music participants. The results showed that the instrumental music participants (n = 69) mean ACT composite score was 23.39, and the mean score for the non-instrumental music participants (n = 402) was 19.68. The instrumental music students outscored their non-music counterparts by a mean score of 3.71.

Little (2015) studied two different middle schools in southern California comparing English language arts and mathematics test scores from the Common Core State Standards test to determine if instrumental music students' scores differed from non-instrumental music students' scores. The stratified sample size was 130 students; 65 students participated in instrumental music, and 65 students did not participate. In selecting the sample size, Little controlled participant selection to neutralize for effects of SES, gender, and intelligence by creating equal sample groups. The results indicated that

instrumental music participation positively affected English language arts and mathematics scores as compared to the non-instrumental music participants. The English language arts mean score was 1.61 points higher for instrumental music participants than non-participants. The mathematics mean score was 2.08 points higher for instrumental music participants versus their non-instrumental music counterparts.

Guhn et al. (2019), in a large-scale study of 112,916 students in grades 7-12 from four public schools in British Columbia, Canada examined the relationships between music education, mathematics, and science achievement in Grade 10 as well as English achievement in Grades 10 and 12. The study of instrumental music had a positive correlation to higher achievement scores in all areas. It was further noted that music students had broad gains in executive functioning skills.

> Music-making often entails numerous executive-functioning related processes including anticipation, planning, memory, synchronization with other musicians; instrumental music-making especially entails shifting between mental and physical tasks (e.g. rearranging one's fingers to perform the same and different patterns), recalling and auditing from working memory different pieces of music and pattern sets, and substantial control or mastery over one's expressive behaviors. An example of "updating" is the process musicians use to simultaneously read music notation, and coordinate and anticipate finger movements to play the correct melodic patterns. (Guhn et al., 2019, p. 2)

Students involved in instrumental music were academically ahead of their peers not involved in instrumental music by one year. It was noted in their findings that the more music courses a student participated in throughout their school career, the wider the

achievement gap became between students enrolled in music courses and those where were not enrolled in music. Some researchers suggest that more music instruction will lead to better academic achievement for students (Guhn et al. 2019).

Impact of Pull-Out Programs on Academic Achievement

Parents are made aware that since not all students choose to participate in instrumental music instruction, students are taken out of their regular classroom for this activity. As far back as the 1990s, parents have shown a willingness to help their child with instruction or homework they may have missed because of the positive impact that music presents (Leblanc, 1990). In the same study, Leblanc noted that instrumental music students take extra responsibility to maintain their homework in other courses and devote extra study time at home to keep up with their peers.

Many administrators may not realize that music instruction does not impede other learning, and perhaps it may even enhance learning in other subjects (Robitaille & O'Neil, 1981). Several researchers have shown that music students achieve superior scores in standardized tests beyond their non-music counterparts as well as those that show no difference between the two groups (Dryden, 1992; Engdahl, 1994; Kvet, 1985; Robitaille & O'Neil, 1981; Saker, 1997; Schneider, 2000). Some teachers may find that students being taken from their classroom for music instruction is a distraction that adds stress or extra work as they try to help students with missed assignments (Gillespie, 1992).

In a study conducted by Kvet (1985), four Midwestern urban school districts with 2,167 students in 26 elementary schools were involved. Kvet matched students between the four school districts based upon gender, race, pre-sixth grade achievement scores, IQ,

and SES to discover if significant differences exist between students pulled from their regular classroom for the study of instrumental music and students not studying instrumental music in the areas of reading, language, and mathematics in sixth grade. Kvet's (1985) findings were consistent across the four districts studied. There was no significant difference in achievement between students involved in instrumental music pull-out lessons and those who were not involved in instrumental music pull-out lessons.

In 1983 and 1989, Circle studied third- and sixth-grade students in the Shawnee Mission Schools who were tested using the Iowa Test of Basic Skills (ITBS) (as cited in Gillespie, 1992). Students began pull-out string instruction in fourth grade and pull-out band instruction in fifth grade. After two years of string instruction and one year of band instruction, test scores were compared between the students involved in instrumental music versus students not involved. Circle (as cited in Gillespie, 1992) found the scores of students enrolled in instrumental music to be higher in both mathematics and reading comprehension than their non-instrumental music peers.

Dryden (1992) studied students enrolled in instrumental music in a medium-sized southwestern Kansas school district of approximately 4,500 students. Of the fifth-grade population of 270 students, 164 were involved in pull-out instrumental music instruction. Utilizing the CTBS, Dryden found that students who participated in instrumental music had higher achievement in reading vocabulary than non-participants. Additionally, she determined that being dismissed from regular classroom activities for instrumental music instruction did not negatively impact their math or reading scores.

Engdahl (1994) conducted a study in South Bend, IN, public schools in which 299 fifth- and sixth-grade students were identified as being enrolled for instrumental music in

a pull-out model. In this study, the pull-out students' CTBS test scores were matched from third-grade results to a student who was not in instrumental music to compare their growth through the sixth grade after three years of instruction. Engdahl (1994) determined that there was no significant difference in scores on the CTBS test of reading, mathematics, and language arts for students pulled out for instrumental music instruction versus their non-pull-out peers. However, he did note positive gains by the pull-out band students in all areas tested, but not at a significant level.

Saker (1997) noted no disadvantage academically for elementary students enrolled in instrumental music lessons via a pull-out program who miss part or all regular classroom instruction to participate in music lessons versus students not enrolled in instrumental music not missing instruction. Saker utilized test results from the CTBS administered to students from four rural school districts in Nebraska. The testing population was an equal number of fifth-grade students (n = 83) who participated in instrumental music and those who did not participate in instrumental music. The results indicated the non-instrumental student scores did improve more than those of instrumental students but not at a level of significance. In language arts achievement scores, again, both music and non-music students' scores increased. Although both group's scores improved, the music students' scores increased more than the non-music students, but still, not at a significant level of difference. Instrumental music students' scores did outpace their non-music counterparts by 4.2 points. In comparing the total battery of tests, the instrumental music students' scores were higher than their non-music counterparts by 1.5 points; again, a statistically significant difference was not found.

Cox (2001) utilized the Stanford Achievement Test (9th ed.) scores before and after being enrolled in instrumental music classes to compare the growth of students. The study involved 298 participants. The test scores being evaluated were reading, mathematics, and language. The observable attributes were demographic data, student test scores, free and reduced lunch status, and instrumental music status. Upon seeing some students with extreme score fluctuations, it was decided to remove outliers of any score that increased or decreased by more than 15 points since it was determined that such large swings were unlikely under normal testing circumstances. Based on the test scores, Cox (2001) concluded that students enrolled in an instrumental music pull-out programs do not suffer academically. Additionally, he documented that instrumental music students have higher academic achievement than their non-instrumental peers and that students who opt to participate in instrumental music have higher academic attainment than their non-instrumental music peers. Cox (2001) also concluded that students who self-select into music have higher academic achievement than their peers prior to enrollment in band or strings.

Hash (2011) studied 353 students from a suburban Midwestern city during the years 2007 to 2010. Of the 353 students, 61 were involved in band, and the remaining 292 were not. Approximately 24% of the students were classified as low income, and 12% had limited English proficiency. Elementary band in the observed district consisted of one full group rehearsal and two private lessons per week, all using the pull-out model of instruction. Middle school bands meet after school with one pull-out lesson during the week on a rotating basis. Academic achievement was measured using the ACT Explore College Readiness test comprised of evaluation in English, math, reading, and science.

Hash determined that all subject tests and composite scores were higher for band students versus those not enrolled in band. After further analysis, Hash (2011) concluded that students who only participated for one year of band instruction scored virtually the same as students who had never participated in band. However, students who participated in band for five years significantly outscored their peers without band experience.

Academic Achievement Implications for Low SES Students Enrolled in Instrumental Music

Since the 1960s, social scientists have recognized the significance of a family's SES's impact on the academic achievement of students (Kantor & Lowe, 2017). Researchers have shown that a student's low SES typically corresponds to low academic achievement. When generalized across school populations, the achievement of a school predominately filled with low SES students is generally lower than schools with a primarily high SES enrollment (Caldas & Bankston, 2001; O'Donnell & White, 2005). While these trends have been substantiated, some low SES students can overcome this obstacle and are considered academically successful (Kurt, 2010). Students involved in learning instrumental music are not exempt from SES implications.

Fitzpatrick (2006) studied the achievement of low SES students in Columbus, Ohio enrolled in instrumental music by analyzing test scores in mathematics, reading, citizenship, and science over eight years. Of the 15,431 students in the sample, 915 were enrolled in instrumental music. An analysis of the data indicated that students who were not considered low SES outscored their low SES peers. Upon further examination, Fitzpatrick recognized that students who opted to enroll in instrumental music had higher test scores than those who never enrolled in instrumental music. Fitzpatrick (2006)

suggested that students who enroll in instrumental music are more apt to have higher achievement scores from the outset.

Davenport (2010) studied students from six schools from the Baltimore County School District, Maryland. The district had 121,715 students in the secondary schools, including 27 middle schools and 24 high schools. A sample of 60 students was randomly selected from each school, which was divided into two groups of 30 each. Thirty were selected who were involved in instrumental music, and 30 were not enrolled in instrumental music. The district used the Maryland School Assessment, for middle school students and the Maryland High School Assessment for high school students to test for mastery of skills as set out by No Child Left Behind and the Maryland State Department of Education. Archival data were gathered for mathematics and reading scores and attendance for the 2007-2008 school year. The independent variable was participation in instrumental music. The dependent variables were attendance and reading and math scores for each middle school student or algebra and English for each high school student. Davenport (2010) concluded there was not a significant difference in reading or mathematics scores of students enrolled in instrumental music and those not enrolled in instrumental music. Davenport (2010) also concluded that the average daily attendance between students enrolled and students not enrolled in instrumental music was almost identical and therefore provided no statistical difference. However, students enrolled in instrumental music significantly outscored those not enrolled in instrumental music in both English and algebra on the Maryland High School Assessment. Additionally, students involved in instrumental music in high school had significantly higher attendance rates.

Kurt (2010) studied students in a small Midwestern city middle school. There were 38 participants enrolled in Grades 6-8. The group was made up of 40% low SES students. Academic achievement was measured using scores from the NWEA MAP and ITBS. Results showed that regardless of a student's SES, literacy achievement improved over time while students were active in instrumental music (Kurt, 2010). Both low and high-SES students made gains the NWEA MAP tests in literacy. The low SES group, who pretested at a considerably low level, almost caught up with the high SES group after three years of music lessons. Kurt concluded that the longer a student studies music, the more significant the impact on all cognitive functions leading to growth in other areas.

Deisler (2011) compared common characteristics of successful high school band programs in low and high socioeconomic schools in the state of Florida in a mixed-methods study involving 414 students, 10 band directors, and 10 principals. Deisler used 32 questions regarding the perceptions of success regarding the band programs using a 7-point Likert-type rating scale. Participants could rank-order some questions and use a checklist for other perceptions of the success of the band program and then rated 12 statements about the value of participation in the band. Deisler found that schools that have low-quality music programs also tend to have lower standardized test scores. Music, like other academic areas such as mathematics and reading are not exempt from the effects of SES on student performance. Schools that have an overall population of low SES students also tend to have lower scoring and performing music ensembles (Deisler, 2011).

Blomquist (2014) studied two Missouri school districts third-grade through eighth-grade students totaling almost 2,000 students. One district was more affluent with their population's average income above the Missouri average while the other was significantly below the average, thus providing a broad sample to compare SES effects on music students. Scores on the Missouri Assessment Program that is administered to third through eighth graders each year were compared in the areas of communication arts and mathematics. Additional data were gathered regarding attendance rates. Blomquist's results supported previous findings that students in instrumental music outperformed their non-instrumental music counterparts but went further to profess that students participating in high-quality music programs had higher scores than students from lower-quality programs. Low SES students involved in instrumental music programs outperformed their non-instrumental music low SES counterparts. It was also recognized that students from schools with music programs outperformed students from schools without such programs.

Oban (2015) completed a longitudinal study of sixth through tenth-grade students involved in instrumental music comparing NWEA MAP test score growth of students in poverty versus students not living in poverty. Specifically, he compared the NWEA MAP reading and mathematics test scores. The participants were from a Midwestern school district serving over 11,000 students. The district used free and reduced lunch status to determine SES. The total number of sixth through tenth-grade students was 4,328. Non-instrumental music and non-poverty participants were 58.1% of the sample (n = 2,514) and non-music, poverty participants were 28.8% (n = 1,246). Instrumental music, non-poverty made up 10.9% (n = 473) and music, poverty participants were 2.2%

(n = 95). The results indicated that students who participated in instrumental music did realize higher overall growth in achievement in their sixth through tenth-grade years when compared to students not participating in instrumental music. Oban noted that for students enrolled in instrumental music, the NWEA MAP scores in mathematics grew by a mean score of 3.89, and NWEA MAP reading grew by a mean score of 1.90 above their non-instrumental music peers. However, for students categorized as low SES, the NWEA MAP math score fell behind their low SES peers not involved in instrumental music by a mean score of 2.96. In reading, the low SES students did out-perform the non-instrumental music counterparts showing a mean score growth of 0.03. Both scores still left the students on NWEA MAP grade level and did not show that students were falling behind their peers. Oban (2015) concluded there was no significant difference in NWEA MAP scores between students categorized as low SES involved in instrumental music and students not categorized as low SES.

Guhn et al. (2019), in the largest study of its kind involving 112,000 students in British Columbia, Canada, determined that students with a low SES background benefited from instrumental music education. While it has been demonstrated in prior research (Blomquist, 2014; Moyer, 2010), Guhn et al. (2019) also noted that students with higher SES backgrounds tend to enroll in music courses and tend to obtain higher academic scores. In their analysis, they controlled for children's SES background and education of their neighborhoods. The results still showed that instrumental music gave all students regardless of SES status, a boost in achievement.

Academic Achievement Implications for Low SES Students Involved in Pull-out Instrumental Music Programs

Since low SES achievement has been studied broadly in music education, it is important to consider the implications for students involved in pull-out instrumental music instruction to gain a broader understanding of its impact on student learning. Dryden (1992) examined 270 fifth-grade students in a mid-sized southwest Kansas town involved in pull-out music instruction. Of this total, 164 students were involved in instrumental music. In examining students enrolled in instrumental music, she found that students who paid full price for lunch scored significantly higher in achievement than those who received free and reduced lunch as measured by the ITBS.

Balsinger (2004) collected Kansas Assessment scores from students in eight elementary schools (n = 356) using a pull-out model of instruction, one middle school (n = 148), and one high school (n = 82) in Grades 5, 8, and 12. Half the participants in each group were involved in instrumental music, and half were not. Four elementary schools received Title I funding for low SES pupils. The remaining four elementary schools, middle school, and high school were not receiving supplemental Title I funding. The study incorporated four groups for comparison. Group one was comprised of students receiving free or reduced lunch who participated in instrumental music. Group two was comprised of students who participated in instrumental music who paid full price for lunch. Group three included students who were not involved in instrumental music and received free or reduced lunch. Group four was made up of students who were not involved in instrumental music and paid full price for lunch. According to Balsinger (2004), students participating in instrumental music significantly outscored students not enrolled in instrumental music in reading at all grade levels. Similar results were found in mathematics. When analyzing the students receiving free or reduced lunch, it was

discovered that students paying full price outscored their peers by 7.75% in reading and 13.8% in math. Students participating in instrumental music outscored their non-music counterparts in every aspect.

Moyer (2010) studied 19 band programs from across the country in nine different states. He gathered thoughts from band directors and parents regarding various aspects of the program as well as statistical data regarding test scores, demographics of the students, and more. During his research on pull-out programs and SES, Moyer discovered that parents from low SES households tended to have less education and might not value school-offered opportunities such as band or might not have past experiences in music education. Moyer suggested providing accommodations for students and parents in low-SES situations. Assistance was offered in the way of reduced or free instrument use, but also urged educating the parents to the benefits of music for children, and solutions to assist with expenses such as reeds, books, oil, and possible transportation for after-school activities. Moyer further observed that parental involvement and support is a critical element in the success of students involved in instrumental music similar to overall academic achievement.

Ricketts (2012) studied 320 students from a small Midwestern town in south-central Kansas. Participants were 172 fifth-grade students and 148 sixth-grade students involved in a pull-out instrumental music program. Of these students, 108 fifth-graders and 85 sixth-graders were identified as low SES. The Kansas Mathematics and ELA Assessments were used to compare academic achievement. Fifth-grade results showed that students enrolled in instrumental music scored higher in both mathematics and ELA, although not significantly. Students identified as low SES status scored significantly

lower than their high SES status counterparts. Sixth-grade instrumental music students scored significantly higher in both mathematics and ELA than the students not enrolled in instrumental music. Again, students identified as low SES did not score significantly different than students considered high SES. Rickets (2012) concluded that the longer a student studies instrumental music, academic achievement improves, much like Guhn et al. (2019).

Academic Achievement Implications for Students Identified as Learning Disabled

Public schools in the United States educate more than six million students with disabilities, which is approximately 9% of school-age children. Students with disabilities struggle with academic performance more than their non-disabled counterparts (Swanson, 2008). According to the National Assessment of Educational Progress (NAEP, 2019), since 2007, students with learning disabilities have scored approximately 30-40 points behind regular education students using their unique 500-point scale. Academic achievement within the population of students diagnosed with exceptionalities can vary dramatically depending upon the individual student's disability. For instance, when comparing reading comprehension scores, approximately 12% of special needs students reached the average score of the regular education population. However, within the special education population, the scores varied widely based upon a student's diagnosis. A visually impaired student typically scores at the 25th percentile while someone with a speech/language impairment might score at approximately the 13th percentile, and one with mental retardation might only score at the 1st percentile (Swanson, 2008).

After carefully reviewing the research regarding students with learning disabilities, it is difficult to find comparisons of academic achievement between students

identified as learning disabled and non-learning disabled in the literature because its title implies a student with a learning impairment struggles academically compared to a non-disabled student (Candler, Johnson & Green, 1983; Jackson, 2014, Livingston, 2010). Students who have a learning disability process inputs in their area of difficulty differently than so-called "normal" students (Bowser, 2012). A person can have a deficiency in reading but be entirely capable and even excel in mathematics or social studies. "Learning disabilities manifest themselves as differences in how a person stores, retrieves, and processes information" (National Center for Learning Disabilities, 2014, p. 3). Common types of learning disabilities are dyslexia, difficulty with words; dyscalculia, difficulty with math; dysgraphia, difficulties in writing. Associated deficits and disorders: auditory processing deficit, difficulty in understanding and using auditory information; visual processing deficit, difficulty in understanding and using visual information; executive functioning deficits, difficulty planning, organizing strategizing, remembering details, and managing time and space; attention-deficit/hyperactivity disorder, difficulty with attention, hyperactivity, and distractibility (National Center for Learning Disabilities, 2014).

Redmon (2007) studied the impact of inclusion versus pull-out programs for students identified as learning disabled in DeKalb County, TN. She studied 107 third through sixth-grade students comparing students' achievement on the Terra Nova Achievement test in mathematics and reading/language over three years from 2003 to 2006. While Redmon compared two different models of instruction delivery, inclusion versus pull-out instruction, the important aspect with regards to this study is that students identified with learning disabilities who were also considered from a low SES level

scored significantly lower on the math Terra Nova Achievement test than did special needs students at the higher SES level. Students from a low SES background compounded the achievement issue for students already struggling to obtain mastery.

Wilson (2008) embarked on a study of factors that influenced the math course enrollment for students with disabilities within high schools. Using data from the 2002 Educational Longitudinal Study, Wilson compared student data of 6,398 students in 608 schools. Through his research, he found that on average, students with disabilities were three-and-a-half years behind their non-disabled peers in math achievement. Wilson (2008) found students identified as learning disabled typically only completed Algebra 1, while students without disabilities frequently continued through Algebra 3 and Trigonometry.

Booker (2009), in a study of over 800,000 third through fifth-grade students in the state of Georgia, examined state assessment scores from the Criterion-Referenced Competency Test (CRCT) in mathematics and reading, comparing students with disabilities versus those without disabilities. The Booker study involved the analysis of data over three school years from 2004 to 2007. In third grade mathematics, approximately 99% of non-disabled students met or exceeded the standards, while only 89% of students with disabilities met or exceeded the standards. In fourth grade mathematics, 99% of non-disabled students met or exceeded the standards, whereas only 79% of disabled students achieved the same level. In fifth grade mathematics, again, approximately 99% of non-disabled students met or exceeded the standards, while only 84% of learning-disabled students met or exceeded the standard. The results were similar for the reading portion of the test. In third grade, 99% of non-disabled students met or

exceeded the standard, although only 89% of learning-disabled students scored at the same level. In fourth grade reading, 99% of the students without disabilities again met or exceeded the standard compared to only 85% of the students identified with learning disabilities. Finally, in sixth-grade reading, 99% of the students without learning disabilities met or exceeded the standard, compared to only 86% of the students with learning disabilities met or exceeded the standard. Booker's findings indicated that students without a learning disability have a 10-14% advantage in meeting or exceeding the standards in mathematics and reading on the CRCT.

Livingston (2010) studied the academic progress of sixth through eighth-grade students with learning disabilities to students without disabilities using the CRCT in the state of Georgia. Livingston used archival CRCT results for mathematics and reading from 2004 to 2009. The study compared data for six urban school systems from across the state of Georgia. There were almost 368,000 sixth through eighth-grade students enrolled at the time of the study, with 7.1% or just over 26,000 students categorized as learning disabled. In all years and all tests, students without disabilities scored higher than students identified with learning disabilities. The results were reported as the number of students meeting or exceeding the standards. During the sixth-grade, the number of students meeting or exceeding the standards in reading was separated by 20 percentage points at most and 18 points at minimum. During the seventh grade, there was a 31-percentage point difference, and eighth grade differed by as many as 27 percentage points. In mathematics, sixth graders meeting or exceeding the standards varied by as many as 37 percentage points, seventh-graders were separated by as many as 42 percentage points, while eighth-graders got to within 23 percentage points below their

non-disabled counterparts, but as wide as 45 percentage points over the five-year study. The achievement gap is wider in mathematics than reading (Livingston, 2010). A student with a learning disability who has difficulty processing written language or mathematical computations due to cognitive differences are held to the same standards on norm-referenced test which by their very nature are designed to test understanding of concepts targeted to the general population regardless of the needs of some learners for individualized, special instruction (Livingston, 2010).

Jackson (2014) studied the impact of an art-based curriculum to increase academic comprehension in students with learning disabilities. Jackson (2014) stated that children involved with art-related activities are encouraged to be more creative and develop problem-solving and motor skills that are useful in academics such as mathematics, science, and language. In her small research study, 16 fifth- and sixth-grade students with learning disabilities were divided into two groups of eight each. One group was taught a set of lessons using hands-on art-based instruction. The second group was taught the same material through traditional teaching methods, including books, worksheets, discussions, and lectures. Both groups were administered a pre-test and a post-test after completing the unit. The group taught with the art-based instruction scored 23% higher on the post-test than the traditionally taught group of students. Not only did the art instruction group complete the task with higher scores, but they also demonstrated more attentive and enthusiastic attitudes towards learning (Jackson, 2014).

Heninger (2017) conducted a study in a western Wisconsin high school with 233 participants taking the ACT Aspire test. Participants of the study were divided into two groups; those who were enrolled in instrumental music and those who were not enrolled.

The primary independent variable was enrollment in instrumental music. Other independent variables were gender, race and ethnicity, enrollment in special education, and poverty. The dependent variables were the ACT Aspire composite, writing, English, science, reading, and math scores. The findings of Heninger's study showed that female students obtained the highest composite scores while those with free and reduced lunch and students with learning disabilities scored at the bottom. Overall, race and gender demonstrated little significant difference in the ACT Aspire test scores. Conversely, students enrolled in the free and reduced lunch program or special education showed significantly lower scores. When the study of instrumental music was factored into the test results, those who participated in instrumental music provided a significant statistical boost to the participant's scores, especially in English, science, and mathematics. "Among all of the independent variables tested in the study, none made a statically significant positive contribution that was larger than instrumental music study alone" (Heninger, 2017, p. 39).

Specific research regarding instrumental music participation and students with learning disabilities is scant in existing research. Articles and available research studies seldom reference comparisons between achievement scores of students identified as learning disabled to other students with learning disabilities, nor do they compare students with learning disabilities to their non-disabled counterparts. Therefore, this research will add valuable data for discussions.

Summary

Chapter 2 considered the historical beginnings of teaching instrumental music and the development of the pull-out method of scheduling, which predominantly occurs at the

elementary level. The review of literature explored numerous studies regarding the academic achievement of students involved in instrumental music spanning the last fifty years. Current education leaders are focused on the needs of every student, especially those who may have more challenges with academic endeavors. Throughout the literature review, it was noted that students coming from low SES backgrounds struggle to achieve academic success compared to students from more affluent backgrounds. There was no research examined that dealt specifically with the academic achievement of students identified as learning disabled who were involved in instrumental music. Therefore, it was deemed important to study low SES students enrolled in pull-out instrumental music and provide findings for students with learning disabilities enrolled in instrumental music. Included in Chapter 3 are the methodology used for the study: the research design, selection of the participants, the measurement, and the data collection procedures. Additionally, the data analysis and hypothesis testing are described, as well as the limitations of the study.

Chapter 3

Methods

The first purpose of this study was to determine if there was a difference in the academic achievement of fifth- and sixth-grade students enrolled in instrumental music, as measured by the NWEA MAP Mathematics and Reading score growth (fall to spring) between all fifth- and sixth-grade students, low SES students, and students identified as learning disabled during the 2018-2019 academic year. The second purpose of this study was to determine if there was a difference in the academic achievement of fifth- and sixth-grade students enrolled in pull-out instrumental music instruction, as measured by the Kansas Mathematics and ELA Assessments for all students, low SES students, and students identified as learning disabled during the 2018-2019 academic year. Included in this chapter are the research design, selection of participants, measurement, data collection procedures, data analysis and hypothesis testing, and limitations.

Research Design

A quasi-experimental design using archival data was utilized for this study. According to Creswell (2014), this design is appropriate when archival data is used from tests that have already been administered, and a comparison of two independent groups takes place. The independent variable was participation in pull-out instrumental music instruction. The dependent variables were the NWEA MAP Mathematics and Reading Assessment score growth (fall to spring) and the Kansas Mathematics and ELA Assessment scores. These variables would be compared for the group as a whole, and for the sub-groups of low SES students and the students identified as learning disabled.

Selection of Participants

The population for this study was the fifth- and sixth-grade students in District S, a Midwestern suburban district during the 2018-2019 school year. Purposive sampling was used to identify participants. Lunenburg and Irby (2008) defined purposive sampling as sample selection based on the researcher's experience or knowledge of the group to be sampled and its fit to the study. Fifth- and sixth-grade students with fall and spring NWEA MAP Mathematics and Reading Assessment scores, as well as Kansas Mathematics and ELA Assessment scores, were included in the sample.

Measurement

Students in District S take two achievement tests. The NWEA MAP Assessment scores provide feedback about student growth over the school year, and the Kansas Assessment scores indicate mastery of content. These tests are used to better understand the growth of the student as well as the class or school. The NWEA MAP assessment provides information about an individual student's growth from one test score to the next (Fleming, 2016). The Kansas Assessment scores are judged against a standard or norm for all students in Kansas.

NWEA MAP Assessment. For this study, the mathematics and reading portions of the NWEA MAP assessment were used. In the mathematics assessment, there are thirteen areas that the NWEA MAP assessment measures: computation base ten, computation fractions and rational numbers, data and statistics, equivalence and properties, graphs and functions, length, area volume and coordinate geometry, number sense base ten, number sense fractions, rational numbers and irrational, probability, problem solving, fractions and ratios, shapes, attributes, congruence and similarity, solving problems, equations, and inequalities, working with units including degrees.

There are five strands in the reading assessments: word recognition and vocabulary, reading comprehension - literal, reading comprehension- inferential/interpretive, reading comprehension - evaluation, and literary response. Each test contains approximately 52 questions and is not timed. It is an adaptive test meaning that it adjusts to the student's responses providing more difficult problems if the student is successfully answering the provided questions and easier problems if the student is struggling, thus determining the level of understanding and achievement (NWEA, 2017).

Validity is the degree to which an instrument measures what it is intended to measure (Lunenburg & Irby, 2008). Most of the documented validity evidence for NWEA assessments comes in the form of concurrent validity. This form of validity is expressed in the form of a Pearson correlation coefficient by comparing the scores from the NWEA MAP to other established tests in the same subject area (see Table 1). Strong concurrent validity is indicated when the correlations are in the mid .80s or higher (NWEA, 2016).

Table 1

Concurrent Validity Statistics from NWEA – Compared to Stanford Achievement Test 9th Ed. 2001, Spring Term

Content Area	Sample Size	Correlation Coefficient
Grade 5 Reading	7,724	.86
Grade 6 Reading	3,832	.86
Grade 5 Mathematics	7,794	.87
Grade 6 Mathematics	3,834	.88

Note. Adapted from: *Reliability and Validity Estimates: NWEA Achievement Level Tests and the Measure of Academic Progress,* by Northwest Evaluation Association, 2004, Lake Oswego, Oregon.

NWEA combined test-retest reliability and a type of parallel forms reliability and increased the time period between the two tests. The NWEA retest time frames are spread across seven to twelve months, and the retest is not the same test, but rather one that is comparable to the first, in content and structure, but differing in the difficulty of the items (NWEA, 2004). Given those two factors, "months separating the administration of the tests and comparable (but not identical) test forms, it would not seem unreasonable to expect reliability to drop below .80" (NWEA, 2004, p. 2). However, as evidenced in Table 2, that is not the case. The data shows that the NWEA MAP test is a valid and reliable instrument for measuring student achievement.

Table 2

NWEA Test-Retest Reliability Statistics: 2002 Fall to Spring

Content Area	Sample Size	Correlation Coefficient
Grade 5 Reading	55,451	.91
Grade 6 Reading	52,257	.91
Grade 5 Mathematics	56,500	.91
Grade 6 Mathematics	54,325	.93

Note. Adapted from: *Reliability and Validity Estimates: NWEA Achievement Level Tests and the Measure of Academic Progress,* by Northwest Evaluation Association, 2004, Lake Oswego, Oregon.

Kansas Assessment Program (KAP). The University of Kansas Achievement and Assessment Institute (2017) indicated that the KAP "includes a variety of tests aligned to Kansas' content standards, which help educators and policymakers evaluate student learning and meet the requirements for federal and state accountability" (para. 1). The KAP has undergone extensive development and testing to ensure its validity and reliability. All assessment items are developed and aligned with the Kansas College and Career Ready Standards (KCCRS), and creation of test questions are developed with well-established procedures and criteria. The Kansas Mathematics Assessment measures achievement in five areas in fifth-grade: ratios and proportional relationships, number system, expressions and equations, geometry, and statistics and probability. In sixth-grade, the Kansas Mathematics Assessment measures achievement in operations and algebraic thinking, number, and operations – base ten, number and operations – fractions, measurement and data, and geometry. On the ELA Assessment, both fifth- and sixth-grade areas of assessment include: reading literary and informational texts and writing effectively for a range of purposes and audiences. Test takers are under no time

constraints to complete the test. (University of Kansas Achievement & Assessment Institute, 2017).

Evidence of content validity for the KAP depends upon the alignment of the KAP to the KCCRS and between the test and test blueprint. After tests are developed, they undergo multiple rounds of content and bias reviews. After being field tested, the statistical properties are reviewed. To be selected for operational use, they must pass content, psychometric, and KSDE review. Tests are also administered according to standardized procedures. To assess reliability, KAP has used Cronbach's alpha (see Table 3). Reliabilities of ELA and mathematics tests are above .90. Therefore, the Kansas ELA and Mathematics Assessments are considered valid and reliable (University of Kansas Achievement & Assessment Institute, 2017).

Table 3

Kansas Assessment Test Reliability by Grade and Subject

Grade	ELA	Mathematics
5	.91	.95
6	.91	.94

Note. Adapted from the "*KAP Technical Manual 2016*," University of Kansas Achievement & Assessment Institute, January 2017, Lawrence, Kansas.

Designations of learning disabled and low SES. In District S, students who have been identified as learning disabled have undergone an extensive process of identification. A school improvement team (SIT), teachers, and a school psychologist all work together collecting data including KS Assessment, NWEA MAP, and Dibels scores along with looking at at-risk indicators, second language acquisition, frequent moves and more. If a student is diagnosed with a learning disability, it is designated in the student's

records, and an Individual Development Plan (IEP) is created stating the learning disability and needed interventions (District S. principal, personal communication, June 6, 2019).

The US Department of Agriculture (USDA) has specified that "children from families with incomes at or below 130% of the Federal poverty level are eligible for free meals. Those with incomes between 130% and 185% of the Federal poverty level are eligible for reduced price meals" (USDA, 2017, p. 2). District S uses this guideline to determine students who are eligible for free or reduced lunch.

Data Collection Procedures

Before collecting the data, the researcher submitted the IRB form to Baker University on June 8, 2019. The IRB was approved on June 13, 2019 (see Appendix A). The researcher submitted the Regulations and Procedures for Research Projects form to District S on June 19, 2019 (see Appendix B). After permission to conduct the research had been granted, the researcher requested the data from District S's assessment and research department (see Appendix B). The data was collected and provided to the researcher on June 28, 2019 in a Microsoft Excel spreadsheet.

Data Analysis and Hypothesis Testing

This study utilized quantitative, archival data from District S. Once the Microsoft Excel spreadsheet of data was compiled and received, it was imported into IBM SPSS Statistics Faculty Pack 25 for Windows. Independent-samples *t* tests were chosen to analyze the data because "a mean from one group is compared with a mean from another group to determine the probability that the corresponding population means are different" (Lunenburg & Irby, 2008, p. 70). As part of the data collection, data were gathered based

on whether students had been identified by the district using the USDA guidelines as low SES, and those having an Individual Educational Plan (IEP) with a learning disability. The SES and IEP status information was used to create subsamples for the analysis used to address RQ2, RQ3, RQ5, RQ6, RQ8, RQ9, RQ11, and RQ12.

RQ1. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H1. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H1. The two sample means, the average NWEA MAP Mathematics Assessment score growth for fifth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H2. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H2. The two sample means, the average NWEA MAP Mathematics Assessment score growth for sixth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment

score growth for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ2. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H3. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H3. The two sample means, the average NWEA MAP Mathematics Assessment score growth for low SES fifth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth for low SES fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H4. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H4. The two sample means, the average NWEA MAP Mathematics Assessment score growth for low SES sixth-grade

students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ3. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

***H5*.** There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H5. The two sample means, the average NWEA MAP Mathematics Assessment score growth for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth for fifth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

***H6*.** There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between sixth-grade students identified as learning disabled enrolled in

instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H6. The two sample means, the average NWEA MAP Mathematics Assessment score growth for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ4. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H7. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H7. The two sample means, the average NWEA MAP Reading Assessment score growth for fifth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H8. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H8. The two sample means, the average NWEA MAP Reading Assessment score growth for sixth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ5. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H9. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H9. The two sample means, the average NWEA MAP Reading Assessment score growth for low SES fifth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for low SES fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H10. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H10. The two sample means, the average NWEA MAP Reading Assessment score growth for low SES sixth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ6. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

H11. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H11. The two sample means, the average NWEA MAP Reading Assessment score growth for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for fifth-grade students identified as learning disabled who were not enrolled in instrumental music, were

compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H12. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between sixth-grade students identified as learning disabled enrolled in instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H12. The two sample means, the average NWEA MAP Reading Assessment score growth for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ7. To what extent is there a difference in Kansas Mathematics Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H13. There is a difference in Kansas Mathematics Assessment scores between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H13. The two sample means, the average Kansas Mathematics Assessment scores for fifth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment scores

for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H14. There is a difference in Kansas Mathematics Assessment scores between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H14. The two sample means, the average Kansas Mathematics Assessment scores for sixth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment scores for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ8. To what extent is there a difference in Kansas Mathematics Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H15. There is a difference in Kansas Mathematics Assessment scores between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2017-2018 school year.

An independent-samples *t* test was conducted to test H15. The two sample means, the average Kansas Mathematics Assessment score for low SES fifth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment score for low SES fifth-grade students not enrolled in instrumental music, were

compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H16. There is a difference in Kansas Mathematics Assessment scores between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2017-2018 school year.

An independent-samples *t* test was conducted to test H16. The two sample means, the average Kansas Mathematics Assessment score for low SES sixth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment score for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ9. To what extent is there a difference in Kansas Mathematics Assessment scores between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

H17. There is a difference in Kansas Mathematics Assessment scores between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H17. The two sample means, the average Kansas Mathematics Assessment score for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas Mathematics Assessment score for fifth-grade students identified as learning

disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H18. There is a difference in Kansas Mathematics Assessment scores between sixth-grade students identified as learning disabled enrolled in instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H18. The two sample means, the average Kansas Mathematics Assessment score for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas Mathematics Assessment score for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ10. To what extent is there a difference in Kansas ELA Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H19. There is a difference in Kansas ELA Assessment scores between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H19. The two sample means, the average Kansas ELA Assessment scores for fifth-grade students enrolled in

instrumental music and the average Kansas ELA Assessment scores for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H20. There is a difference in Kansas ELA Assessment scores between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H20. The two sample means, the average Kansas ELA Assessment scores for sixth-grade students enrolled in instrumental music and the average Kansas ELA Assessment scores for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ11. To what extent is there a difference in Kansas ELA Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H21. There is a difference in Kansas ELA Assessment scores between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H21. The two sample means, the average Kansas ELA Assessment score for low SES fifth-grade students enrolled in instrumental music and the average Kansas ELA Assessment score for low SES fifth-grade students not enrolled in instrumental music, were compared. The level of

significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H22. There is a difference in Kansas ELA Assessment scores between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H22. The two sample means, the average Kansas ELA Assessment score for low SES sixth-grade students enrolled in instrumental music and the average Kansas ELA Assessment score for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

RQ12. To what extent is there a difference in Kansas ELA Assessment scores between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

H23. There is a difference in Kansas ELA Assessment scores between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H23. The two sample means, the average Kansas ELA Assessment score for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas ELA Assessment score for fifth-grade students identified as learning disabled who were not

enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

H24. There is a difference in Kansas ELA Assessment scores between sixth-grade students identified as learning disabled enrolled in instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H24. The two sample means, the average Kansas ELA Assessment score for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas ELA Assessment score for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

Limitations

Lunenburg and Irby (2008) defined limitations as "factors that may have an effect on the interpretation of the findings or on the generalizability of the results" (p. 133). The researcher could not control the quality of teaching from classroom to classroom, nor the number of absences for students; thus, accounting for gaps in learning and potential test score differences. Additional factors beyond the scope of control of this study were the amount of home encouragement, study habits, or tutoring by older siblings or parents or the benefits of after-school tutoring programs and their effects on test scores. Sixth grade students not enrolled in instrumental music may contain students who did participate in instrumental pull-out class instruction the previous year, thus skewing the not-enrolled in instrumental music data. Evidence exists showing high academic

achievers are more likely to be involved in instrumental music, as well as children from two-parent families or students with a higher SES background (Kinney, 2008). Social and cultural influences were beyond the scope of control for this study, as well. Some cultures place a higher value on different styles of music or education (Guhn et al., 2019). Additionally, the social contexts of students and parents can be an influence on children's desire to be involved in instrumental music (Dryden, 1992). Data was not collected determining the instruction students in this study may have been missing.

Summary

In this chapter, the research design was described. The participants were fifth- and sixth-grade students from District S, a suburban Midwestern city. Since students in this district take two different types of tests, the results of both assessments were utilized to provide more robust comparisons. One is an adaptive test, the NWEA MAP, which measures the student progress and is not referenced to other students. The second is the Kansas State Assessment, a norm-referenced test. Data collection methods were identified, and finally, the research questions were restated with appropriate hypothesis testing procedures followed by the study's limitations. Chapter 4 includes the results of the hypothesis testing.

Chapter 4

Results

The purpose of this study was to determine whether there was a difference in the academic achievement of fifth- and sixth-graders who are involved in pull-out instrumental music and fifth- and sixth-graders who are not involved in instrumental music for the 2018-2019 academic years. To measure academic achievement, data was gathered from District S from the NWEA MAP Mathematics and Reading tests as well as the Kansas Mathematics and ELA Assessments. Additional variables were the student's SES status and whether a student was categorized as learning disabled.

Descriptive Statistics

SSPS software was used to calculate the mean and standard deviations for the data collected from District S. The following table provides information for how many students were involved in instrumental music at the elementary level and those who were not enrolled in instrumental music, as well as the students' SES status and the number of students identified as having a learning disability involved in the study at the elementary level in District S during the 2018-2019 school year (see Table 4).

Table 4

Participant Demographics

Variable	Fifth grade	Sixth Grade
Instrumental Music		
Enrolled	972	662
Not Enrolled	1,205	1,348
SES		
Free/Reduced Lunch	804	718
Full Pay Lunch	1,373	1,292
Learning Disability		
With	205	163
Without	1,972	1,847
Total Students	2,177	2,010

Hypothesis Testing

The results of the hypothesis testing are included below. An independent-samples *t* test was used to analyze the data because a mean from one group was compared with a mean from another group to determine if they are different. Each research question is presented, followed by the associated hypothesis, analysis used, and the results of the hypothesis testing.

RQ1. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H1. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H1. The two sample means, the average NWEA MAP Mathematics Assessment score growth for fifth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth (fall to spring) for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(2055) = -.58$, $p = .565$. The average NWEA MAP Mathematics Assessment score growth (fall to spring) is not different between fifth-grade students enrolled in instrumental music ($M = 12.03$, $SD = 7.31$) and fifth-grade students not enrolled in instrumental music ($M = 11.84$, $SD = 7.54$). H1 was not supported.

H2. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H2. The two sample means, the average NWEAMAP Mathematics Assessment score growth (fall to spring) for sixth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth (fall to spring) for sixth-grade students not enrolled in

instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(1892) = -1.30$, $p = .20$. The average NWEA MAP Mathematics Assessment score growth (fall to spring) is not different between fifth-grade students enrolled in instrumental music ($M = 11.28$, $SD = 7.02$) and fifth-grade students not enrolled in instrumental music ($M = 10.84$, $SD = 7.01$). H2 was not supported.

RQ2. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H3. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H3. The two sample means, the average NWEA MAP Mathematics Assessment score growth (fall to spring) for low SES fifth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth (fall to spring) for low SES fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(742) = -0.24$, $p = .82$. The average NWEA MAP Mathematics Assessment score growth (fall to spring) is not different between low SES fifth-grade students enrolled in instrumental music ($M = 10.60$, $SD = 7.46$) and low SES fifth-grade students not enrolled in instrumental music ($M = 10.47$, $SD = 7.38$). H3 was not supported.

H4. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H4. The two sample means, the average NWEA MAP Mathematics Assessment score growth (fall to spring) for low SES sixth-grade students enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth (fall to spring) for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(663) = -1.39$, $p = .17$. The average NWEA MAP Mathematics Assessment score growth (fall to spring) is not different between low SES sixth-grade students enrolled in instrumental music ($M = 10.80$, $SD = 7.16$) and low SES sixth-grade students not enrolled in instrumental music ($M = 9.98$, $SD = 6.78$). H4 was not supported.

RQ3. To what extent is there a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

***H5*.** There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H5. The two sample means, the average NWEA MAP Mathematics Assessment score growth (fall to spring) for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth (fall to spring) for fifth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(156) = 2.05$, $p = .042$. The average NWEA MAP Mathematics Assessment score growth (fall to spring) for fifth-grade students identified as learning disabled enrolled in instrumental music ($M = 6.86$, $SD = 7.70$) is less than the average NWEA MAP Mathematics Assessment score growth (fall to spring) for fifth-grade students identified as learning disabled not enrolled in instrumental music ($M = 9.72$, $SD = 8.30$). H5 was supported. The effect size, as

indexed by Cohen's *d*, indicated that the two means were .35 standard deviations apart. This is considered a medium effect.

H6. There is a difference in NWEA MAP Mathematics Assessment score growth (fall to spring) between sixth-grade students identified as learning disabled enrolled in instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H6. The two sample means, the average NWEA MAP Mathematics Assessment score growth (fall to spring) for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Mathematics Assessment score growth (fall to spring) for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(128) = -0.58$, $p = .57$. The average NWEA MAP Mathematics Assessment score growth (fall to spring) is not different between sixth-grade students identified as learning disabled enrolled in instrumental music ($M = 9.16$, $SD = 7.12$) and sixth-grade students identified as learning disabled not enrolled in instrumental music ($M = 8.23$, $SD = 8.07$). H6 was not supported.

RQ4. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H7. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H7. The two sample means, the average NWEA MAP Reading Assessment score growth (fall to spring) for fifth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(2031) = 1.74$, $p = .08$. The average NWEA MAP Reading Assessment score growth (fall to spring) is not different between fifth-grade students enrolled in instrumental music ($M = 6.39$, $SD = 7.59$) and fifth-grade students not enrolled in instrumental music ($M = 7.00$, $SD = 8.16$). H7 was not supported.

H8. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H8. The two sample means, the average NWEA MAP Reading Assessment score growth (fall to spring) for sixth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth (fall to spring) for sixth-grade students not enrolled in

instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(1881) = 0.19$, $p = .85$. The average NWEA MAP Reading Assessment score growth (fall to spring) is not different between sixth-grade students enrolled in instrumental music ($M = 5.70$, $SD = 7.34$) and sixth-grade students not enrolled in instrumental music ($M = 5.77$, $SD = 7.67$). H8 was not supported.

RQ5. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H9. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H9. The two sample means, the average NWEA MAP Reading Assessment score growth (fall to spring) for low SES fifth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth (fall to spring) for low SES fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(731) = 1.29$, $p = .20$. The average NWEA MAP Reading Assessment score growth (fall to spring) is not different between low SES fifth-grade students enrolled in instrumental music ($M = 6.68$, $SD = 8.30$) and low SES fifth-grade students not enrolled in instrumental music ($M = 7.51$, $SD = 8.55$). H9 was not supported.

H10. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H10. The two sample means, the average NWEA MAP Reading Assessment score growth (fall to spring) for low SES sixth-grade students enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth (fall to spring) for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(653) = .21$, $p = .83$. The average NWEA MAP Reading Assessment score growth (fall to spring) is not different between low SES sixth-grade students enrolled in instrumental music ($M = 6.20$, $SD = 8.27$) and low SES sixth-grade students not enrolled in instrumental music ($M = 6.35$, $SD = 8.16$). H10 was not supported.

RQ6. To what extent is there a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

H11. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H11. The two sample means, the average NWEA MAP Reading Assessment score growth (fall to spring) for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth (fall to spring) for fifth-grade students identified as learning disabled who were not enrolled in instrumental music were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(159) = .47$, $p = .64$. The average NWEA MAP Reading Assessment score growth (fall to spring) is not different between fifth-grade students identified as learning disabled enrolled in instrumental music ($M = 6.69$, $SD = 12.50$) and fifth-grade students identified as learning disabled not enrolled in instrumental music ($M = 7.65$, $SD = 12.13$). H11 was not supported.

H12. There is a difference in NWEA MAP Reading Assessment score growth (fall to spring) between sixth-grade students identified as learning disabled enrolled in

instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H12. The two sample means, the average NWEA MAP Reading Assessment score growth (fall to spring) for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average NWEA MAP Reading Assessment score growth (fall to spring) for sixth-grade students identified as learning disabled who were not enrolled in instrumental music were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(126) = -0.07$, $p = .95$. The average NWEA MAP Reading Assessment score growth (fall to spring) is not different between sixth-grade students identified as learning disabled enrolled in instrumental music ($M = 6.81$, $SD = 11.62$) and sixth-grade students identified as learning disabled not enrolled in instrumental music ($M = 6.66$, $SD = 9.77$). H12 was not supported.

RQ7. To what extent is there a difference in Kansas Mathematics Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

***H13*.** There is a difference in Kansas Mathematics Assessment scores between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H13. The two sample means, the average Kansas Mathematics Assessment scores for fifth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment scores for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(2101) = -5.79$, $p = .00$. The average Kansas Mathematics Assessment score for fifth-grade students enrolled in instrumental music ($M = 303.29$, $SD = 28.71$) is higher than the Kansas Mathematics Assessment score for fifth-grade students not enrolled in instrumental music ($M = 295.78$, $SD = 30.33$). H13 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .25 standard deviations apart. This is considered a medium effect.

***H14*.** There is a difference in Kansas Mathematics Assessment scores between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H14. The two sample means, the average Kansas Mathematics Assessment scores for sixth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment scores for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(1941) = -5.73$, $p = .00$. The average Kansas Mathematics Assessment score for sixth-grade students enrolled in instrumental music ($M = 310.01$, $SD = 32.60$) is higher than the Kansas Mathematics Assessment score for sixth-grade students not enrolled in instrumental music ($M = 301.16$, $SD = 32.12$). H14 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .27 standard deviations apart. This is considered a medium effect.

RQ8. To what extent is there a difference in Kansas Mathematics Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H15. There is a difference in Kansas Mathematics Assessment scores between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2017-2018 school year.

An independent-samples *t* test was conducted to test H15. The two sample means, the average Kansas Mathematics Assessment score for low SES fifth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment score low SES for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(773) = -3.31$, $p = .00$. The average

Kansas Mathematics Assessment scores for low SES fifth-grade students enrolled in instrumental music (M = 288.94, SD = 25.52) is higher than the Kansas Mathematics Assessment score for low SES fifth-grade students not enrolled in instrumental music (M = 282.97, SD = 23.81). H15 was supported. The effect size, as indexed by Cohen's d, indicated that the two means were .24 standard deviations apart. This is considered a medium effect.

H16. There is a difference in Kansas State Mathematics Assessment scores between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2017-2018 school year.

An independent-samples t test was conducted to test H16. The two sample means, the average Kansas Mathematics Assessment score for low SES sixth-grade students enrolled in instrumental music and the average Kansas Mathematics Assessment score for low SES sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's d, is reported.

The results of the independent-samples t test indicated there was a statistically significant difference between the two means, $t(686) = -2.29$, $p = .02$. The average Kansas Mathematics Assessment score for low SES sixth-grade students enrolled in instrumental music (M = 291.72, SD = 24.63) is higher than the Kansas Mathematics Assessment score for low SES sixth-grade students not enrolled in instrumental music (M = 286.79, SD = 25.43). H16 was supported. The effect size, as indexed by Cohen's d, indicated that the two means were .2 standard deviations apart. This is considered a small effect.

RQ9. To what extent is there a difference in Kansas Mathematics Assessment scores between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

H17. There is a difference in Kansas Mathematics Assessment scores between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H17. The two sample means, the average Kansas e Mathematics Assessment score for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas Mathematics Assessment score for fifth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was not a statistically significant difference between the two means, $t(166) = -0.82$, $p = .41$. The average Kansas Mathematics Assessment score is not different between fifth-grade students identified as learning disabled enrolled in instrumental music ($M = 274.73$, $SD = 24.95$) and fifth-grade students identified as learning disabled not enrolled in instrumental music ($M = 271.33$, $SD = 24.66$). H17 was not supported.

H18. There is a difference in Kansas Mathematics Assessment scores between sixth-grade students identified as learning disabled enrolled in instrumental music and

sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H18. The two sample means, the average Kansas Mathematics Assessment score for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas Mathematics Assessment score for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(130) = -2.04$, $p = .04$. The average Kansas Mathematics Assessment score for sixth-grade students identified as learning disabled enrolled in instrumental music ($M = 283.19$, $SD = 26.63$) is higher than the Kansas Mathematics Assessment score for sixth-grade students identified as learning disabled not enrolled in instrumental music ($M = 273.02$, $SD = 23.83$). H18 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .42 standard deviations apart. This is considered a medium effect.

RQ10. To what extent is there a difference in Kansas ELA Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H19. There is a difference in Kansas ELA Assessment scores between fifth-grade students enrolled in instrumental music and fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H19. The two sample means, the average Kansas ELA Assessment scores for fifth-grade students enrolled in instrumental music and the average Kansas ELA Assessment scores for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(2103) = -7.34$, $p = .00$. The average Kansas ELA Assessment score for fifth-grade students enrolled in instrumental music ($M = 308.87$, $SD = 29.43$) is higher than the Kansas ELA Assessment score for fifth-grade students not enrolled in instrumental music ($M = 299.15$, $SD = 30.96$). H19 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .32 standard deviations apart. This is considered a medium effect.

H20. There is a difference in Kansas ELA Assessment scores between sixth-grade students enrolled in instrumental music and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H20. The two sample means, the average Kansas ELA Arts Assessment scores for sixth-grade students enrolled in instrumental music and the average Kansas ELA Assessment scores for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(1943) = -6.32$, $p = .00$. The average Kansas ELA Assessment score for sixth-grade students enrolled in instrumental music ($M = 305.34$, $SD = 28.64$) is higher than the Kansas ELA Assessment score for sixth-grade students not enrolled in instrumental music ($M = 296.44$, $SD = 29.83$). H20 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .3 standard deviations apart. This is considered a medium effect.

RQ11. To what extent is there a difference in Kansas ELA Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year?

H21. There is a difference in Kansas ELA Assessment scores between low SES fifth-grade students enrolled in instrumental music and low SES fifth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H21. The two sample means, the average Kansas ELA Assessment score for fifth-grade students enrolled in instrumental music and the average Kansas ELA Assessment score for fifth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(773) = -4.22$, $p = .00$. The average Kansas ELA Assessment score for low SES fifth-grade students enrolled in instrumental music ($M = 292.79$, $SD = 27.62$) is higher than the Kansas ELA Assessment score for low

SES fifth-grade students not enrolled in instrumental music (M = 284.30, SD = 27.14). H21 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .31 standard deviations apart. This is considered a medium effect.

H22. There is a difference in Kansas ELA Assessment scores between low SES sixth-grade students enrolled in instrumental music and low SES sixth-grade students not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H22. The two sample means, the average Kansas ELA Assessment score for sixth-grade students enrolled in instrumental music and the average Kansas ELA Assessment score for sixth-grade students not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(686) = -3.83$, $p = .00$. The average Kansas ELA Assessment score for low SES sixth-grade students enrolled in instrumental music (M = 290.31, SD = 24.35) is higher than the Kansas ELA Assessment score for low SES sixth-grade students not enrolled in instrumental music (M = 281.82, SD = 26.52). H22 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .33 standard deviations apart. This is considered a medium effect.

RQ12. To what extent is there a difference in Kansas ELA Assessment scores between fifth- and sixth-grade students identified as learning disabled enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year?

H23. There is a difference in Kansas ELA Arts Assessment scores between fifth-grade students identified as learning disabled enrolled in instrumental music and fifth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H23. The two sample means, the average Kansas ELA Assessment score for fifth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas ELA Assessment score for fifth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(166) = -2.00$, $p = .05$. The average Kansas ELA Arts Assessment score for fifth-grade students identified as learning disabled enrolled in instrumental music ($M = 277.69$, $SD = 28.51$) is higher than the Kansas ELA Assessment score for fifth-grade students identified as learning disabled not enrolled in instrumental music ($M = 268.51$, $SD = 27.01$). H23 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .33 standard deviations apart. This is considered a medium effect.

H24. There is a difference in Kansas ELA Assessment scores between sixth-grade students identified as learning disabled enrolled in instrumental music and sixth-grade students identified as learning disabled not enrolled in instrumental music during the 2018-2019 school year.

An independent-samples *t* test was conducted to test H24. The two sample means, the average Kansas ELA Assessment score for sixth-grade students identified as learning disabled who were enrolled in instrumental music and the average Kansas ELA Assessment score for sixth-grade students identified as learning disabled who were not enrolled in instrumental music, were compared. The level of significance was set at .05. When appropriate, an effect size, as indexed by Cohen's *d*, is reported.

The results of the independent-samples *t* test indicated there was a statistically significant difference between the two means, $t(130) = -2.13$, $p = .04$. The average Kansas ELA Assessment score for sixth-grade students identified as learning disabled enrolled in instrumental music ($M = 277.91$, $SD = 30.12$) is higher than the Kansas ELA Assessment score for sixth-grade students identified as learning disabled not enrolled in instrumental music ($M = 266.50$, $SD = 25.108$). H24 was supported. The effect size, as indexed by Cohen's *d*, indicated that the two means were .43 standard deviations apart. This is considered a medium effect.

Summary

Chapter 4 began with descriptive statistics of the sample from District S used in this study. Following were the results of the data analysis and the hypothesis testing for the research questions related to the pull-out instrumental music instruction of fifth- and sixth-grade students in District S. Chapter 5 includes a summary of the study, findings related to the literature, and the conclusions.

Chapter 5

Interpretation and Recommendations

Throughout the United States, students are regularly pulled-out of elementary classrooms for instrumental music instruction. Sometimes parents, teachers, and administrators are concerned that students missing instruction will be hindered academically and not be able to perform as well on local and state tests as their peers who are not missing instruction. Included in this chapter are the study summary, the findings related to the literature, and the conclusions.

Study Summary

This section provides a summary of the current study. Information is included regarding an overview of the problem and the purpose statement and the research questions. Finally, a review of the methodology and the major findings of the study are presented.

Overview of the problem. Some regular classroom teachers and building principals are opponents to pull-out instrumental music instruction, fearing that the students fall behind their peers academically (Cox, 2001; Engdahl, 1994; Moore, 2012). A concern has been expressed that low SES students and students with learning disabilities were being harmed academically when being pulled from regular classroom instruction. While there is a plethora of evidence supporting lack of negative impact of pull-out instructional models on student's academic achievement, relatively few studies focused on low SES students and none could be referenced, at the time of this study, regarding students with learning disabilities (Cardarelli, 2003; Guhn et al., 2019; Heninger, 2017; Little, 2015; Moore, 2012; Zanutto, 1997).

Purpose statement and research questions. The first purpose of this study was to determine if there is a difference in mathematics score growth and reading score growth (fall to spring) as measured by the NWEA MAP assessment between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The second purpose of this study was to determine if there is a difference in NWEA MAP mathematics score growth and reading score growth (fall to spring) between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The third purpose of this study was to determine if there is a difference in NWEA MAP mathematics score growth and reading score growth (fall to spring) between fifth- and sixth-grade students identified as learning disabled and enrolled in instrumental music and fifth- and sixth-grade students identified as learning disabled and not enrolled in instrumental music during the 2018-2019 school year. The fourth purpose of this study was to examine if there is a difference in Kansas Mathematics Assessment scores and ELA Assessment scores between fifth- and sixth-grade students enrolled in instrumental music and fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The fifth purpose was to determine if there is a difference in Kansas Mathematics Assessment scores and ELA Assessment scores between low SES fifth- and sixth-grade students enrolled in instrumental music and low SES fifth- and sixth-grade students not enrolled in instrumental music during the 2018-2019 school year. The final purpose was to determine if there is a difference in Kansas Mathematics Assessment scores and ELA scores between fifth- and sixth-grade students identified as learning disabled and enrolled

in instrumental music and fifth- and sixth-grade students identified as learning disabled and not enrolled in instrumental music during the 2018-2019 school year. To address the purposes of this study, 12 research questions were developed with 24 corresponding hypotheses tested.

Review of the methodology. A quasi-experimental design using archival data was utilized for this study. All fifth- and sixth-grade students enrolled in District S during the academic year 2018-2019 who took the Kansas State Assessments and NWEA MAP Assessments were included. Two subgroups were also identified and compared: students identified as low SES and students identified as learning disabled. One-sample *t* tests were utilized to test the hypotheses. Cohen's *d* was used to determine the effect size when a significant difference in the means was observed.

Major findings. The results of the hypothesis testing were mixed with regard to the effect of enrollment in pull-out instrumental music on academic achievement. The results of the data analysis of NWEA MAP Mathematics and Reading Assessment score growth, indicated no significant difference in scores between fifth- and sixth-grade students participating in pull-out instrumental music instruction and fifth- and sixth-grade students not participating in pull-out instrumental music instruction with one exception. Fifth-grade students identified as learning disabled who were enrolled in pull-out instrumental music instruction showed significantly less growth than fifth-grade students identified as learning disabled who were not enrolled in pull-out instrumental music instruction.

The results of the hypotheses testing related to the Kansas Mathematics and ELA Assessment scores indicated that fifth- and sixth-grade students and low SES students

participating in instrumental music instruction pulled from their regular classroom significantly outscored their counterparts who were not enrolled in pull-out instrumental music instruction. In contrast, the results for fifth-grade students identified as learning disabled and enrolled in pull-out instrumental music instruction were not different from their peers not enrolled in pull-out instrumental music instruction.

Findings Related to the Literature

This section examines the current study's findings as they relate to the literature considering the academic achievement of fifth- and sixth-grade students pulled out of their regular classroom for instrumental music instruction compared to fifth- and sixth-grade students not enrolled in instrumental music. Also, under consideration were students identified as low SES and students identified as learning disabled. There were no prior studies that could be identified for comparison of the impact on achievement for fifth- and sixth-grade students pulled out of their regular classroom for instrumental music instruction related to students identified as learning disabled.

Some researchers have shown support for pull-out music instruction by demonstrating that missing classroom instruction has no significant negative impact on learning compared to those not missing instruction (Cox, 2001; Davenport, 2010; Engdahl, 1994; Kvet, 1985; Saker, 1997; Schneider, 2000). The results of the current study support their findings with the NWEA MAP test results in mathematics and reading, except students identified as learning disabled. In the current study, fifth-grade students identified as learning disabled were at a distinct disadvantage in NWEA MAP Mathematics score growth falling behind their non-instrumental music counterparts by

almost three points. However, in sixth grade, there was no difference in NWEA MAP score growth in mathematics or reading for students identified as learning disabled.

Throughout the years there have been multiple studies touting the positive benefits of involvement in instrumental music programs on academic achievement (Balsinger, 2004; Blomquist, 2014; Dryden, 1992; Hash, 2011; Little, 2015; Moore, 2012; Oban, 2015; Ricketts, 2012; Robitaille & O'Neil, 1981; Zanutto, 1997). The results of the current study support their findings when comparing the Kansas Mathematics and ELA Assessment scores across the entire sample, students identified as low SES, and sixth-grade students identified as learning disabled. Results for students identified as learning disabled seemed inconsistent. On the NWEA MAP Mathematics assessment, fifth-grade students enrolled in instrumental music scored lower than their fifth-grade students with learning disabilities not involved in instrumental music. On the Kansas Mathematics Assessment, the same group of fifth-grade students identified as learning disabled enrolled in instrumental music did not show a significant gain in assessment scores above their peers not enrolled in instrumental music, although all other subgroups demonstrated significant gains for students enrolled in instrumental music over their peer groups not enrolled in instrumental music.

Previous research focused on the achievement of low SES students compared to their high SES peers (Balsinger, 2004; Cox, 2001; Dryden, 1992; Ricketts, 2012). The results of these studies determined that low SES students achieved at lower levels than their high SES peers. However, the results of the current study support the findings of Blomquist (2014) and Ricketts (2012) that low SES fifth- and sixth-grade students involved in instrumental music pull-out instruction performed no differently than their

non-instrumental music instruction peers on the NWEA MAP Mathematics and Reading Assessment. However, in the current study, they performed significantly better in the Kansas Mathematics and ELA Assessments.

There were no previous studies of students identified as learning disabled involved in fifth- and sixth-grade pull-out instrumental music programs. Therefore, comparisons were not able to be drawn. This research should serve as a benchmark for future studies in this area so that music, special education teachers, administrators, and parents can learn more about students with learning disabilities involved in band or string programs.

Conclusions

This section provides conclusions drawn from the current study regarding the impact of fifth- and sixth-grade pull-out instruction in instrumental music on the academic achievement of students in District S. Implications for action and future research are included. The section ends with concluding remarks.

Implications for action. The findings of this study, along with previous studies, should be shared with parents, teachers, and administrators detailing the positive benefits of instrumental music instruction. While music should be studied primarily as a creative and artful discipline, it can also provide positive benefits across the curriculum, including mathematics, language arts, and reading. Given the positive academic benefits to low SES students and students with learning disabilities, two populations that are considered at risk for failure and dropping out of school, these positive impacts should be maximized by making every effort to remove barriers to enrollment and involve as many of these at-risk populations as possible in instrumental music. Administrators and teachers of

elementary students, as well as parents, should be educated to the idea that pull-out instrumental music programs do not harm student's academic achievement, but rather can provide positive benefits. It is recommended that District S continues its pull-out instrumental music program, and efforts should be encouraged to include all students, including students identified as low SES and those with learning disabilities.

Recommendations for future research. Further research should be conducted in other regions of the country. Using different achievement tests would also add further insight into achievement through the use of different measuring instruments and score data. Additionally, further research should be performed comparing low SES instrumental music student's achievement to low SES students' achievement not enrolled in instrumental music. Guhn et al. (2019) suggested that students not currently studying music should start, therefore closing the achievement gap. In this study, the pull-outs were only twice a week. Further study should be undertaken measuring achievement for students pulled from their regular classroom instruction three to five times per week.

If achievement tests are measuring the abilities and understanding of students, it would seem there should be some overlap in results of the hypothesis testing, rather than the discrepancy between NWEA MAP growth scores (mostly no significant differences) and Kansas Assessment scores (mostly all significant differences). It could aid understanding of how the two tests arrive at their conclusions to research the correlations of their test questions and measurements. It would also be beneficial to process the same analysis using science and social studies achievement scores. It could be beneficial to examine achievement scores utilizing different delivery models than pull-outs from

classroom instruction such as before or after school or during a dedicated “specials” time so students would not miss core instruction.

Since there were no previous studies of students identified as learning disabled participating in instrumental music and their academic achievement, it would be beneficial to have more studies in this area. Instrumental music teachers have long touted the benefits of participating in instrumental music programs both artistically as well as academically. For students with special needs, the benefits of instrumental music study could go beyond the areas of mathematics and ELA into other subjects and social and emotional learning. Future studies could serve to broaden the understanding of the benefits of continued mainstreaming for students with disabilities into music performing ensembles at all levels. Studies focused on the academic achievement of students with specific learning disabilities involved in pull-out instrumental music instruction could prove beneficial to clearly understand the implications of that form of instruction on their disability category. It could also prove beneficial to survey students, parents, and teachers of students with learning disabilities involved in pull-out instrumental music instruction to determine their perceptions of the music instruction’s impact in other areas of learning such as task-focus, decision-making, sense of belonging and other areas.

Long-term studies following the same population from beginning pull-out instrumental music instruction through high school graduation could prove beneficial to determine overall gains for all three groups. Replicating this study in both urban and rural settings could also prove enlightening. Future studies could also control for parent’s highest education level attained since more educated parents may encourage or push their

students to achieve at higher levels than parents who did not graduate high school. Replicating the study in private schools might also present new information.

Concluding remarks. Music is a universal language. It has been created to communicate emotion, share history, and culture. Beyond its artistic benefits, it also has the potential to connect parts of the brain in unique manners, thus improving cognitive functions and aiding in other learning such as mathematics, language, and reading (Jackson, 2014; Livingston, 2010). Students who grow up in low socioeconomic conditions can benefit tremendously from the study of music as can students with learning disabilities. Every effort should be made to ensure all students, regardless of financial or cognitive ability, enjoy equal access to instrumental music education. Involvement in instrumental music not only provides academic benefits as supported by this study, but there are also emotional benefits that are achieved due to belonging to a positive peer group and creating beautiful art (Jackson, 2014).

Educators should take every opportunity to communicate these positive attributes to parents, teachers, administrators, and policymakers to ensure that instrumental music education is not diminished or minimized. Noting the positive benefits that can be obtained from instrumental music instruction, enrollment in an instrumental music ensemble should be encouraged and promoted. It should be encouraged as part of a well-rounded curriculum over multiple years as the benefits increase with the longevity of enrollment, including multiple classes per year (Guhn et al. 2019). Music is referenced multiple times in ESSA as part of a well-rounded education and is considered a core subject alongside mathematics, ELA, science, and social studies (NAfME, 2015). The

study of music, including pull-out instrumental music is important as an art form, but also for the academic benefits it can provide across the curriculum.

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Appendices

Appendix A: Baker IRB Approval Letter

Baker University Institutional Review Board

June 13th, 2019

Dear Bill Thomas and Susan Rogers,

The Baker University IRB has reviewed your project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at npoell@bakeru.edu or 785.594.4582.

Sincerely,

Nathan Poell, MA
Chair, Baker University IRB

Baker University IRB Committee
Scott Crenshaw
Erin Morris, PhD
Jamin Perry, PhD
Susan Rogers, PhD

Appendix B: District S Request for Data and Approval Letter

May 4, 2019

Greetings Dr. [redacted]

As you know I am pursuing my degree in Educational Leadership from Baker University. As part of the requirement for that degree, I am researching the effects of pull-out band and string instruction on fifth and sixth grade students Kansas State Assessment Mathematics and Reading test scores as well as MAP Assessment Mathematics and Reading scores. I wish to compare:

A. Students enrolled in instrumental music and those not enrolled in instrumental music
B. Students designated as low SES involved in instrumental music and low SES not involved in instrumental music
C. Students designated as learning disabled involved in instrumental music and those learning disabled not enrolled in instrumental music.

As part of my study, I am requesting the use of archival data from USD 512. The data should not be identified by student name or ID number. All data will be kept confidential and only seen by myself, my major professor and my research analyst. The data will be maintained in a secure format and will be destroyed after completion of the research and degree confirmation. The desired data format is an Excel spreadsheet. The data needing to be gathered is 2018-2019:

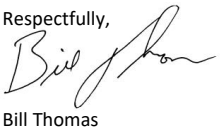
- All 5th and 6th grade students KS Assessment Mathematics Scores; spring 2019
- All 5th and 6th grade students KS Assessment Reading Scores; spring (2019)
- All 5th and 6th grade students MAP Assessment Mathematics Scores; fall (2018) and spring (2019)
- All 5th and 6th grade students MAP Assessment Reading Scores; fall (2018) and spring (2019)
- Students identified as Learning Disabled during the 2018-2019 school year
- Students identified as low SES during the 2018-2019 school year
- Students enrolled in 5th and 6th grade band during the 2018-2019 school year
- Students enrolled in 5th and 6th grade strings during the 2018-2019 school year

Baker would like to obtain your preliminary approval for allowing the study and provision of data. Upon receiving your preliminary approval, I will attach to my IRB request for consideration by Baker University. Once approval is granted from the review board, I will provide you their approval documentation and can obtain your final approval.

I would like to obtain the data set on or around July 1, 2019 or as soon after as possible. The results of the study can be made available to Shawnee Mission use if desired. It will be published in a dissertation. I have also been contacted by the Kansas Music Review to provide a summary of my findings. Shawnee Mission School District will not be mentioned by name in my work. I hope to review and manipulate the data in July and compile the findings in September - October.

Please let me know if you have any further questions or needed clarifications.

Respectfully,



Bill Thomas
[redacted]
Student, Baker University

Tuesday, July 16, 2019 at 9:03:43 PM Central Daylight Time

Subject: RE: IRB Approval for Bill Thomas
Date: Friday, June 28, 2019 at 2:55:49 PM Central Daylight Time
From: [redacted]
To: Bill Thomas
Attachments: ThomasBillDissertationData_DeIdentified.xlsx

Here you go. Your template was very helpful.

Enjoy!

dg

From: Bill Thomas
Sent: Wednesday, June 19, 2019 8:43 PM
To: [redacted]
Subject: IRB Approval for Bill Thomas

[redacted] Attached is the approval from Baker University for my study. Dr. Rogers wanted me to include the spreadsheet sample again as a help in the process.

I appreciate you working me in as you are able. As soon as you are able to get the data to me, I will begin working through it with my data analyst.

You are appreciated! Let me know if you have questions.

Bill Thomas
Director of Bands - [redacted]
[redacted]