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Moving Forward with Music to Promote Student Growth: A Mixed Methods Study with 9th-Grade Algebra 1 Students

Willie Mae Dean

Moving Forward with Music to Promote Student Growth:

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Algebra 1 Students

by

Willie Mae Dean

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A Dissertation submitted to the Education Faculty of Lindenwood University in

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This Dissertation has been approved as partial fulfillment

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Dr. Shelly Fransen, Dissertation Chair	*07/26/2023* Date
Dr. Diana Bourisaw, Committee Member	*07/26/2023* Date
Dr. Kathy Smith, Committee Member	*07/26/2023* Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university course or degree.

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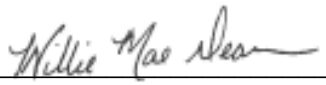
Signature:  Date: *07/26/2023*

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I dedicate my Doctoral Degree to my mother, Louise Dean Griffin. She always believed in me and inspired me to do my best. I love you, Mama.

Abstract

The purpose of this mixed methods study was to investigate what effect music had on student achievement and student behavior during independent practice time for 9th-grade Algebra 1 students. Benchmark assessments from the participating district, a focus group of six students, and four in-person teacher interviews provided the data for this study. The beginning-of-year Galileo Algebra 1 benchmark assessment was used as a baseline for the study. Algebra 1 teachers were asked to participate in one of three ways, to play teacher-selected music, to allow students to listen to their own music, or allow no music to be played during independent practice. The middle-of-year Galileo assessment was used to determine student growth for the study. An ANOVA was performed, and no significant difference was found between the three groups. A student focus group was used to gather student perceptions of the experience and focused on the impact the implementation of background music being played during independent practice had on their learning. A key theme discovered from the student focus group was that students wanted a voice and a choice in their learning experience. Additionally, the study examined how teachers viewed the behavior of their Algebra 1 students after the implementation of background music. A key theme identified amongst teachers and students both was that a process for selecting and listening to the background music needed to be in place and provided to students to minimize classroom distraction.

Key Terms

Music in the classroom

Algebra and Music

Music and student behavior

Student choice

Student voice

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Chapter One: Introduction

Schools across the United States reported low Algebra 1 achievement scores on benchmark assessments (Allensworth et at., 2013; Cadorna et al., 2021; Fong et al., 2016; Lailiyah et al., 2018; Nomi et at., 2021). Cadorna et al. (2021) suggested that Algebraic concepts are crucial components of Mathematics. Students are not mastering the mathematical concepts required for Algebra 1, such as reasoning and problem-solving skills. (Lailiyah et al., 2018; Loehr et al., 2018; Nomi et at., 2021). Algebra is critical to comprehending and appreciating key concepts and principles employed in real-life problem-solving, communication, reasoning, making connections, representations, and judgments utilizing suitable technology (Cadorna et al., 2021; Loehr et al., 2018).

Chapter One will include the background of the study and the conceptual framework. Also included in Chapter One will be the statement of the problem, the purpose of the study, and the research questions. Finally, the significance of the study, the definition of key terms, and the delimitations, limitations, and assumptions will be described.

Background of the Study

Standardized testing emerged in the United States educational system in 1838 (National Education Association, 2020). The innovative methods provided a foundation for the formal assessments of student achievement (National Education Association, 2020). Formal and summative assessments are two types of assessments most generally utilized in all school systems across America to assess the learning of state standards and new materials (Dixson & Worrell, 2016). According to Johnson and Jenkins (2009):

> Formative assessments are commonly referred to as assessments for learning, in which the focus is on monitoring student response to and progress with

> instruction. Formative assessments provide immediate feedback to both teacher and student regarding the learning process. Summative assessment is commonly referred to as an assessment of learning, in which the focus is on determining what the student has learned at the end of a unit of instruction or at the end of a grade level (e.g., through grade-level, standardized assessments). Summative assessment helps determine to what extent the instructional and learning goals have been met. (How Outcomes Inform Instruction and Educational Practices section)

Assessments are one of the most critical functions for supporting learning within the educational system (Wiliam, 2000; Taras, 2008). Properly implemented assessments within a classroom can provide data to improve pedagogical practices and instructional outcomes (Asghar, 2013; Dunn & Mulvenon, 2009; Wininger, 2005).

Harlen and James (1997) described the differences between formative and summative assessments by suggesting that the characteristics of formative assessments are:

- It is essentially positive in intent, in that directed towards promoting learning; it is therefore part of teaching;
- It takes into account the progress of each individual, the effort put in and other aspects of learning which may be unspecified in the curriculum; in other words, it is purely criterion-referenced.
- It has to take into several instances in which certain skills and ideas are used and there will be inconsistencies as well as patterns in behavior; such inconsistencies would be ‘error’ in summative evaluation, but in formative evaluation, they provide diagnostic information;

- Validity and usefulness are paramount in formative assessment and should take precedence over concerns for reliability;
- Even more than assessment for other purposes, formative assessment requires that pupils have a central part in it; pupils have to be active in their own learning (teachers cannot learn for them) and unless they come to understand their own strengths and weaknesses, and how they might deal with then, they will not make progress.

In contrast, the characteristics of summative assessment are:

- It takes place at a certain interval when achievement has to be reported;
- It relates progression in learning against public criteria;
- The results for different pupils may be combined for various purposes because they are based on the same criteria;
- It requires methods which are as reliable as possible without endangering validity;
- It involves some quality assurance procedures;
- It should be based on evidence from the full range of performance relevant to the criteria being used (pp. 372-373)

Garrison and Ehringhaus (2007) identified several examples of summative assessments that were used at the district and classroom levels. The list consisted of:

- State assessments
- District benchmark or interim assessments
- End-of-unit- or chapter test
- End-of-term or semester exam

- Scores that are used for accountability for schools (AYP) and students (report card grades) (Garrison & Ehringhaus, 2007, para. 4)

Wiliam (2006) described formative assessments in three categories in terms of learning needs based on types, focus, and lengths to adjust and better meet the learning needs of students (see Table 1).

Table 1

Wiliam and Thompson Categories of Formative Assessments

Type	Focus	Length
Long-cycle	Between instructional units	Four weeks to one year or more
Medium-cycle	Between lessons	One day to two weeks
Short-cycle	Within a single lesson	Five seconds to one hour

Note. This table was based on Table 2 Cycle times for formative assessments (Wiliam & Thompson, 2008, p. 26).

Theoretical Framework

Valamis (2022) defined cognitive learning as "an active style of learning that focuses on helping you learn how to maximize your brain's potential" (para. 1). Western Governors University (2020) stated, "The theory of cognitive learning asks learners to look at thinking and mental processes, and how cognitive thinking can be influenced by external and internal factors" (para. 4). According to Padgett (2020), cognitive learning theory is largely based on the works of Jean Piaget, who rejected the idea that learners are passive and simply react to stimuli in the environment. Instead of focusing solely on observable behavior, cognitive theory seeks to explain how the mind works during the learning process (Padgett, 2020, para. 5). Cognitive learning theory is based on the understanding that everyone thinks differently, and no one learns in the same manner.

Brown (2019) reported cognitive learning theory is comprised of two further cognitive theories of learning: "cognitive behavioral theory (CBT) and the social cognitive theory (SCT)" (para. 4). Western Governors University (2020) described SCT as "The idea that learning happens in a social context and is impacted by the person, environment, and behavior" and CBT as "The idea that how we think, how we feel, and how we behave are directly connected together" (paras. 5-6). Threadgold et al. (2019) acknowledged, "Background music is an environmental stimulus known to influence cognitive performance" (para. 1). The approach of utilizing cognitive learning theory as a theoretical framework provides a connection of how music within the classroom could have an impact on student learning.

Statement of the Problem

School districts across the country are having issues with high school students passing Algebra 1 assessments (Anderson, 2014; Nauer et al., 2015). Nauer et al. (2015), reported:

> Every year, thousands of New York City students find themselves taking and retaking aspects of algebra in order to graduate. Both the course and the exam have been deemed too important to fail. But plenty of kids do—too often, repeatedly. It's a phenomenon some educators call the "algebra whirlpool." (para. 2).

Anderson (2014) revealed, "82% of the high school students in a suburban county fail their Algebra 1 final exams" (para. 1). Anderson (2014) also discovered, "Overall, 3,713 of 4,545 high school students failed the Algebra 1 exam in the Montgomery County public school system, according to county records" (Anderson, 2014, para. 4) This supporting research prompted concerns for students' performance on the Algebra 1 exam.

According to Ojaleye and Awofala (2018), “The poor performance is not unconnected to errors committed by students while trying to solve problems on algebra. Students often commit both procedural and conceptual errors when solving problems on algebra” (p. 486). Krishnan (2020) determined, “Math and music are two entirely different fields of study, but there is a strong correlation between them” (para. 1). This study may show a connection between music and student growth in the area of math. Holmes and Hallam (2017), stated, “Music psychologists have established that some forms of musical activity improve intellectual performance, spatial-temporal reasoning, and other skills advantageous for learning” (p. 425). The implementation of music during independent practice may determine how much influence teacher-selected music, student-selected music, or no music has on student perception of their learning, teacher perception of behavior, and overall academic achievement.

Previous research has proven the relationship between music and math (Gabb & Zuk, 2017). Gabb and Zuk (2017) also suggested, “Students who are musically trained have been observed to have higher mathematics grades and standardized test scores, compared with students who have not studied music” (para. 2). When teachers integrate music and mathematics, students become aware of the power of math in the music-making process. (An et al., 2013). According to Maas (2013), “Many students enjoy listening to music while doing their homework” (p. 5). This research will provide students an opportunity to voice their feelings regarding the impact music has on learning.

Purpose of the Study

The purpose of this study is to examine the influence of music on student academic achievement, and student perceptions of the effect music has on their

performance on Algebra I benchmark tests. This study will also review teacher perceptions of students 'behavior in Algebra I class. Data will be obtained from the participating district's benchmark assessments, one student focus group, and four in-person teacher interviews. The results of this study may suggest that music has a positive impact on 9th-grade students' Benchmark assessment in Algebra I.

Research Questions and Hypotheses

The following research questions and hypotheses guided the study:

1. What is the difference in student growth on the Galileo Algebra 1benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all?

2. What are Algebra 1 students 'perceptions regarding the effects of listening to their own selected music has on their academic performance in 9th-grade Algebra 1 class?

3. What are teachers 'perceptions of students 'behaviors after the implementation of student-selected music, teacher-selected music, or no music at all?

$H1_{0:}$ There is no difference in student growth on the Galileo Algebra 1benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all.

$H1_a$: There is a difference in student growth on the Galileo Algebra 1benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all.

Significance of the Study

The significance of this study is to explore how educators can use music to support students' learning in math (Roldan Roa et al., 2020, p. 1). Edelson and Johnson (2004) deducted:

> by integrating mathematics and music, teachers will be able to help children achieve national and state learning standards in mathematics as well as in creative arts. Teachers can use music to enhance children's pleasure and understanding of difficult mathematics concepts and skills. (para. 1)

Argabright (2005) determined, 'When other curricular areas are integrated with music, learning in these areas becomes more meaningful for students. Classroom teachers often use music as a "connector' in their teaching because they have found music as an invaluable teaching tool" (para. 3). Pogue (2018) noted, "Music is a universal language, and it is important to understand how it can help children learn" (p. 3).

Edwards (2019) stated, "In considering the needs of students, researching, and discussing multiple types of pedagogical tools such as the incorporation of music into a content-specific curriculum is necessary for the amelioration of differentiation and cross-curricular planning" (para. 5). Mayes (2018) found, "after looking at the problems and opportunities for improvements, and intervention was designed to incorporate music into the core curriculum in hopes of increasing student test scores, mastery of skills, and increase student knowledge" (para. 4). White (2007) believed the results from the study of background music being implemented in a classroom setting during independent practices would be of great value to all educators. The use of background music could also promote student learning in such ways as positive student performance and behaviors, increased student test scores, and higher student motivation levels.

According to Atilgan (2021) “The relationship between music and math and the impact of math on music is perceived as important and frequently researched by many researchers” (p. 3296). Ross (2022) reported, “background music in the classroom has passed many tests for efficacy regarding promoting learning” (para. 4); while de la Mora Velasco and Hirumi (2020) argued “that there is still a lack of available studies from researchers to determine how background music might have a positive or negative effect on learning” (p. 2826). This research gives students a voice in their learning using background music during independent practice and engages them in their learning.

Definition of Key Terms

For the purposes of this study, the following terms are defined:

District Benchmark

A district benchmark is a benchmark exam given across many classes, an entire grade level, a whole school, or across a district. The purpose of a benchmark exam is to understand if students have mastered specific standards and are ready to move on (Moody, 2020).

Delimitations, Limitations, and Assumptions

The scope of the study was bounded by the following delimitations:

Time Frame

This study was conducted during the fall of 2021.

Location of the Study

This study took place in a suburban district of St. Louis, Missouri.

Sample

The sample for this study included both Algebra 1 students and Algebra 1 teachers and student participants that qualified for this research were 9th-grade Algebra 1

students. The adults that qualified were Algebra 1 teachers certified by the Missouri Department of Elementary and Secondary Education.

Criteria

The criteria for student participation was that students were in the 9th grade. The criteria for the teachers were that they were certified by the Missouri Department of Elementary and Secondary Education and that the researcher was not a co-teacher in the selected classroom.

The following limitations were identified in this study:

Sample Demographics

The sample was limited to one grade level, one subject, and one building in a suburban district in Missouri.

Instrument

The interview instrument and the focus group instrument might be considered a limitation because both sets of questions were researcher-created.

Self-reported Data

The data received from the focus group and the interviews relied on participants accurately reporting their responses.

The following assumptions were accepted:

1. The responses of the participants were offered honestly and willingly.
2. The sample was representative of the general population of MO DESE-certified Algebra 1 teachers and 9th-grade Algebra 1 students.

Summary

Chapter One included a historical synopsis of formative and summative assessments. The conceptual framework of cognitive learning theory was introduced.

Also introduced in Chapter One were the statement of the problem, the purpose of the study, and the research questions and hypotheses. The significance of the study and the definition of key terms were provided. Finally, the delimitations, limitations, and assumptions were described.

Chapter Two will include a review of the current literature. The conceptual framework will be further described. The topics of music in the classroom, student assessments, student behavior, and the effect music has on student behavior will be investigated.

Chapter Two: Review of Literature

This review of literature contains current research on the effects music has on student learning. The literature review is an important piece of this study because it allows for the triangulation of data when answering the research questions of this study. Several topics will be covered, all selected specifically to address the research questions.

Chapter Two will include a further investigation of cognitive learning theory. Other topics will include music in the classroom and student assessments, including Galileo and NWEA. Finally, student behaviors in the classroom and the effect music has on classroom behavior will be presented.

Theoretical Framework

Cognitive learning theories hold a unique place in history: they explore the depths of the mind from the perspective of process (Grider, 1993, p. 1). According to Yilmaz (2011), "familiarity with subject matter is not enough for teachers to engage in effective and pedagogically meaningful instructional practices" (para. 2). Boyes (2013) stated,

> Cognitive learning theory regards learning as the thought process of a student in an individual situation, subject to the influences of that particular environment. The student first connects to their own experience and prior knowledge, then works in reverse to ascertain the theories and principles that contribute to that truth. (para. 15)

Burney (2008) reported, "In the social cognitive model there are the elements of human agency and perceived self-efficacy that contribute to cognitive development and performance" (para. 1). Brown (2019) pointed out:

> Cognitive behavioral theory refers to the role of cognition in the behavioral pattern of individuals. By formulating self-concepts of the individual's own

> accord, their behavior is directly affected. The concepts can be based on extrinsic or intrinsic factors, both positive or negative. (para. 6)

Academy of Mine (2022) suggested "Cognitive Learning Theory is a more active approach to learning, where learners' answers are not just judged by correctness, but also on how a learner arrives at their answer" (para 3).

Mandi (2021) indicated that the fundamental aspects of cognitive learning are comprehension, memory, and application. For cognitive learning to be efficient and benefit students, they should understand the reason why they are learning the specific subject in the first place (Indeed Editorial Team, 2022). The cramming of information is discouraged in cognitive learning (Barany, 2019). Cramming is described as ineffective in education (Grade Power, 2017). Wenk (2017) suggested that relying on memory provides a deeper understanding of the subject and fosters the ability to relate to new knowledge with previous experiences or information.

Students being able to apply cognitive learning strategies helps develop problem-solving skills to be utilized in real-life situations and learning topics (Valamis, 2022). To maximize student achievement Western Governors University (2020) suggested the following cognitive learning strategies be utilized:

1. Asking questions. Students asking questions for an opportunity to dive deeper into meaning.
2. Having opportunities to make errors. Teachers provide hands-on problems to give students the opportunity to make mistakes and learn from them.
3. Fostering self-reflection/self-questioning. Teachers provide opportunities for students to understand their mental processes and think about their thinking.

4. Thinking aloud. Teacher model how they process and work out their problems and give the students the same opportunities. (para. 7)

Celiköz et al. (2016) held the view that "cognitive processes and activities such as processing information, mental representation, guesses and expectations are accepted to be a basis in the interpretation of learning" (p. 31).

Cognitive Behavioral Theory

Cognitive behavioral theory (CBT) refers to one's mental process and how they may interpret life events (James, 2011). Cognitive behavioral theory explains how a person interacts with another through thoughts, feelings, and behavior (PsychologyTools, 2022). When individuals are processing a thought, it could lead to an emotion, which then will turn into a specific behavior (How Emotions Affect Behavior, 2016). Stanger (2022) suggested that individuals changing their behaviors may also lead to changes in their feelings and thoughts.

Social Cognitive Theory

Social cognitive theory provides an understanding of how individuals are influenced by each other or their environment (LaMarte, 2019). Stone (2017) indicated that observational learning is one of the main components of social cognitive theory. Nickerson (2023) added that observational learning is a process where individuals learn wanted and unwanted behaviors. Cherry (2022) found that in social cognitive theory models are known to be quick ways of acquiring information. A model can be a teacher, peers, or people in your community that influence an observer's behavior (Valamis, 2022). Bandura (1989) the founder of social cognitive theory noted, "Modeling influences can convey rules generative and innovative behaviors as well" (p. 25).

Cognitive learning theories will provide a solid framework for this investigation. The current literature will provide a solid foundation for the link between cognitive learning theories and each topic of the literature review. The first topic presented will be music in the classroom.

Music in the Classroom

Music was introduced in the classroom by educators for the first time in 1930 as a tool to aid learners to increase student engagement (Sigman, 2005). DiDomenico (2017) pointed out that integrating music correctly in the classroom environment enhances students' engagement, environment, learning, and development. Bokiev et al. (2018) claimed teachers use music to communicate, explore, and create a culture of learning conducive to student achievement.

Music in education can affect cognitive performance on certain, task complexity and independence of task, but has been shown to improve performance on easy tasks (Wilson, 2018). Alexander (2022) implied when it comes to music selections, *music matters;* students perform differently to calming music than to music they perceive to be aggressive. Brewer (1995) revealed, "Music will activate students mentally, physically, and emotionally and create learning states which enhances understanding of learning material" (Active Learning Experience section).

Connelly (2019) investigated students in a reading course listening to Western music at a Japanese university. Connelly (2019) investigated the effect of students listening to Western music in the classroom on communicative ability and motivation. Connelly (2019) determined that the majority of students developed a newfound interest in English and displayed greater levels of motivation throughout the course. The use of music in the classroom has also shown a reduction in anxiety and increased motivation.

Sigman (2005) argued that there are no changes in concentration when high school students listen to background music while completing in-class assignments. When it came to listening to music in the classroom, Barile (2022) believed silence was golden. Barlie (2022) considered researchers supporting ideas of increased concentration in students who listened to music in the classroom irrelevant (Barlie, 2022).

When it comes to the effects of background music in the classroom Stegemiller (2012) believed that "research shows that music can improve performance, learning, and emotional states of people" (para. 1). Fletcher (2014) revealed, "MRIs of a patient listening to music show that music "lights up" the entire brain, which connects to or evokes positive feelings" (para. 9). Schlichting and Brown (1970) concluded that because music may excite emotions in one person but not in another, and because the same person may respond differently at different times, it should not be expected that all students will enjoy the music and give a better performance all the time.

Teachers being able to choose background music that is culturally relevant and interesting to students, will not only increase their engagement, but it will also make them feel seen (Berry, 2022). Koolidge and Holmes (2018) investigated the effects of background music on children's puzzle assembly and determined, "background music without distracting lyrics may be beneficial and superior to background music with lyrics for young children's cognitive performance even when they are engaged independently in a nonverbal task" (Abstract section). Mohan and Thomas (2020) explored and discovered that "there is a plethora of research assessing the effects of background music on task performance; however, these results have largely been inconclusive and divided" (Abstract section).

Alegria (2017) affirmed, “music is one tool engage each student and provide a pathway for connections and deeper understanding” (para. 5). Barnes (2020) stated, “researchers have found that music can have a profound effect on brain activity to increase certain neuro-connections as well as enhance brain activity” (para. 4). Able (2020) reported, “music activates both the left and right brain at the same time, and the activation of both hemispheres maximizes learning and improves, memory” (para. 3). Lehmann and Seufert (2017) determined there was “a significant interaction between listening to background music and working memory capacity” (p. 8).

Student Behaviors in the Classroom

Students’ misbehaviors are often defined as those behaviors which interfere with the teaching and learning process in the classroom environment (Erdem & Kocyigit, 2019; Johnson et al., 2019). Johnson et al. (2019) believed, “There are few attempts, if any, have sought to inductively examine the reasons that underlie the existence and occurrence of student’s misbehavior in the classroom” (p. 2). Future research is needed to explore and consider the practical implications of understanding behavior and how to support positive student behaviors and mitigate negative student behaviors (Johnson et al., 2019; Sun & Shek, 2012). Evaluating an individual’s perception of students to understand specific behaviors is common practice (Johnson et al., 2019). Miller and Poston (2020) stated, “How we perceive others can be improved by developing better listening and empathetic skills, becoming aware of stereotypes and prejudice, developing self-awareness through self-reflection and engaging in perception checking” (para. 1).

Educators have found that there are several classroom disruptions dealing with student behaviors that may limit or prevent the delivery of classroom instruction (Joslyn

et al., 2019). Some of a teacher's daily disruptions consist of student misbehaviors such as:

1. Defiance of classroom rules - Defiance, disruptive talking, and bullying.
2. Feelings of resentment – The student not knowing, avoid of work, or wanting to learn the content and not wanting a certain teacher to teach them.
3. Acting out – throwing things, tapping, yelling, rudeness to the teacher, and fighting.
4. Cheating – copying off other students and the internet when completing assignments and taking tests.
5. Truancy- skipping class, and tardiness.

These disruptions are some of the most pressing concerns in the classroom today (Aelterman et al., 2019; Sun & Shek, 2012). There are many issues that may cause students to disrupt the classroom setting (Yussif, 2021). One reason for students' misbehaviors is students not understanding the curriculum (Erdem & Kocyigit, 2019). Music is one tool that can be utilized to manage classroom behaviors; according to Bucher (2019), "Students are less likely to be a behavioral problem in the classroom when they are interested in the material, and constantly "doing" instead of listening to a teacher talk at them" (p. 19).

Shamnadh and Anzari (2019) provided three principal factors that cause students to misbehave in the classroom. Those factors included the student, the teacher, and the society (Shamnadh & Anzari, 2019). Using those three factors, Yussif (2019) proposed nine reasons why students misbehave.

Student Factors

1. **Impulsivity:** A student reacts to a situation without thought. Personality is a factor in the student's actions.
2. **Personal skill deficiency:** A student lacks the personal skills that allow them to cope with their environment or others in their environment.
3. **Belief deficiency:** A student believes that education or subject matter is not important and disrupts class because of their belief. (Student Factors section)

Teacher Factors

1. **Failure to teach effectively:** The teacher does not have effective classroom management or lesson plans for students to achieve their educational and emotional needs within the classroom setting.
2. **Inaccurate expectations:** The teacher wants students to believe what they are teaching just because they said it with no inquiry from the student. Some teachers like to blame outside factors such as the parents of the students for their misbehavior instead of trying to find a solution for the student behavior.
3. **Inaccurate judgment:** Teachers passing wrong judgments on students' behaviors. Instead of teachers giving students the time to make the right choices. (Teacher Factors section)

Environmental/Societal Factors

1. **Family:** The student's family social status and environment could affect a student's behavior.
2. **Sociability:** The students wanting to interact with other students during instruction could lead then to misbehaving.

3. **Other responsibilities/works:** Some students have other responsibilities outside of school such as work or taking care of other siblings that may cause them to misbehave. (Environmental/Societal Factors section)

The Effects Music Has on Classroom Behavior

Hallam and Price (1998) discovered, "The effects of music on the moods, emotions and behavior of both individuals and groups noted throughout history" (para. 1). Järvelä (2018) explained, "Music is a sound that is recognized by hair cells in the inner ear. The sounds are transmitted as electrical signals through the midbrain to the auditory cortex and other parts in the brain" (para. 2). According to Savan (2009):

> Previous research has shown that background music has an effect on certain phycological and biochemical pathways in pupils with special educational needs and emotional behavioral difficulties. When background music is played during practical lessons, pupils become better coordinated and their behavior improves. (p. 1029)

Strachan (2015) believed, "If music alters brain waves to prepare the brain for learning, the application of music could be useful in a variety of settings with learners of many ages" (p. 7). Schwartz et al. (2017) suggested, "Music may be effective in stimulating a person to respond to simple and repetitive tasks rather than complex tasks" (p. 8). Jamshidzad et al. (2018) suggested, "A music pulse can affect the intellectual and behavioral rhythmicity of the human brain. As manipulation of background music is relatively simple it can be used to change behavior" (para. 4).

Du et al. (2020) acknowledged, "Background music provides a unique window into how the brain works when music and cognitive tasks are presented simultaneously" (para. 2). Lemaire (2020) found that background music being presented within a

classroom setting for a group of students' cognitive performances may have diverse effects according to individual's differences. Du, et al. (2020) noted:

> Some behavioral studies have shown that reading comprehension can be improved using background music, such as Mozart's music, highly repetitive music with a narrow tonal range and songs. In contrast, with other studies have shown negative effects of background music on reading comprehension using hip-hop music, UK garage-style music, slow- tempo music by Bach, fast and loud music, familiar non lyrical music, and songs as background music. The discrepancy between these behavioral studies could be due to the differences in music and listeners. Indeed, the effects of background music on reading comprehension depends on music selection, music characteristics, and lyrics. On the other hand, some individual factors, such as musical preferences and music expertise, have been suggested to influence the effects of background music. (para. 2)

Kiss and Linnell (2021) were the first to conduct a study on preferred background music on attentional states by collecting subjective reports as behavioral measures of performance reaction time. They concluded, "Importantly, listening to preferred background music was found to increase task-focus and decrease mind wondering states on low demanding sustained-attention task although it did not affect overall reaction time" (p. 2323). Current and past research of background music has been found to have pedagogical implications (Van Horn, 2020). Studies have shown that students find music to be an important part of their classroom learning experience (Van Horn, 2020).

Math and Music

When it comes to music and math Church (2001) proclaimed that there is a magical bond between the two,

> Music and math seem to create a connection between the two hemispheres of the brain. Music is considered a right- brain activity, while math is a left-brain activity. When combined, the whole child is engaged not only in the realm of thinking but in all the other domains of social-emotional, creative, language and physical development. Music and math: Together they make a complete developmental package. (para 3)

Mayes (2018) supported aligning music and math curriculum across disciplines. More importantly Mayes (2018) felt teaching music and math simultaneously would increase student learning. Roldán Roa et al. (2020) called attention to the fact that,

> Educational research argues that traditional teaching approaches and instructional methods for mathematics curricula do not have a positive impact on students. On the contrary, learning experiences that are not based on traditional teaching approaches for mathematics curricula can contribute to bridging the achievement gap and reducing mathematical anxiety. (para, 2)

Santos-Luiz (2007) supported the theory of "mathematical concepts forming part of the music world. Through that connection, it is possible to establish a positive correlation between participation/performance in music and cognitive development in mathematics" (para,1). Civil (2007) concluded that "the project suggested the validity of the theory because when math and music were combined in my classroom the students exhibited higher achievement" (pp. 36–37).

Professional Development

Darling-Hammond et al. (2017) defined effective professional development as "structured professional learning that results in changes to the teacher practices and improvements in students learning outcomes" (p. 2). Therefore Mizell (2017) believed, "Professional development is the only strategy school systems have to strengthen educators' performance levels. Professional development is also the only way educators can learn so that they are able to better their performance and raise student achievement" (p. 7). Francis (2021) acknowledged that:

> There are many ways that professional development can impact a student learning outcome. The first is that engaged teachers are more likely to have engaged students. Since we know that professional learning can help to prevent teacher burnout, it stands to reason that it will also help to excite and engage students in the classroom. Teacher professional development also translates into student understanding of subject matter. When teachers engage in professional learning on the subject matter and curriculum they teach, it provides them with new skills and knowledge to help them explain complex concepts and ideas to students. (paras. 14–15)

The Teach for America Editorial Team (2018) specified, "As you connect with like-minded partners, colleagues, and community members, these skills will help you form relationships and influence others to accelerate progress toward educational equity" (para, 7).

When educators discover new innovative teaching strategies such as using music in the classroom during independent practices students are allowed to have a voice and to make a choice to increase test scores (Merrill & Gonser, 2021). Professional development

allows teachers to learn how to implement, make changes, and evaluate their instruction to better meet the needs of their students (Queens University, 2023). According to Power School (2021), "There are 4 ways professional development can improve school districts:

1. Retention
2. Deeper subject knowledge
3. A collaboration environment
4. Student achievement the most important, measurable results of investing in professional development" (p. 1).

Darling-Hammond et al. (2017) categorized seven widely shared elements of effective professional development:

1. Is content focused
2. Incorporates active learning utilizing adult learning theory
3. Supports collaboration, typically in job-embedded contexts
4. Uses models and modeling of effective practice
5. Provides coaching and expert support
6. Offers opportunities for feedback and reflection
7. Is of sustained duration (p. 1)

Student Assessments

The prevalent use of formative and summative assessments that includes classroom pedagogy brings about great importance to the momentum of change in education (Taras, 2008). Wiliam (2000) stated:

> Traditionally, the informal day-to-day use of assessment within classrooms to guide learning has received far less attention than the more formal uses, and to the

> extent that it has been discussed at all, it has tended to be discussed as an aspect of pedagogy or instructional design. However, within the past ten years, there has been a recognition of the need to integrate (or at least align) the routines of informal classroom assessment with more formal assessment practices. (para. 2)

Formative assessments include various procedures, such as observation, feedback, and journaling which are frequently used by teachers (Harlen & James, 1997; Johnson & Jenkins, 2009). There are also universal principles that validate the effectiveness of formative assessment (Johnson & Jenkins, 2009). The key is the use of quality assessment tools and the reoccurring information from the assessments that improve instruction (Johnson & Jenkins, 2009).

Summative assessments are also utilized by teachers (Johnson & Jenkins, 2009; Zook, 2021). They have a plethora of tools and methods that provide an overall view on what students have learned during general instruction (Johnson & Jenkins, 2009; Zook, 2021) Information from summative assessments is provided at the student, classroom, school, and district levels (Johnson & Jenkins, 2009; Zook, 2021). The defining characteristics that make summative assessments effective can increase student achievement (Johnson & Jenkins, 2009; Zook, 2021). Summative assessments must have a clear alignment between the assessment, the curriculum, and the instruction (Johnson & Jenkins, 2009). Most importantly, a summative assessment must be both valid and reliable to generate accurate measurements of student learning (Johnson & Jenkins, 2009). Within summative assessments, clear and specific objectives are connected to instruction to provide information about specific learning objectives required at the state level (Johnson & Jenkins, 2009).

Dixson and Worrell (2016) and Zook (2021) concluded that formative and summative assessments are great tools to utilize within the educational setting. However, Gezer et al. (2021) pointed out, “Formative assessment is the most frequent assessment with the smallest scope, whereas summative assessment is the least frequent with the most substantial scope, including teachers and school districts” (p. 674). When teachers are implementing instruction, formative assessments should be used to enhance instruction during the introduction of a lesson to help students learn new concepts (Dixon & Worrell, 2016; Zook, 2021). Dixson and Worrell (2016) suggested it was best practice to use formative assessments throughout a lesson for students to become more engaged in their learning.

Dixson and Worrell (2016), Johnson and Jenkins (2009), and Zook (2021) believed that teachers should utilize summative assessments at the end of a unit, chapter, quarter, or semester. This allows the teacher to assess and evaluate the skills students gained and retained mastery of over the course of study (Dixson & Worrell, 2016; Johnson & Jenkins, 2009; Zook, 2021). Summative assessments also provide data to close the gap between student learning outcomes and provide intervention (Dixson & Worrell, 2016; Johnson & Jenkins, 2009; Zook, 2021). Dixson and Worrell (2016) defined and highlighted the characteristics of formative and summative assessments (see Table 2).

Table 2

Characteristics of Formative and Summative Assessments

Characteristic	Formative Assessments	Summative Assessments
Purpose	To improve teaching and learning To diagnose student difficulties	Evaluation of learning outcomes Placement, promotions decisions
Formality	Usually informal	Usually informal
Timing of administration	Ongoing, before and during instruction	Cumulative, after instruction
Developers	Classroom teachers to test publishers	Classroom teacher to test publishers
Level of stakes	Low-stakes	High-stakes
Psychometric rigor	Low to high	Moderate to high
Types of questions asked	What is working What needs to be improved	Does student understand the material Is the student prepared for next activity
Examples	How can it be improved Observations Homework Questions and answer sessions Self-evaluation Reflections on performance Curriculum-based measures	Projects Performance assessments Portfolios Papers In-class examinations State and national tests

Note. This table was based on Table 1 in Formative and Summative Assessment in the Classroom (Dixon & Worrell, 2016, p. 154).

School districts across the country use various formative and summative assessments (Bell, 2021; Cordray et al., 2012; Fairman et al., 2018). The Galileo K-12 benchmark assessment and the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) are two such assessments. Both the Galileo and the NWEA are included in the review of literature.

Galileo

The Galileo K – 12 benchmark assessment is a tool some school districts utilize across the United States to measure student growth (Bell, 2021). Bergan et al. (2013) noted, “Galileo K-12 online benchmark can measure student mastery of standards targeted for instruction” (p. 1). The Galileo benchmark assessment is aligned with Common Core State Standards. (Bell, 2021; Bergan et al., 2013). Militello and Heffernan (2009) described the assessment as follows,

> Galileo is a system for building benchmark assessments available through Assessment Technology Incorporated (ATI). The Galileo system has a large bank of items and is designed to enable ATI to work collaboratively with a district to design on assessment system that is aligned with local instruction and informs curriculum planning. (p. 3)

According to Burnham (2009), “Teachers can review the report for individual students. School district administrators can view the report aggregated at the class, school, or district level so that progress through the curriculum is visible at a glance” (p. 15). Galileo K-12 online instructional dialogs were designed to include higher-level expectations and intervention efforts within classroom instructions, formative assessments, and district-wide interim assessments (Burnham, 2009).

D. M. Baker (personal communication, June 2, 2023) shared:

> The Galileo Algebra 1 benchmark assessment assesses students' grade-level skills in mathematics, measures mastery of math standards, and can predict state test performance with 85 percent accuracy. The Galileo assessments are aligned with the Missouri state standards or district pacing guide. The questions are presented to the students in the form of multiple choice with several technology-enhanced

items. There are approximately 35 questions on the Galileo Algebra 1 benchmark assessment. Students could complete the test within an hour's time frame.

The key learning targets represented within the Galileo Algebra 1 Benchmark assessment include:

- The Real Number System
- Quantities
- Seeing Structures in Expressions
- Arithmetic with Polynomials and Rational Expressions
- Creating Equations
- Reasoning with Equations and Inequalities
- Interpreting Functions
- Building Functions
- Linear, Quadratic, and Exponential Models
- Interpreting Categorical and Quantitative Data (Imagine Learning.com, 2023, Algebra section)

D. M. Baker (personal communication, June 2, 2023) added, "The Galileo Algebra 1 benchmark assessment has built-in technology that makes sure there is no duplication of questions". The students were able to score a total of 46 points on the Galileo benchmark (D. M. Baker, personal communication, June 2, 2023). There are 4 developmental levels (DL) scores in the ranges of Below Basic, 1274-1406, Basic, 1407 -1451, Proficient, 1452- 1478, and Advance, 1479-1794 (D. M. Baker, personal communication, June 2, 2023).

Northwest Evaluation Association (NWEA)

Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) is one of the most utilized commercial systems that incorporate benchmark assessments and training in differentiated instruction (Cordray et.al, 2012; Fairman et.al, 2018). The NWEA MAP involves a computer-adaptive assessment with multiple-choice test questions (Cordray et.al, 2012; Militello & Heffernan, 2009; Reardon et. al, 2018). The NWEA MAP assigns test items to students by correlating the difficulty of items to the achievement level of the student (Hegedus, 2018; Militello & Heffernan, 2009). According to Hegedus (2018):

> NWEA is uniquely positioned to refine prior research and study the differential impact of identifying CSI schools using achievement and growth because of the following factors:
>
> - The MAP Growth partner base is approximately 20% of the nation's public schools.
> - The adaptive design of MAP Growth produces an accurate measurement of all students regardless of their achievement level.
> - The MAP Growth scale is designed to track student progress over time in a simple manner.
> - The unique student achievement and growth norms from NWEA are nationally representative, are explicitly designed to be aggregated, and support comparisons across subjects and grades. (p. 4)

Also built in the NWEA MAP assessment is teacher training and access to MAP resources on how to utilize the data to differentiate instruction for all students (Cordray et al., 2012).

Summary

Chapter Two literature review included the theoretical framework of Cognitive Behavioral Theory and Social Cognitive Theory. Also reviewed in this chapter were the enlightenment of music and its effects on music in the classroom, student behavior, and the connections between music and math. This literature review examined the importance of teacher professional development, student behaviors, and student assessments such as Galileo and NWEA MAP, which are used to drive instruction and show student growth.

Chapter Three will include the methodology used to answer the research questions and an overview of the problem and purpose of the research. Also, a description of the population, sample, and instruments utilized throughout the research will be discussed. The data collections and data analysis will also be presented along with ethical considerations.

Chapter Three: Methodology

The purpose of this chapter is to review and introduce the methodology used to conduct this research on music promoting student growth in an Algebra 1 class. An overview of the problems that drive the research will be provided. The mixed method approach allows both qualitative and quantitative data on student achievement and teacher and student perception of learning to be gathered. Other components of this chapter involve a description of the population sample and instruments utilized along with data analysis. Ethical considerations will also be discussed.

Problem and Purpose Overview

High schools across the country were struggling to pass Algebra 1 assessments (Anderson, 2014; Nauer et al., 2015). Thousands of high school students were finding themselves needing to take or retake Algebra 1 as a graduation requirement (Boylan, 2011; Nauer et al., 2015). School districts placed high importance on the achievement levels of the Algebra 1 course and exam (Nauer et al., 2015); however, students continued to fail year after year (Nauer et al., 2015). Educators viewed the failure as the *algebra whirlpool* (Nauer et al., 2015). In suburban counties, 82% of high school students failed Algebra 1 final exams (Anderson, 2014, para .1).

Students' underachievement in Algebra 1 appears to be connected to errors students make when solving algebra problems (Ojaleye & Awafala, 2018). Procedures and conceptual errors are made frequently when students are solving Algebra 1 problems (Ojaleye & Awafala, 2018). Through the methodology in this study, a connection may be discovered between music and student growth in Algebra 1. There are music psychologists who have proven that forms of musical activity can improve intellectual performance, spatial-temporal reasoning, and other skills beneficial for learning (Holmes

& Hallam, 2017). Students listening to music during individualized practice on class assignments may reveal how much of an enhancement that teacher-selected music, student-selected music, or no music has on the perception of student learning, teacher views on behaviors, and academic achievement.

According to An et al. (2013), "Mathematics instruction integrated with music can effectively increase students' intrinsic motivation, because it fosters an enjoyable learning experience in which students may be more aesthetically engaged" (p. 3). Music is known to have an effect on student learning (Mayes, 2018; Stegemiller, 2012; Wilson, 2018). That is why the purpose of this study was to review and discover the effects music had on academic growth and students' views on music increasing student scores on the Algebra 1 benchmark. Teacher perceptions of student classroom behaviors will be revealed. Galileo benchmark data were provided by an accredited school district, and a focus group, and teacher interviews were conducted. The results from this investigation may enlighten math teachers and others in the education field of innovative ways for 9th-grade students to improve their scores on the benchmark assessment in Algebra 1.

Research Questions and Hypotheses

The following research questions and hypotheses guided the study:

1. What is the difference in student growth on the Galileo Algebra 1benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all?

2. What are Algebra 1 students' perceptions regarding the effects of listening to their own selected music has on their academic performance in 9th-grade Algebra 1 class?

3. What are teachers 'perceptions of students' behaviors after the implementation of student-selected music, teacher-selected music, or no music at all?

$H1_{0:}$ There is no difference in student growth on the Galileo Algebra 1 benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all.

$H1_a$: There is a difference in student growth on the Galileo Algebra 1 benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all.

Research Design

The research design selected for this study was a mixed-methods design. According to Burkholder et al. (2020), "An important first step in decision-making about research methods is consideration of the purpose of research" (p. 113). A mixed methods design was selected for this study because it allowed for the collection of multiple types of data. Mixed-methods studies utilize both qualitative and quantitative types of research methodology (Burkholder et al., 2020; Creswell & Creswell, 2018). Collectively, qualitative and quantitative methods provide an opportunity to collect more varied data that strengthens the validity of the findings and conclusions within the study (Burkholder et al., 2020; Creswell & Creswell, 2018). The research questions were created to explore whether the use of background music during independent practice made a difference on student growth and student behavior.

Burkholder et al. (2020) suggested a qualitative methodology is "generally inductive, and the data from which the qualitative researcher works are principally

textual, or narrative" (p. 7). The qualitative data in this study consisted of data collected from two different sources: a student focus group discussion and individual teacher interviews. The value of qualitative research is that it allows the researcher to further examine participants' responses by asking follow-up questions to gain better insight and clarity (Burkholder et al., 2020; Creswell & Creswell, 2018).

Burkholder et al. (2020) concluded:

> In quantitative research, where the researcher seeks to understand and describe a phenomenon, behavior, or issue using numerical data and statistical analysis, this includes elements such as the specific structural features of the study, measurement of variables, and strategy for sampling. (p. 51)

The behavior examined in this study focuses on the impact music has on student achievement and if there is a difference in student performance depending on which type of music the student listens to. The quantitative data gathered were secondary data, specifically students' pre and post Galileo Benchmark assessments scores.

Population and Sample

The population for this study included Algebra 1 students from a suburban district in St. Louis, Missouri. The population of 9th-grade Algebra 1 students for this study was 312 students. These students were divided into six classes. A purposive sample of three classes was selected to participate in this study. A purposive sample allows the researcher to determine the criteria for the selection of the sample to be used (Fraenkel et al., 2019). The criteria used to select the three classes were that classes have a minimum of 25 students and that the PI was not a teacher in the classroom. The secondary data sample size of 9th-grade Algebra 1 students was 312 students; 25 to 30 students in each class should be sufficient to obtain valid statistical results (Johnson & Christensen, 2020).

Instrumentation

Quantitative

The instrument used to collect quantitative data consisted of the high school district assessment. The Galileo Benchmark assessment was given to address research question number 1. The Galileo Benchmark was the measurement of the difference in student growth on the Algebra 1 benchmark before and after the implementation of background music (Gabb & Zuk, 2017; Holmes & Hallam, 2017).

Qualitative

This study utilized two different qualitative instruments. The student focus group instrument included five open-ended discussion questions. The teacher interview instrument included seven open-ended questions.

Student focus group questions 2 and 4 were generated to answer research question 1 which provided feedback on which method of student listening preferences of music caused the most effective outcome on student growth in Algebra 1 (Gabb & Zuk, 2017; Holmes & Hallam, 2017). Focus group questions 1, 3, and 5 addressed research question 2, the students' perceptions of the effect background music had on their academic performance (Threadgold et al., 2019; Wilson, 2018). The teacher interview questions were developed to gather teacher perceptions of the effect music had on student behavior and to answer research question 3 (Schwartz et al., 2017; Jamshidzad et al., 2018)

Reliability -Validity

The Galileo Benchmark assessment was vetted for reliability and validity by ATI. According to ATI (2023), "ATI's ongoing research routinely demonstrates that Galileo assessments demonstrate high reliability, predictive validity, and accuracy in forecasting student performance on statewide tests" (Research on Reliability, Validity, and

Forecasting Accuracy section). Focus groups and interviews engaged the participants in questions that pertained to the research questions within the study. The student focus group and teacher interview questions were direct, concise, and unbiased. The teachers and students were able to comprehend the questions being asked and responded appropriately.

The Survey/Interview Validation Rubric for Expert Panel (VREP) was utilized to ensure both the focus group questions and the interview questions were valid and reliable (Simon & White, 2013). There were 14 areas of criteria reviewed and scored in the VREP rubric. There were five of the 14 criteria areas that met expectations and the other 9 criteria areas exceeded expectations with no modifications needed. Member checking was also utilized to ensure the accuracy of the qualitative data. According to Mertens (2020), member checks entail providing participants with transcripts of their interviews to review for accuracy.

Data Collection

After district permission was granted (see Appendix A) and the Lindenwood Institutional Review Board approved the study, the three Algebra 1 classes were purposively selected. The criteria for selection was that the researcher was not a co-teacher in any of the selected Algebra 1 classrooms. Once the three classrooms were selected, a classroom teacher participation email (see Appendix B) was sent to the teachers of those three classrooms requesting their class participation in the study. The three teachers were asked to be the liaison between the researcher and the parents. The teachers were asked to send home to parents a copy of the parental participation letter (see Appendix C) and the adult consent on behalf of minors (see Appendix D) and then collect the signed forms and return them to the researcher. The three teachers and a

paraprofessional were also asked to participate in an interview. A copy of the adult informed consent form for teachers (see Appendix E) and a copy of the interview questions (see Appendix F) were provided.

The three classroom teachers were also asked to select two students from their classroom to participate in a focus group discussion. Once the students were selected, the classroom teachers were provided with a parental participation letter for those students. Along with the letter, a copy of the parental consent form on behalf of minors was also provided for the teachers to send home with participating students. The parents were asked to return the signed consent form to the Algebra 1 teacher. The selected student focus group participants were provided with a letter of participation for the focus group discussion (see Appendix G) and a copy of the minor assent form (see Appendix H) and a copy of the focus group discussion questions (see Appendix I). Once six of the selected students agreed to participate, the focus group discussion was scheduled.

Data Analysis

The quantitative data were analyzed using descriptive and inferential statistics. Johnson and Christensen (2020) argued, “Descriptive statistics starts with a set of data, sometimes called a data set. The researcher attempts to convey the essential characteristics of the data by arranging the data into a more interpretable form” (p. 474). Coolidge (2021) acknowledged, “Inferential statistics is concerned with making conclusions about populations from smaller samples drawn from the population” (p. 144). The use of tables and figures were utilized to illustrate the secondary data used to answer research question 1. An Analysis of Variance (ANOVA) was used to determine whether there was a significant difference between the three groups. Coolidge (2020)

suggested, “In ANOVA, the focus is on different types of variance inherent in a multigroup design” (p. 283).

Group 1 was the group that did not listen to music during independent study time. Group 2 was the group that listened to music that was selected by the teacher during independent study time. Group 3 was the group that was allowed to listen to the music of their own choice during independent study time. The difference between each student’s beginning of the year and end of semester Galileo benchmark Algebra 1 scores were calculated. Those scores were then added to an online ANOVA test calculator for analysis.

The qualitative data were analyzed using open and axial coding and were used to answer research questions 2 and 3. Garvey and Jones (2021) suggested, “Through open and axial coding, researchers break data down into parts, or codes, that are then interrelated to explain social phenomena” (p. 2). According to Burkholder et al. (2020), open coding is “the process of identifying, labeling, examining, and comparing your codes and categorizing them into larger, conceptual categories encompassing a variety of similarly themed codes” (p. 236).

Once categories were identified during the open coding process, axial coding was then used to identify major themes. Axial coding involved an examination of the categories identified through the open coding process and the development of major themes. (Burkholder et al., 2020). For this study, both the focus group discussion and the individual interviews were transcribed. After the data were transcribed the transcript of the focus group was given to each focus group participant to verify the accuracy and clarify responses if needed. Interview transcripts were emailed to participants in order to

ensure accuracy. After participants' responses were verified, the process of open and axial coding took place.

Ethical Considerations

The participants in this study were protected and assured complete anonymity. Ethics were held in high regard. The informed consent letters were read and given to all participants to sign prior to the research being conducted. All the secondary data, the signed documents, and the interview and focus group transcripts were secured. Three years after the completion of the research project, all files will be destroyed. Participants will be identified with alphanumeric codes. The focus group and interview data were member checked to ensure accuracy. All participants and parents of minors that participated in the research received and signed a consent form that described the purpose of the study, the risk, and how they could opt out of the research at any time.

Summary

Chapter Three provided an outline of the research method used to answer the research question. The researcher discussed the problem, purpose, research design, population, sample, instrumentation, data collection, data analysis, and ethical consideration. The methodology was designed to answer the question, will music being played during independent practice increase student scores on the Galileo Algebra 1 benchmark assessment. The students and teachers provided their perspectives on how music affected student achievement.

Chapter Four will demonstrate how effective the methodology was after implementation. The results of the study will be described and analyzed. The data from the Galileo Algebra 1 benchmark assessment will measure and describe in detail from a statistical point of view. The chapter will also include data from the student focus group

and the individual teacher interviews which will provide a connection between music and student learning.

Chapter Four: Analysis of Data

A description and an analysis of the data collected which addressed how effective background music during independent practice for students increase student achievement will be highlighted in Chapter Four. Quantitative data from the Galileo benchmark assessment was used in this study to measure the academic achievement of 9th-grade students. A student focus group discussion and individual teacher interviews provided the perspectives of both students and teachers regarding the effect music has on both learning and behavior.

Student data were collected from 36 of the 64 eligible students. Eligible students were those whose parents permitted their child to participate in the study. Six eligible students also participated in the focus group discussion. The Teacher data were collected from four classroom teachers whose students also participated in the study. Tables and figures will be utilized to illustrate the quantitative data showing the effects background music had on student achievement.

Quantitative Data

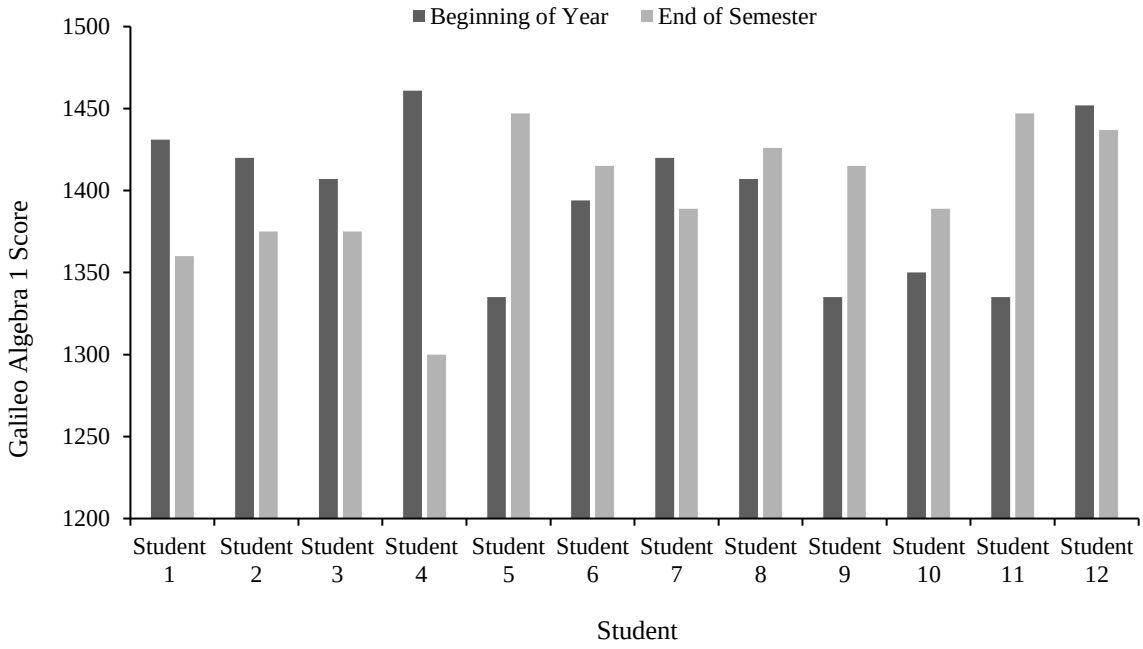
Data from the Galileo benchmark assessment tool were used to answer research question 1. The Galileo Algebra 1 benchmark assessment is utilized throughout the school district to generate achievement data on all 9th-grade students in Algebra 1. The pretest took place during the September 2021 assessment time period, and the post-assessment took place in November 2021 assessment period.

The quantitative data utilized for this study were the beginning of year and end of semester Galileo Algebra 1 test scores. Figure 1 shows the data gathered for students whose teacher-selected the music played during independent practice. Students 1, 2, 3, 4,

7, and 12 improved their Galileo test scores. The scores of students 5, 6, 8, 9, 10, and 11 decreased.

Figure 1

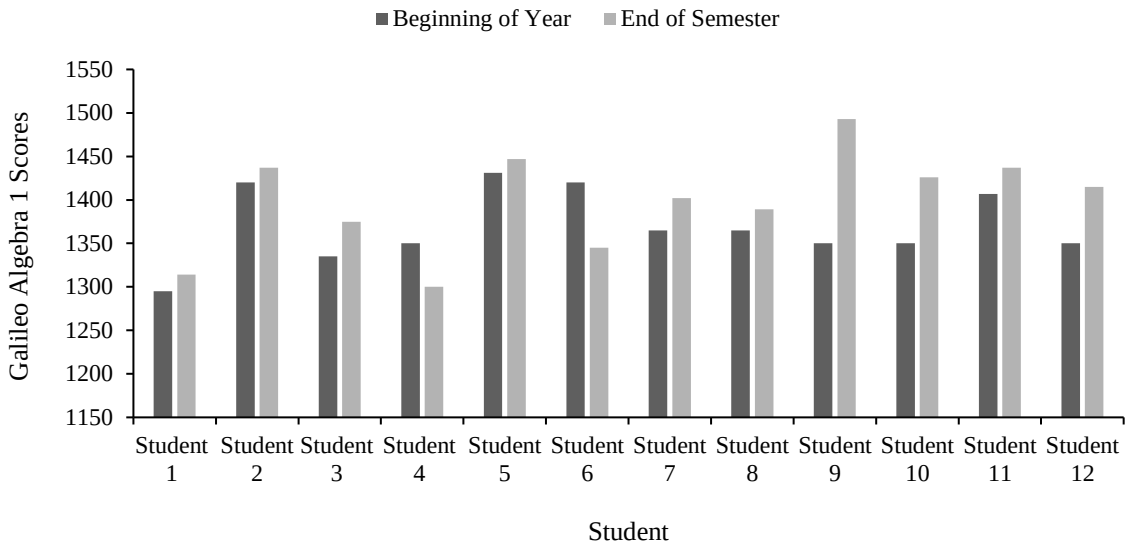
Galileo Scores for Teacher-Selected Music



The Galileo scores provided data from the beginning of the year until the end of the semester. Figure 2 shows data from students who selected their own music to listen to during independent practices. Students 1, 2, 3, 5, 7, 8, 9, 10, 11, and 12 all increased their Galileo benchmark. Students 4 and 6 scores decreased on the Galileo benchmark.

Figure 2

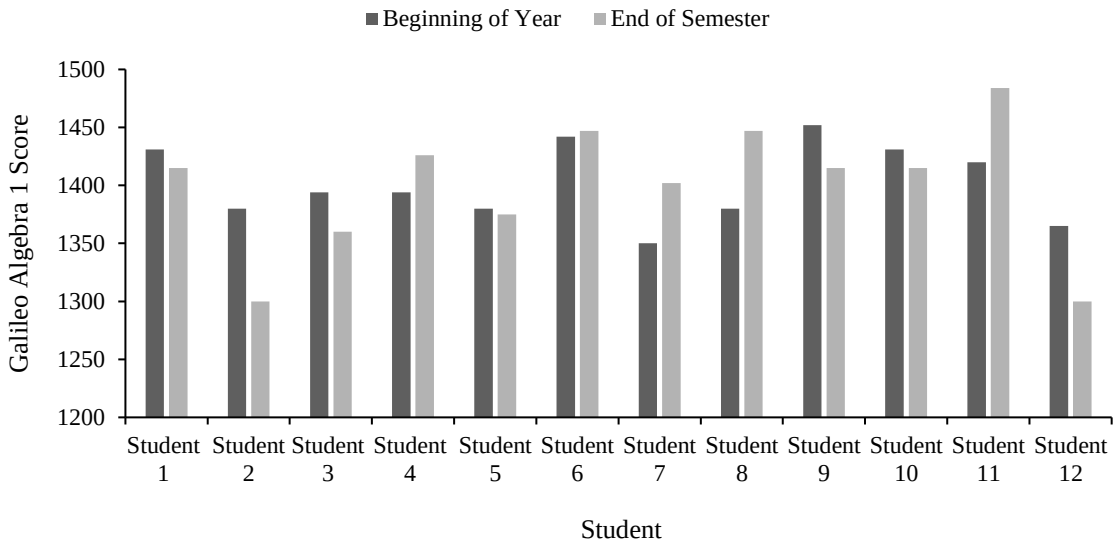
Galileo Scores for Student-Selected Music



The results of the students listening to no music at all are shown in Figure 3. The student's growth on the Galileo was significantly lower between the pre- and post-assessment for most students. Students 4, 7, 8, and 11 scores increased on the Galileo Benchmark Assessment. Students 1, 2, 3, 5, 6, 9, 10, and 12 scores all decreased on the Galileo Benchmark Assessment.

Figure 3

Galileo Scores for Class with No Music



ANOVA Analysis

A two-way ANOVA was performed to analyze the effect of teacher-selected music in the classroom, student-selected music in the classroom, or no music in the classroom had on the Galileo Algebra 1 benchmark assessment. Beginning-of-year and end-of-semester assessment data were used. A two-way ANOVA revealed that there was not a statistically significant interaction between the effects of teacher-selected music, student-selected music, and no music played during independent study time for Algebra 1 ($F(2, 66) = 1.242$, $p = .4662$). Simple main effects analysis also showed that student-selected music played during independent study time did not have a statistically significant effect on test scores ($p = .4574$). Simple main effects analysis showed that teacher-selected music played during independent study time did not have a statistically significant effect on test scores ($p = .3986$). There was no significant difference; therefore, the null hypothesis was not rejected. There is no significant difference in

student growth on the Galileo Algebra 1 benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all.

Qualitative Data

The qualitative data collected for this mixed methods study included a student focus group discussion and individual in-person teacher interviews. The researcher was the facilitator for the focus group and the teacher interviews. Each participating classroom teacher-selected two random students who had been granted permission to participate in the focus group discussion by their parents.

The student focus group included three male students and three female students. Two of the six selected students had an individualized educational plan (IEP) to address the students' disabilities. The focus group discussion lasted approximately 40 minutes. Each participant was assigned a numeric code to ensure anonymity. The participants were encouraged to share their views during the session through conversation with the other participating students. The participants were asked five questions about their perception of "How background music affected their learning and behavior."

The teacher interview participants included two male teachers and two female teachers. In addition, two of the teachers were African American, and the other two were Caucasian. The participants' teaching experience ranged from five to 20 years in mathematics. Seven interview questions focused on each teacher's perception of how they felt the students' behaviors and academics increased in a positive manner. Each teacher interview was approximately 30 minutes in length.

Focus Group Discussion

The focus group was held in a classroom setting. The students were informed of the purpose of the study. The students were also made aware that they were in a safe environment for discussion. The students could respond openly and honestly to the questions, and there were no right or wrong answers. Classroom teachers were made aware that the students would be out of class for approximately 30 to 45 minutes. The students were responsible for all missed assignments during that time frame. The students were told that the focus group session was being recorded. Participants were also provided an opportunity to opt out of the focus group session.

Focus Group Discussion Question 1

How do you feel about having a choice in how you learn in the classroom?

All focus group participants stated they liked having a choice about how they learned in the classroom. Participant 5 stated, “I feel it would be a better experience to decide how I would like to learn in my different subject areas than just doing things the regular way.” Participants 1, 3, 4, and 6 added that they liked having choices. Participant 2 declared.

> I agree with number 5’s statement. I feel that having choices is necessary and fun to have a choice, but there should be a minimum amount when it comes to students making their own choices in the classroom. Say there was one subject that the teacher can break up a lesson into three parts so you can learn and grow in your own style, allowing you to pick an option and do what you want but also keep it to where you don’t drive too far off from what you need to be doing. This allows me to still have a voice. Because if there is an assignment, I would want three different options on how to do said assignment, so it always depends on how

> I'm feeling that day to go through with it. I would still do it but, it's just that I would get options on how to do it now.

For the participants to feel like they have a choice and voice in their education, all six participants felt teachers should know about their learning styles and what works best for them. Participant 1 indicated, "I would like to email and talk to my teacher about my assignments is what helps me." Participant 2 made an analogy of groups in kindergarten and stated,

> I feel this is important to be known on the first day bases. So, you know how everyone goes into their separate group and functions and plays together. It's basically you know how some people are more hands-on, some are visual learner, and some are just let me do it by myself, and I got it. It's good to break down the classroom into groups to understand how to effectively teach better for each separate group and still get everyone to learn.

Participant 6 agreed, "If somebody feels they learn visually or are more hands-on then they can get help from people in their group just like them and learn better." Participant 5 added, "I agree with number 2 because you can go into groups with your peers and see and learn and get to know them more. They can also tell the teacher how they learn to help find better ways to teach people." Participant 1 would also like to see more grouping in the classroom; they proclaimed, "Groups allow you to see how others are learning on assignments."

Focus Group Discussion Question 2

Do you think listening to your own selected music during independent practice improved your accuracy on class assignments?

All students agreed that they liked having their own choice of music to listen to during independent practice, and most of the group agreed that music improved their accuracy on class assignments. Participant 4 argued that there was no correlation between music choice being played and accuracy on class assignments by saying,

> I would say no, because most people, most of our music, as you'll say most of our music is hyped, and for me, hype music is not ideal music to study with. I prefer the calming music that was played in our class.

Participant 2 interjected to elaborate and stated,

> Yes, I feel as if having a choice of listening to your own music that is basically yours, meaning that it's what you like to listen to, and it is not just one basic genre. I feel that it gives a nice little sense of being calm and collected and focused.

Participant 2 confirmed part of the statement made by participant 4 by stating,

> Though I do understand what you were saying, number 4, because certain music can tend to get you in a certain mind, so it is important when you choose your music; you should choose something that will help you instead of distracting you.

Participant 3 eagerly stated for the record,

> I disagree with number 4 because I feel like you should have enough knowledge to know what music helps you focus on the subject you are working on and the music you pick out for you is the best music that you think will help you concentrate. I know people that can operate and concentrate listening to rap music because I can focus and concentrate listening to rap music.

Participant 5 wanted their voice to be heard by placing their card in the air to be called on next and exclaimed:

> I agree with number 3! Because depending on the type of music that you like to listen to, it can bring you to a state of mind of calmness where you will be able to get work done and focus. Now, it can depend on the music, but depending on that person, it might not affect others as it would you.

Participant 1 agreed with 3 and 5 by describing the type of music that can enhance their learning in the classroom. “If I listen to jazz music, it will put me straight to sleep, but if I listen to rap or R&B, it increases my workload.”

The participants described the different types of music that they believed would assist them with academic achievement. Participant 6 stated, “I like all music.” Participant 2 could not give exact music for all students but feels “there are multiple genres that they deem for these type of circumstances like some students may take a test may say rock music helps me or I listen to pop, old music, retro or indies music but I prefer rap and pop” Participant 4 said, “The music that would help me is pop, rap, and calm music with less vocals and more instrumental.” Participant 5 was able to use problem-solving strategies during independent practice by listening to rap, calm, vocal, and soft music that calmed them down. Participant 1 stated, “mine is 90’s and mid-2000s R&B and 90’s and 2023 Rap.” Participant 3 revealed a love for rock music but stated, “I sometimes listen to soul music and really like R&B the melodies help me focus more.”

Focus Group Discussion Question 3

Do you feel listening to your own selected music during independent practice improved your behavior? Why or why not?

All participants feel that music influences their behavior. Participant 3 started off by saying,

> So, I feel like, especially with rap music, people can be influenced by what they are saying in the song; that is why I don't listen to rap all the time, but I still listen to it sometimes. I feel like R&B really helps my behavior because I used to get upset really easily but when I started listening to R&B, and now I'm just calmer, I don't like to talk to many people as much.

Participant 1 agreed that rap music was an issue for them at one time in their life and commented, "I feel like last year rap music had me all over the place because I was immature and still trying to find myself." Participant 4 agreed with participant 3 about how some rap music lyrics influenced students' behavior and provided a specific and current artist of this day that students imitated and shared:

> I agree with number 3 and depending on what the music says can influence your behavior. For example, let's say certain rap like *The Baby,* their words and music might have you wanting to do the same thing they do. The difference is they were grown, but if students listened to a different genre of music, such as jazz, they will be calmer.

Participant 2 added:

> So, basically, I think music with certain circumstances music helps with behavioral issues because only for the fact of I know I get heavy test anxiety. I don't like taking tests. I don't like the silent room and just listening to everyone writing things down and finishing up. I feel like music is a big, major stress reliever for me, and no matter what music I'm listening to, whether it is heavy rap or calm music, it just helps in general not to focus on everyone else and the test itself.

Participant 6 stated, “Music can affect my behavior, but it mostly depends on my mood that day.” Participant 5 shared beliefs and experiences that they witnessed involving the effects of music on human behavior:

> I do believe that music can help with your behavior because, for example, my grandma, she gets a little cranky or a little mad, but when she turns on her music, she calms down and sits down and she listens to people. I do the same thing when I am aggravated or stressed out, I turn on some music, and it keeps me on track.

The participants also felt that music could have a negative effect on their behaviors in the classrooms. The participants were able to express the causes and effects that may lead students to have discipline issues from the types of music they listened to during the school day. Participant 1 felt, “If I’m real, real mad and listen to some rap music, I may go off on someone inside the classroom.” Participant 3 stated,

> I feel like if I’m aggravated, and I put on aggressive music, it will only make me more aggravated, and when people are coming up to me saying random stuff, it intensifies it. Like last year when I stepped on someone’s foot by accident, and they yelled at me, and I almost fought them. I would never forget that because I almost got suspended.

Participant 2 agreed with 1 and 3 by clearly saying that,

> I agree with 1 and 3 because if you are already upset and you listen to certain [music], it can get you in a deeper mood than what you already were in, and it can make it hard to focus because you are already in a mood.”

Participant 4 stated, “Yes, music can affect students’ behavior in a negative way. I have experience seeing people when they are sad, and they tend to put on sad music and that doesn’t help their situation; it only makes them sadder.”

When negative behaviors arise in students, the participants in this focus group believed that teachers nor administrators should ever take their choice to listen to music away from students. The participants felt they could regulate their behaviors. Participant 4 reflected on how they were able to deal with their behavior change, and music did not have to be taken away, "When I am sad, I listen to happy music, and when I'm mad, I listen to happy music." Participant 2 agreed with participant 4 when it comes to taking away students' options:

> I feel taking away the option of listening to music may be deemed good, in, like, teachers' eyes, or like a dean's eyes, but it does have its ups and downs. For some people music is a relaxing point or an escape to help them calm down so if they are responsible enough to play opposite music to help calm down, I think you should still give them that decision. However, if they are not, then I think you should let them calm down, relax, and then give them the choice to make the decision if they want to listen to music because irrational thinking is very common with people around our age.

Participant 1 agreed with participant 2 and expressed how the classroom environment would be without music, "If you take away music from me, I know that it would make me really sad." Participant 5 was adamant about students having the choice to listen to music, "I feel like music should not be taken away because music makes you feel better overall." Participant 3 felt:

> Emotions are complex, so for somebody to control their emotions, they need some type of resort, and sometimes that resort is music, and if you take away that last resort, it will make them even more angry or sad, and that music that usually

> helped them calm down is not there, and they don't have the option anymore because they have taken away the option.

All participants agreed that students could sometimes be moody or make irrational decisions. However, they do not feel music has caused discipline issues within the school environment. The participants in this focus group did not receive any referrals during the implementation period of listening to their own or teacher-selected music.

Focus Group Discussion Question 4

How do you feel each of the following strategies will affect achievement on classroom assignments and* which *do you feel is the most effective for you?

- ***Teacher-selected music during independent practice.***
- ***Student-selected music during independent practice.***
- ***No music at all during independent practice.***

The focus group participants unanimously felt that teacher-selected music being played during independent practice would not be a good strategy for them. Participant 1 responded by stating, "I don't think this is a good practice for me because I may not like what the teacher is playing". Participant 5 enlightened the focus group by sharing, "I feel like it depends on what the teacher puts on because depending on what that teacher might like to put on for the class the students may not like it. Certain types of music just don't help." Participant 3 insisted,

> I just don't like the type of music that the teacher plays. Because they are not appealing to me. It actually gets me off focus and I'm saying what type of music is this? That is why I make sure that I have my headphones so that I can listen to my own music that will help me focus.

Participant 6 was in the control group that did not have music played; their response from previous experiences of teachers playing music in the background during independent practices was, “It’s just not my preferred music taste, and rather I’d not listen to teachers picking out music for me.” Participant 2 agreed with Participant 3 that personal headphones were needed in that situation;

> I agree with number 3 only because I do have a teacher that plays music and often more times than not, I just don’t like listening to it. It's only because it’s like a parity version like someone else is singing rather than the other singer or like kid’s bop. We don’t have a choice in what is being played. It’s like the teacher picked a random playlist and that’s it. So, I do like bringing my headphones to that classroom because I like listening to my own music, so I don’t get so distracted by what the teacher is playing or the students asking could they pick out a song.

Participant 4 liked listening to all music except for country and always carried wireless headphones to listen to preferred music selections instead of the teachers.

Student-selected music was popular among the focus group participants, and they loved having music as a choice in their learning. All participants felt that music was a strategy that was effective in increasing student engagement and achievement. Participant 2 added,

> I just have one thing to add along with our agreement of student-selected music being best for student achievement. I feel like it is important for us to have an option, but you need to be prepared to make that option. If you don’t have headphones and nobody can supply them, without headphones you should not play music. The reason why is that you should not be blasting your music from

> your phone or computer because what if anyone wanted silence and you were playing your music loudly off your phone or computer, it would be distracting to them that is why you need headphones and make sure they are a reasonable volume that it helps you but do not disturb others in the process.

The strategy of no music inside the classroom was frowned upon by most of the focus group. The focus group participants agreed that without music it would be difficult to focus on class work and cause distractions. The focus group participants also felt that the classroom environment and teacher management of the classroom could be determining factors in the effectiveness of why music should or should not be played within the classroom setting. Participant 4 stated,

> I think it depends on the teacher, the classroom, and just the area that the students are in. Like this classroom, I can work in here with no problem, but for other teachers' classrooms, it is difficult in their classroom because there are so many distractions, like people that don't want to be quiet, and no learning can go on. This is where the options come in handy, and I use my headphones.

Participant 6 added, "No music will not work for me. I need music." Participant 2 raised several points about how no music would be more of a problem than an enhancement for student achievement or engagement.

> I feel having no music at all will be very problematic for multiple reasons. The first reason being honestly, some people just don't work well in silence. There has to be something playing, it's either that or it would be weird for them. There are also some people who don't like listening to anything while they work but always want the option to listen to music if they choose to, and to have the option stripped away from you, no one will be happy, but, I do agree with number 4, that

> it depends on the classroom environment. Like one headphone in and one out is expectable, both headphones in the ear is not expectable in a teacher's point of view and having both out is good. It's just in certain classroom there is certain functions and different things you just have to work around so options are needed.

Participant 3 presented concerns about how no music at all would affect some students with disabilities.

> With me, I have ADHD so, I cannot focus without music. And, I feel like if I don't get to access music, I get very fidgety, and I won't be able to focus so I would just be tapping on my legs or tapping on things and I would not be able to focus on my work because music helps me focus. I wouldn't notice my work which is right in front of me.

Participant 5 also expressed their need for music during the school day. All the focus group participants felt they could not function without music.

> I feel like not having the option to play any music at all is probably one of the worst things a student can have. Personally, I need music to function in the classroom and hallways. It makes my day a whole lot brighter. Without it my life is down and draining because I don't have the boost that I need to go on with my day.

Participant 1 realized how no music could hinder their education and shared, "I feel like music helps me, and if I didn't have no music I would be talking and not getting my work done."

Focus Group Discussion Question 5

In what ways do you feel music might become a distraction during independent practice?

All focus group participants agreed that there are times when music can be a distraction for students in the classroom environment during independent practice. The participants were able to describe in detail the distractions. Participant 3 stated, "Music could be a distraction sometimes, not with me, but with other people. Some students can get so caught up in their music that they space out in the music and forget what they are doing." Participant 4 added,

> Yes, I agree with number 3 because some music you do space out with. I space out sometimes with my own music a lot. I don't know why, but I do. Some students even start singing out loud to the songs not even knowing that they are doing it, while others are wanting silence, and this causes a distraction.

Participant 2 described how headphones can be a distraction and how students should stay engaged in the classroom.

> I agree with numbers 3 and 4, solely because when having headphones, you either have the volume too loud where everyone can hear it or so low you can barely hear it or sometimes you can get it just right…enough just for you to hear. But my headphones are over the top, and I cannot hear you and my voice gets loud, louder than I need to be. So sometimes you need to look at the teacher to see if they are getting ready to give instructions just to make sure you are still engaged in the lesson and maintaining your work.

Participant 1 admitted,

> When I have my air pods in my ears, I can't hear a thing. Then I may start rapping a song loudly, and people are telling me to be quiet, and I don't hear them. I get mad when somebody tells me to stop talking.

Participant 5 reiterated, “I feel like music can be a distraction if it comes to the teacher playing music because the students may not like it.”

The focus group participants found that there were some music genres that might have the opposite effect on students as opposed to pop, rap, and R & B. Participant 1 described the negative effect jazz music had on them when played in the classroom, “Jazz is a problem for me. I fall asleep as soon as it starts playing. When I was in daycare that is the music, they always put on when it was nap time.” Participant 3 shared that instrumental music was not a good choice for students to listen to and that it would have a negative effect on their work productivity. Participant 3 determined that the music must have vocals to work.

Teacher Interviews

The teacher interview participants consisted of two male teachers and two female teachers. Two of the teachers were African American and the other two were Caucasian. The years of teaching experience for the teachers varied from five to 20 years. There were seven interview questions that focused on each teacher’s perceptions of how they felt music may have impacted student behavior and academic achievement. Each teacher interview lasted approximately 25-30 minutes.

Teacher Interview Question 1

In what ways, if any, do you feel teacher-selected music for students to listen to while completing independent work might make an impact on student behavior?

All teachers felt that playing background music in the classroom created a positive culture and climate within the classroom. The music most preferred by teachers was instrumental jazz, modern instrumental, and instrumental violin. The student’s behaviors were manageable after the implementation of teacher-selected music. The

teachers were unable to choose the most effective genre that might enhance student learning and improve student behavior because students listen to multiple genres. Teacher 1 stated, “Music affects students in different ways. It depends on the individual student on how certain music affects them.” Teacher 3 proclaimed, “I know that there is a connection with music and mathematics.”

Teachers 1 and 4 agreed that teacher-selected music during independent practice provided a more relaxed and focused atmosphere. Teacher 1 added, “The students were calmer when they listened to the music I selected for them. The students’ behaviors changed for the better when they were listening to the soft melodies.” Teachers 1 and 3’s preference was not to use vocals in selected teacher music. They did not choose songs with vocals because the students may have wanted to sing along or be disruptive, and it would have changed the desired classroom environment and possible student growth. Teacher 2 claimed, “Soothing beats are better. Lyrics may be distracting.” Although Teacher 4 agreed with the effects music with no vocals had on the students, they also believed that songs with meaningful lyrics could enhance behavior and learning, examples being old school R&B. Teacher 4 indicated,

> The music that the students listen to, such as RAP music and other genres, have meaningless words, are corrupt, and deals with violence that students want to imitate. The images portrayed in the songs cause disruptions in the classroom. The students need to hear meaningful and positive lyrics within a song. They may not want to hear it at first, but I believe they would get used to it or just put their headsets in their ears.

Teacher Interview Question 2

Do you think students listening to their own selection music during independent practice improved their accuracy on class assignments? Why or Why not?

All teachers felt that playing background music in the classroom provided students with a voice and a choice in their learning environment. However, music that is selected by the students could have a positive or negative effect depending on the type of music being played. Specific genres could influence student behavior. Positive behaviors occurred, and increased student achievement was evident when students made appropriate choices on the type of music they would be listening to. Teacher 2 observed, "When students made good choices on their music selections, the classroom was calmer, students completed more assignments, and test scores increased." Teacher 1 reported,

> I'm really not sure because the students that are accurate are accurate across the board, and the inaccurate [students] were inaccurate consistently. Music didn't have an effect on the class assignment. I could see it having an impact on behaviors but not assignments.

Teacher 4 agreed with Teacher 1 that there was no improvement or change in accuracy on assignments due to the students listening to background music.

The teachers had different perceptions of whether or not students listening to their own music during independent practice was improving accuracy on class assignments but agreed that there are concerns about allowing students to listen to their own music during independent practice. Teacher 1 expressed that "the biggest concern is students spending too much time searching for songs on their cell phones to get one that they like and not get anything done." Teacher 3's concern was similar to Teacher 1 with students selecting their own music being a distraction by indicating, "The only concern is that listening to

music while students work provides another way for students to look at their cell phones and spend more time texting than actually selecting songs or doing their work." Teacher 4 felt, "Students may be too engaged in the lyrics of the song by singing out loud or in their head breaking their concentration on the lesson." Teacher 2 was concerned about the students making the right choices in selecting music, "Sometimes what teachers might think is a wrong choice of music selection by the students could be right for a student to remain focused on the work even if others perceive it to be distracting music for them."

Teacher Interview Question 3

In what ways do you feel students listening to their own selection of music during independent practice might improve their behavior in class?

All four of the teachers unanimously believed that the culture and climate of their classroom changed during the implementation of students listening to their selected music during independent practice. The teachers were able to observe a change in students' behaviors. Teacher 1 sensed through observation that,

> Students who listen to their own music improve [their] behaviors because they have autonomy. They are more willing to cooperate when they have a choice. The students were not up walking around and distracting others when they were listening to whatever they were listening to.

The teachers witnessed the classroom environment becoming more productive and conducive to learning. Teacher 2 exclaimed,

> I've actually seen what happens when the student places their headphones on. They're more focused on what they're doing and accomplishing, and they can tune out all the rest of the noise and class disruptions that are going on in the classroom that may cause a distraction to them. So, music is able to help students gain focus

and remain focused.

Teacher 3 bought into Teacher 2's belief that students were more focused when listening to their own selected music during independent practice and that there was a behavior change. Teacher 3 stated,

> The students listening to their own music help them focus more. For example, you may have a student talking, walking around the room, and not focusing on classroom assignments and maybe even uncontrollable and a teacher provides the student with the opportunity to listen to their own music helps eliminate distractions and alters a student's behavior.

Teacher 4 reiterated:

> Again, it's that choice, and the student is saying, oh, they going to let me listen to my music, ok, I can now tune in and get to work. So many students are connected and want to multitask, right? And they want to be masters of multitasking. I'm not saying they can't. I'm just saying the goal is for them to ultimately select their own music and then get to work. So, I definitely think it does improve behaviors.

Teachers 1 and 2 saw music as having the biggest impact on the social interaction of students. Specifically, Teacher 1 stated, "There was less talking when music was being played within the classroom, and no music being played caused a disruption." Teacher 2 added:

> One of the biggest impacts that music has on the students is less talking. The music helps control the social engagement between classmates. There are times when other students don't respect the learning process of others, and music will help the students to tune out the distraction.

Teacher 4 observed, " Students didn't argue as much and there were less disruptions while the students were listening to music." Teacher 3 found that the biggest impact that music had an effect on was mental behaviors, "music can calm a lot of students down, especially with those students who have a disability. Students with special needs may utilize music therapy as a way of communicating with others."

Teacher Interview Question 4

How do you feel each of the following strategies will affect students' classroom behavior?

Question 4 was divided into three sub-questions. Each sub-question allowed teachers to focus on the strategies used in this study. The teachers shared their perceptions of how students' behaviors might or might not improve if these strategies were utilized in the classroom environment. The teacher's comments were added under each sub-question.

Teacher-selected music during independent practice

All teachers who participated in the interview found teacher-selected music valuable to students' learning and achievement. When selecting background music for students the teachers wanted to make sure that it had a positive effect on the classroom environment instead of the music creating a negative reaction that might impede student learning. The teachers tried to be cognizant of what type of music would work for all students.

Teacher 1 and Teacher 3 responded similarly. Teacher 1 felt songs that students could relate to helped form a sense of community in the classroom,

> I think teacher-selected music is a good strategy especially when teachers pick calmer but still relatable songs. The classroom environment is more conducive to

> learning, and it gives a sense of community if they are all listening to the same music.

Teacher 3 agreed and shared, “Teacher-selected music would be a good strategy if the right background music was played for the students. I believe it could have a positive effect on student learning and behavior.” Teacher 4 stated, “I feel teacher-selected music is the best strategy to use to enhance learning.” Teacher 3 agreed teacher-selected music could make a difference but was concerned about the impact some music might have on the classroom environment. Teacher 3 stated:

> Sometimes when teachers select the music they may select music the students don’t know, and the student may not enjoy it there can be various reactions. Teachers need to make sure the music they are playing is not taking the focus off of student learning. For example, the students may not have heard a certain type of music the teacher is playing and have questions about the music which prompts a discussion that is not the focus.

Student-selected music during independent practice

Three of the four teachers agreed that student-selected music would have an impact on student behavior. Students selecting their own music give them a choice. The students will focus on class assignments with minimum distractions. Teacher 1 argues that student-selected music may cause a plethora of distractions within the classroom environment. “ I feel that student-selected music creates possibilities for disruptions if students don’t take advantage of the option. If I had a choice, I would prefer not to have students listening to their own music.”

Teacher 2 held the view that student-selected music could benefit students in the classroom environment,

> I think students choosing their own music can be positive. The students can enjoy their music, keep calm, focus, and do better on assignments. It produces a positive behavior within a student. I know that there is some music that students listen to that I have never heard and would not play for the whole class, but it works for them. I feel it is important to know what works for each individual student. I feel it's important for students to have a choice.

Teacher 3 asserted,

> It depends on the classroom environment, but I feel student-selected music would be effective and students would produce more work. They would be seated working not talking and distracting other students if they had the opportunity to listen to their own music. I have observed music helping when students had to focus on a math or science problem that had multiple steps to complete the task.

Teacher 4 believed choice equals responsibility, "Student-selected music may also be a choice to utilize in the classroom. This strategy makes students aware that they have a choice in how they learn and it places responsibility on how they manage their time for learning."

No music at all during independent practice

There was a split among the teachers when it came to using no music at all during independent practice. Teacher 1 and Teacher 4 agreed with each other on not having music at all in the classroom for awareness and understanding of what is best for students. Teacher 1 suggested,

> Students have to learn how to focus without music, and that's a problem that students have. So, I think it's necessary to have the students work with no music

> at times because the state exams don't allow it and most teachers' exams don't as well. So, they need to think in silence.

Teacher 4 established the reasons for students having no music in the classroom setting.

> For math, I feel no music in the classroom would be a strategy that will work in my students' favor. It would provide a better opportunity for students to stay focused and complete assignments. This is what I prefer as a math teacher. Then I have a better chance of understanding what I need to do as a teacher if I have students not comprehending the lesson.

Teachers 2 and 3 concluded that students inside the classroom with no music at all would cause a serious problem for students and their classroom environment. Teacher 3 felt, "No music at all will be a serious problem. This strategy will have students talking, walking around, trying to leave class, and sleeping because they feel class is boring." Teacher 2 suggested that,

> Having no music at all for a strategy should be a personal choice for each person. Also depending on what students are doing at the time. I know for me it depends on what I'm doing if I would want music or not and no music at all would probably make me a horrible student. I listen to music all the time at my desk. I like to have music. I find it to be relaxing. So, if I feel that way as an adult I believe students may feel the same way. I definitely feel if students are not listening to teacher-selected music in the background, or have their own headsets in their ears, may cause more student disruptions, distractions, and behavioral issues.

Teacher Interview Question 5

In what ways do you feel music might be a distraction during independent practice?

All 4 of the teachers felt music could be a distraction during independent practice at times. The distractions could affect the whole class or just an individual student. Most of the teachers agreed that music by itself was not the issue. The issue is how the students chose to implement the music during independent practice. One teacher felt the lyrics within the music were a distraction.

Teacher 4 shared their thoughts on the lyrics in the music, "I feel the lyrics itself and the message of the song makes a student concentrate on it more than they are focusing on the lesson. So, you know you doing two things at once, and that is the distraction." Teachers 1 and Teacher 3 noticed how the students' selection process hindered the student's ability to focus on the lesson and wasted class time. Teacher 1 stated, "Some students spend too much time searching for songs." Teacher 1 also believed, "Some students, if the music is relaxing enough of a song, students will go to sleep when they usually don't sleep in class. I feel that looking for music and sleeping would be the biggest possibilities for distraction." Teacher 3 echoed that sentiment:

> The changing of the music. There could be more focused on trying to find the right music. So, trying to find the right music can actually take away from the learning. Students take about 10 minutes to get started on a lesson. When the student does get started a song may come on that they don't want to listen to so the search begins all over again. Singing out loud, moving around dancing, and sharing music may also be a distraction.

Teacher 2 perceived:

> If music is playing while the teacher is talking or students are using their own devices and different music is being played that may be distracting. There are times that the teacher's music that is quietly being played in the background could cause students to be frustrated or more distracted within the classroom.

Teachers and students like to work in a calm environment that is conducive to learning. Even though all the teachers in this study observed music enhancing learning for some students, they also noticed that some students preferred silence. Teacher 1 argued, "Not all students are able to focus with music, some students need silence." The teachers provided their strategies or thoughts on how to allow autonomy for the students who preferred silence. Teacher 1 suggested,

> The only strategy that I can think of to allow autonomy is student-selected music that students listen to music on their headphones quietly enough that only the student can hear it. That way those students who prefer and need silence to think still get the chance, the opportunity. Also, students who feel they focus better with music playing also get that choice. So, bringing it back to student choice and driving their motivation to do the work.

Teacher 2 agreed with Teacher 1 about the use of headphones and let it be known that "Trying to please all students is impossible, but letting the students use headphones may give all students autonomy." Teacher 3 took a different approach, "To allow autonomy I would first survey the students about what helps them focus and learn. Maybe all the students to be in a secluded space if possible." Teacher 4 could not think of any strategies that would allow for autonomy for all students.

Teacher Interview Question 6

During the implementation period of this study, do you feel your written referrals have increased, decreased, or stayed about the same? And why?

All teachers were able to view their data on student referrals and concluded that all scores either decreased or stayed the same for referrals during the implementation period of this study. The teachers may have had an issue but handled it without writing referrals. Small issues were handled by conferencing, parent contact, or detention. The teachers contributed the decrease in referrals to music being played in the classroom because they saw changes in student behavior, and experienced fewer disruptions and distractions.

Teacher 1 stated, "During the implementation of teacher-selected music I had to have a conversation with students for disruptive behaviors such as bothering other students while they work or socializing, but no referrals were written." Teacher 2 shared, "I would say the referrals decreased. We've had better behavior and improved behaviors from the beginning of the school year just because of music." Teacher 3 presented this analysis of written referrals:

> I think the number of referrals decreased just because the students had a choice to listen to music during independent practice. The environment changed. The students were not being as disruptive or distracted as much. They were able to just actually get their work done.

Teacher 4 acknowledged:

> There were no referrals written because the students in this class remain consistent when it comes to behaviors. I have also been the same since I have

established the expectation for the classroom. Most of the time I will make a phone call home to parents or assign an after-school detention.

Teacher Interview Question 7

What other benefits did you observe as a result of utilizing music in the classroom during independent practice?

When it comes to utilizing music in the classroom during independent practice Teacher 1 believed that there were several benefits:

> One of the factors is that music could be soothing and most of the class was working. You know doing the same thing. The completion rate was higher for the class as a whole. The students' grades were better overall which promotes self-efficacy and students' confidence. The culture of the classroom changed. I don't think music will ever be a problem, but I do believe at times music has its place.

Teacher 2 described the biggest benefit they noticed:

> I think one of the biggest benefits is the individual progress that was of students that made a significate increase because they were allowed to listen to their own music through the headphones and tune out everyone and everything that was going on around them. The students do better on assignments and completing them. So, I've always liked it if the students listen to their own music that helps them stay focused and in tune with what is going on with their classwork was a plus. The climate of the classroom changed for the better. The students' attitudes and attendance improved as well.

Teacher 3 agreed with Teacher 1 and Teacher 3 about the change in the classroom environment:

> The benefit of having music in the classroom was the students were not walking around the classroom. The classroom was a lot quieter. Everyone seems to be more focused. The students' grades were higher than before because they were working with fewer distractions.

Teacher 4 was adamant about the benefits of not having music within the classroom setting:

> So, I would say my benefit is the need for 100 percent of my students to participate and be focused on the lessons. I need my students to be unplugged and right there from all music and distractions. I would say as a math teacher, math waits on no one. If students are not focused on math they will struggle. That is why I believe not having music eliminates distractions within the classroom.

Summary

Chapter Four included a presentation of the data collected. The quantitative data were presented using figures. These figures aided in the analysis of the data. The data gathered from the quantitative portion of the study pertained to research question 1.

The qualitative data were also included in Chapter Four. Perceptions gathered from the student focus group were provided to answer research question 2. The perceptions provided from the individual teacher interviews were gathered to answer research question 3.

Chapter Five will include the findings of this study. The conclusions will be formulated using the data collected from this study and the review of literature provided in Chapter Two. Also provided in Chapter Two will be implications for practice. Implications for practice will suggest possible solutions to the problem addressed in this

study and provide possible solutions as well. Finally, several recommendations for future research will be included.

Chapter Five: Conclusions and Implications

The purpose of this mixed-method study was to consider the influence of music on students' perception and academic achievement on the Galileo Algebra 1 assessment. The teachers' perceptions of students' behaviors after the implementation of music were also examined. This chapter will include the findings from the data collected and presented in Chapter Four. Chapter Five will also include the conclusions of the study and implications for practice. Finally, recommendations for future research will be provided.

Findings

Quantitative

Research question 1. What is the difference in student growth on the Galileo Algebra 1benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all?

A two-way ANOVA was calculated to answer research question 1. There was no significant difference; therefore, the null hypothesis was not rejected. There is no significant difference in student growth on the Galileo Algebra 1 benchmark assessments between 9th-grade Algebra 1 students who listen to their preference in music, 9th-grade Algebra 1 students who listen to music selected by the instructor, and 9th-grade Algebra 1 students who listen to no music at all.

Qualitative

The qualitative data were collected from two different populations and samples. The focus group discussion participants were 9th-grade Algebra 1 students selected randomly by the Algebra 1 classroom teachers. The focus group discussion participants

were asked to share and discuss their perceptions of having a choice in selecting and listening to their own music during independent practice and how those selections affected their academic performance in Algebra 1 class. The teacher interview participants included four Algebra 1 teachers whose classes participated in the quantitative portion of the study. The teachers were asked questions about their perceptions of student behaviors after implementing teacher-selected and student-selected music within the classroom setting.

Focus Group Discussion

Research question 2. What are Algebra 1 students' perceptions regarding the effects of listening to their own selected music has on their academic performance in 9th-grade Algebra 1 class?

Participants 1, 2, 3, 4, 5 and 6 felt having a choice and voice in their learning by making the decision to listen to their own music during independent practice placed them in a better position for learning and academic growth. Participant 5 believed the traditional way of learning could be enhanced by allowing students to make their own decisions on how they learn in different subject areas. The participants in this focus group found teachers knowing their learning styles was important for teaching and grouping students. Grouping students assisted teachers in teaching effectively. Participant 2 specifically discussed students being visual, hands-on, and independent learners. Participant 6 suggested that if students were grouped together by learning styles they would be able to learn from other students just like them.

The majority of the focus group agreed that listening to their own selected music during independent practice impacted the accuracy of class assignments. However, all participants agreed the type of music chosen by students may make a difference and be

distracting rather than productive. As stated previously by Participant 4, the music of our generation is hyped, and hyped music is not conducive to studying. Participant 5 believed the music could be the problem, but it could also be the individual. The same music one student may listen to may not affect another similarly. Some of the focus group participants recognized that they had to make the right decisions on music selections in order to focus. Participant 2 sensed certain music altered their mindset while listening and suggested it would be imperative that students take that into consideration when making their selection. Participant 2 added that students should select music that would assist instead of distract them from learning. There are several types of music that the participants felt would contribute to their academic achievement (See Table 3).

Table 3

Types of Music Student Focus Group Members Felt Enhanced Their Learning

Focus Group Participant	Type of Music							
	Rap Music	Pop Music	R&B Music	Calm Music Fewer Vocals	Instrumental	Jazz Music	Indie Music	Rock Music
1	Y	N	Y	N	N	N	N	N
2	Y	Y	N	N	N	N	N	N
3	N	N	Y	N	N	N	N	Y
4	Y	Y	N	Y	N	N	N	N
5	Y	N	N	Y	Y	N	N	N
6	Y	Y	Y	Y	Y	Y	Y	N

Note. Y= Yes, N=No.

Table 3 represents the types of music the student focus group felt enhanced their learning on class assignments. Participants 2, 3, and 5 made similar statements that suggested listening to the music selected in Table 3 enhanced their learning because they could be calm, focused, and concentrate more while listening to the music of their choice.

According to the students in the focus group, all students thought Rap Music enhanced learning for them and allowed them to increase academic achievement.

Pop, R&B, and Calm Music with Fewer Vocals were tied for the second music genre that enhanced student learning. Instrumental music was third in regard to students being calm, focused, and showing improved academic achievement. Jazz, Indie, and Rock music were the least favorite of the student focus group participants for improving student engagement in their lessons during independent practice. Participant 6 was well-rounded with their music selections by listening to seven types of genres. All other participants had different combinations of genres represented in Table 3. Participants 4 and 5 selected two of the same music genres and one that was different for the music that motivated them to improve academic achievement. Participants 1, 2, and 3 found two genres that enhanced their learning. Participants 1 and 2 agreed on one of the two genres and Participants 1 and 3 also agreed on a different genre.

All focus group participants felt music had an impact on their behaviors. Participants 1, 3, and 4 recalled listening to Rap music altered their behavior in a negative way. Participant 3 suggested it was not just the music, but the lyrics also influenced students. Participant 3 decided to not listen to Rap music all the time. Participant 3 also found music such as R&B helped calm behavior within the classroom setting. Participant 1 discussed Rap music being an issue because of the lyrics and maturity level at the time of the implementation period of this study. Participant 4 agreed that lyrics within music play a leading role in the students' behaviors. Participant 4 provided the name, "The Baby," as an example of music and words that may have students wanting to misbehave or reenact the song.

Participant 2 and Participant 5 believed music could have a positive effect in certain situations. Participant 2 proclaimed that music could provide a solution to behavioral issues such as anxiety, stress, and focus that some students may experience. Music is also helpful during tests. It does not matter what type of music, heavy rap, or calm music. Participant 6 acknowledged that music could have an effect on behavior but is not willing to place all the blame directly on the music. Participant 6 placed most blame for behavior on the current mood or mindset of the student listening.

The focus group participants expressed that there were times when students listened to music during the school day that could produce negative behaviors and created discipline issues. Participants 1, 2, 3, and 4 agreed with Participant 6 that the current mindset and a particular genre of music might cause negative behaviors to manifest in students. Participant 1 and Participant 3 made similar statements about their behaviors when listening to music while already being upset about another situation. Participant 1 shared when they had reached their limit and were truly angry, if they listened to Rap music they could possibly blow up on someone inside the classroom. Participant 3 disclosed when in an aggravated state of mind and the music choice was also aggressive then that would make them more aggravated. When other students were just trying to have a conversation by saying random things, it intensified their emotional state of mind and brought about negative behaviors that might lead to a suspension. Participants 2 and 4 declared that students that were already upset or sad might become more angry or sad while listening to certain types of music and both participants felt that did not help the situation.

Although negative behaviors could occur because of music within the school environment, focus group participants did not believe it should be banned by teachers and

administrators. Participant 2 shared that the administration taking music away might be deemed good from their point of view but for students that music is an escape, calming, and relaxing, and if utilized properly music could be used as a strategy. Students being able to select music to alter their behavior gave them a choice in their learning process. Participant 5 felt music was needed because it made students aware of their emotions. Participant 3 wanted music to always be an option because emotions are complex. In order to gain control, students need the option of music as a last resort in dealing with emotions. All focus group participants affirmed that students could be on an emotional rollercoaster and make irrational decisions but felt music had supported the culture and climate of the school environment. The focus group participants contributed not receiving referrals to the implementation of listening to their own selected music during independent practice.

All focus group participants stated teacher-selected music during independent practice would not be a good option for enhancing learning for the following reasons:

- Not liking teacher-selected music choice
- Certain music doesn't help them focus.
- The need for personal headphones to listen to their own music selection.
- Being distracted by students asking can the teacher pick a new song.

Participant 1 believed teacher-selected music was a strategy that did not work because they might not connect to the music being played. Participant 3 felt that teacher-selected music was not appealing and hindered student focus. That was the main reason why headphones were utilized in the classroom to listen to preferred music to assist with student focus.

Participant 6 felt the same even though they were in the control group. Participant 6 explained that they had a teacher outside of this study that played music often in the classroom and prefers not to have teacher-selected music in class. Participant 6 stated they always brought their headset with them to class because the music that was being played was a parity version or kid's bop which was not a good choice for high school students. Other students always asked the teacher to change the songs and that became a distraction for Participant 6.

The focus group participants loved having a voice and choice in their education. Therefore, making student-selected music a popular choice for the focus group. The focus group participants found student-selected music a great tool to increase learning, student engagement, and student achievement.

Participant 2 attached specific instructions on the responsibilities that came with students making their own music selections. Participant 2 felt the importance of having an option but wanted students to be prepared to make that option. Students should make sure they have their own headphones or they can obtain a pair from a teacher or the library. Students without headphones should not play music from their phone or their computer. Students needed to be respectful of the students within the classroom. Some students preferred silence and loud music was a distraction for them. Students needed to always be respectful and responsible even if they had on headphones. Students needed to make sure the volume was kept at a reasonable level which helped them to focus and not disturb other students in the process.

Most of the focus group participants found that having no music at all would cause a bigger distraction within the classroom environment. The focus group participants suggested that the classroom environment and a teacher's classroom

management style were both effected either positively or negatively depending on whether or not music was being played in the classroom. Participant 4 stated the space within a classroom and classroom management are important. When there is a classroom with a lot of distractions such as students out of their seats and students that refuse to be quiet, no learning can take place. Participant 6 proclaimed that music was needed and they could not successfully do work without it. Participant 2 gave a few arguments on how *no music* might cause complications within the classroom environment. The arguments provided by Participant 2 included:

- Some students don't work well in silence they need the stimulation from music.
- Some students don't listen but want the option to listen to music if they choose.
- The classroom environment would encounter more distractions from students without music.

Participant 4 shared concerns about being a student with a disability and how "no music" would affect them and others with special needs. Participant 4 expressed they could not focus without music due to their disability. If there was no music there was no focus for them in the classroom setting. They displayed behaviors such as fidgeting and tapping on their leg or other objects in the classroom. They sadly stated, "I would not even notice the work that is sitting right in front of me." Participant 5 felt music is needed throughout their day in the classroom and hallways. Music gives a boost to their life, without music it will be draining. Participant 1 stated that no music being played would not provide the help needed to focus on class assignments and get work completed.

All focus group participants found music to be a distraction at times during independent practice. Participant 3 observed students getting caught up in the music and spacing out in the music and not being aware of their surroundings. Participant 4 added that some students became a distraction by singing out loud because they were so into the music. Participant 2 described how having headphones might hinder a student's educational process. There were times when the teacher was giving important information, and the students were not aware due to loud music playing through their headphones. Participant 2 added, students need to check their surroundings and stay in tune with the teacher's instructions to maintain their classwork. Participant 1 admitted they were not able to hear anything and that they distracted others when they started rapping loudly. It caused problems because other students that were trying to work wanted them to be quiet. Participant 1 said this upset them because other students were trying to correct their behavior.

The focus group participants were able to enlighten and provide some music genres that might have a different effect on students as opposed to Pop, Rap, and R&B. Participant 1 remembered Jazz music as a child and stated that if they listened to it now they would fall fast asleep as soon as it started playing. Participant 3 shared that instrumental music had a negative effect on their classroom work productivity.

Teacher Interviews

Research question 3. What are teachers' perceptions of students' behaviors after the implementation of student-selected music, teacher-selected music, or no music at all?

All teachers felt that teacher-selected music made an impact on students' behaviors within the classroom setting. The background music helped create a culture and climate that was positive and aligned with the vision of the school. The students

responded well to instrumental jazz, modern instrumental, and instrumental violin the preferred choice of the teachers. The behaviors of the students were manageable after the implementation of background music during independent practice. Teacher 1 stated soft melodies made the students calmer and behaviors changed for the better. The teachers focused on music without vocals to allow the students to develop positive work ethics and obtain the desired classroom environment. Teacher 2 claimed, playing soothing beats enhances learning and lyrics cause distractions for students. Teacher 4 believed that lyrics could be distracting but meaningful lyrics also could bring about a powerful change in students' behavior and have them motivated and ready for learning.

Teachers noted both negative and positive effects when students were allowed to listen to their own selected music. The teachers felt the type of music genres selected played a major role in how students performed within a classroom during independent practice. All teachers agreed that the students' selected choices of music were imperative to student growth. Through observation, grade reports, and discipline reports teachers recognized positive behaviors and increased student achievement when students made the appropriate music selection. Teacher 2 observed, a calmer classroom environment, students completing more classroom assignments, and increased test scores due to students making good choices in their music selection. Teacher 1 was not sure they could credit the listening of student-selected music to accuracy or improvement on class assignments. Teacher 1 stated, I could see the impact that music had on the students' behavior but the increase in academic achievement and accuracy on assignments was not noticeable in their classroom. Teacher 1 added, the students who made good grades before the implementation of music continued to make good grades, and the students that were unsuccessful continued to be unsuccessful after the implementation of music.

The teachers had different insights on the effects of student-selected music on assignment accuracy but agreed on the following concerns of students listening to music during independent practice:

- Students took too much time searching for music on their cell phones.
- Students used their cell phones to text or view social media instead of working.
- Students became engaged in the lyrics which caused them to sing aloud in class and broke their concentration on the class assignments and also distracted others.
- Students did not make the appropriate music selection for independent practice.

Teacher 1 expressed one of their biggest concerns was that students spent too much time scrolling through their phones trying to make a music selection and student work was not being completed. There was more focus on the selection of the music the students would be listening to than the work they were assigned to complete.

All four teachers unanimously observed a culture and climate change within their classroom setting after the implementation of students listening to music during independent practice. Teacher 1 stated that behaviors changed due to students having the autonomy to listen to their own music during independent practice. When the choice was given the students were more willing to cooperate. The students developed a sense of structure for themselves not walking around distracting other students when they were listening to their own music. Teacher 2 witnessed the classroom becoming more productive and conducive to student learning. Teacher 2 said when the students placed

those headphones on they tuned out other students and became focused on their work. They became less distracted by the noise. It is Teacher 2's belief that music assisted students in gaining and remaining focused on class assignments. Teacher 3 found that the mental behaviors of students were impacted the most by music. Teacher 3 declared music was able to calm students' behaviors down. Students with disabilities are able to benefit by utilizing music as a way of communicating their needs and working with others.

All teachers that participated in this study found teacher-selected music during independent practice valuable to students' success within the learning environment. The teachers made sure the music selected for students was positive and did not include negative connotations. The teachers wanted to be cognizant of the different music genres that were the best fit for the students they served. Teacher 1 and Teacher 3 felt in order to build a strong class community the songs needed to be relatable. Teacher 4 stated the best strategy to enhance student learning was teacher-selected music. Teacher 3 felt that the strategy of teacher-selected music was beneficial for students' learning but had a concern about students not enjoying the teacher-selected music and the focus being taken off of student learning.

Three out of four teachers believed that student-selected music would enhance student growth and achievement. When students were able to make decisions on how they learn it gave them the buy-in they needed to focus in class with minimum distractions. Teacher 1 was opposed to student-selected music because of the belief that there was a plethora of distractions that could evolve within the classroom environment. "When students do not take advantage of the choice that was given and do not make good music selections on their own, then the possibility for distractions arises. If I had a vote, it would be cast for students not selecting their own music." In holding the view that

student-selected music could influence students' classroom behaviors Teacher 2 stated, "my thoughts are student-selected music is positive, especially for students." Students were able to:

- Enjoy music
- Keep Calm
- Complete accurate assignments
- Produce positive behaviors

All student-selected music should not be played in a classroom setting but it could work for the student as an individual. It is important to have choice and as teachers know what works best for each individual student. Teacher 4 believed having a choice equals responsibilities and that gives students the responsibility to organize and manage their time for learning within the classroom setting.

The option of no music at all during independent practice caused a split among the teachers. In order to create an environment where students were understanding and aware, Teacher 1 and Teacher 4 agreed that having no music is best for students. Teacher 1 suggested that students would be able to focus on instruction and assignments without music which could be very distracting at times. The students also need to prepare for exams given by the state and other teachers in the building that do not allow music. They need to learn how to think in silence. Teacher 4 felt math is the one area that no music was needed as a strategy. "No music allows the students to stay focused and turn in more assignments. This is my preference as a math teacher. I then could have a clear picture of what is needed from me as a teacher if my students are not comprehending new concepts of math."

Teacher 2 and Teacher 3 argued that no music being utilized as a strategy for learning would not benefit students but cause issues within the classroom environment. Teacher 3 proclaimed that this strategy would cause negative behaviors such as excessive talking, walking around, students skipping class, sleeping, and being disengaged due to boredom. Teacher 2 stressed having no music at all should be a personal choice for individual students. It should also depend on the lessons during independent practice. "No music at all was not an option not even for me as a teacher."

Music by itself is not an issue, the distraction comes from the students' behavior during and after the implementation of the music, during independent practice. All four teachers agreed there were times music could become an issue during independent practice. The distraction could be a personal issue for one student or the entire class. Teacher 4 felt music with lyrics could be a major distraction and that students might focus more on those distractions than the lesson. Teacher 1 and Teacher 3 noticed how students focused more on the selection of the music was a distraction wasting time in class. Teacher 1 stated some music could cause an issue for students that usually do not have a problem in the classroom such as sleeping when the music sounds too relaxing.

The teachers in this study were able to observe music being a tool to utilize in the classroom to increase student engagement and learning for some students. The teachers also observed that silence was required for some students to be productive within the classroom setting. Teacher 1 stated there were students that concentrate better in silence and music does not help them focus. In order to address the issue and allow autonomy for students who preferred silence Teacher 1 and Teacher 2 suggested the strategy of students listening to their student-selected music with headphones on a low volume. The students that concentrate and focus better in silence could make the choice to work in

silence while other students listened to music with headphones as long as all students were respectful and followed the rules. Teacher 3's approach to autonomy was to survey students' preferences and finding a secluded area if possible.

All teachers concluded that students' discipline during the implementation of this study either decreased or stayed the same. The teachers felt there were no major issues that they could not handle with a conversation, call home to parents, or detention. The teachers felt the music was the contributing factor in the decreased referrals. The teachers observed their classroom having fewer distractions and disruptions from students. Teacher 1 stated, "I have had conversations with students about disruptions but I have not written referrals." Teacher 2 shared the success of the improved behaviors of students since the beginning of the year and attributed the students' behaviors to the implementation of music. Teacher 4 stated no referrals were written and contributed the success to consistency and established expectations within their classroom setting.

Three of the teachers were able to reflect and share the following benefits of utilizing music within their classroom setting.

- Completion rate was higher for the entire class.
- Students' grades increased
- Students self -confidence rose
- Culture and climate change within the classroom
- Fewer distractions

Teacher 4 explained why not having music in the classroom was a benefit for their students by stating, "I have 100 percent of my students focused and engaged in the lesson. They liked the fact that the students were unplugged from all music distractions. The students had a better chance of not struggling because math waits on no one."

Conclusions

This study was conducted to explore the possibility that background music might enhance student achievement in the 9th-grade Algebra 1 classes. The study also investigated students' perceptions of their learning. DiDomenico (2017) reported previous studies "indicate that music has had a positive impact on the engagement level of students, their comprehension levels, and motivation to learn" (p. 7). Teachers' perceptions of student classroom behaviors was also investigated.

The Galileo Algebra 1 benchmark assessment was utilized to measure student achievement and address research question 1 in this study. The Galileo K-12 benchmark assessment measures targeted instruction of students for mastery of the state standards (Bergan et al., 2013). The student achievement from the two test scores was measured by a two-way ANOVA which indicated some students had achieved growth but not significantly enough to reject the null hypothesis.

The student focus group provided insights into the minds and perceptions of the student's thoughts as a group and as individuals. Music is the one strategy that can engage students and open a pathway for connections and a stronger understanding of concepts (Alegria, 2017). The analysis of the teacher interviews on their perception of the effects of music on students' behaviors generated authentic responses. The teachers were transparent about their likes and dislikes of the use of music in the classroom. The following themes were identified.

Theme 1 - Students should have a voice and a choice in how they learn.

All students felt they should have a voice and a choice in how they learn in the classroom. Teachers utilizing music as an innovative teaching strategy during independent practice provided students with a voice and a choice to decide to increase

their scores on assessments (Merrill & Gonser, 2021). In conjunction with the students having a voice and choice in their learning, students felt it was important for teachers to understand their learning process through,

- Learning Styles- such as auditory, hands-on, or visual
- Grouping - to learn from peers
- Open communication- to provide the best way to encourage and engage the students in their learning

Teachers can better assist students by improving how they listen by,

- Developing better listening and empathetic skills
- Becoming aware of their prejudices and stereotyping
- Develop self-awareness through self-reflection
- Engaging in perception checking

All of these strategies are useful when perceiving the needs of students (Miller & Poston, 2020).

Theme 2 - The students' choice of listening to their own music during independent practice improved their ability to complete assignments accurately.

Van Horn (2020) discovered, "Past research, as well as current studies, have shown that learners find music to be a beneficial part of the classroom learning process" (p. 203). All the Focus Group participants said, *YES!,* that they completed assignments accurately after listening to their own music during independent practice and that they had the grades to prove it. Wilson (2018) discovered that "Music has many factors that influence the performance of individuals on cognitive tasks" (p. 2).

Theme 3 - Music improves student behaviors.

The participants of the Focus Group were influenced by Rap, Pop, and R&B. According to Alexander (2022), “The type of music also matters; students perform better when listening to music they perceive as calming rather than music that is perceived as more aggressive” (para. 3). Focus group participants felt that background music being played during independent practices calmed and focused students on class assignments leaving less room for disruptions and distractions within the classroom environment. Teachers who participated in this study also felt classroom behaviors could be managed by the use of music. When the students were interested in the subject content and not just listening to the teachers’ lectures, students were less likely be behavior problems in the classroom (Bucher, 2019).

Participating teachers felt when students made good choices in selecting the music they would listen to, classroom behaviors were less disruptive, and students focused on their lessons. Brown (2019) described the term "cognitive-behavioral theory" as how people’s behavior is influenced by their cognitive processes. Self-concepts that an individual develops on their own has a direct impact on their behaviors. The conceptions may be founded on both positive or negative extrinsic or intrinsic sources (Brown, 2019). The teachers also recognized that students took an active cognitive approach to how they learned and recognized what they needed to do to be academically successful and improve their behaviors.

Theme 4 - How music is implemented by the teacher and student could become a distraction at times during independent practice. The focus group participants described typical distractions as:

- Students who were too involved in their music and forgot about working on the assignment for the day
- Some students spent too much time searching for music to listen to
- Students who did not listen to the teacher's instructions because they had their headphones
- Students sometimes made poor choices when selecting their music and it affected their mood.

It should not be expected that after the implementation of music for students to show improvement. Music affects students' emotions in different ways that could result in positive or negative responses (Schlichting & Brown, 1970).

The participating teachers agreed that music was not a stand-alone strategy that impeded student learning. The process of how the students' implemented the selection of what music they would listen to and how they would listen to their music disrupted the ongoing cognitive process at times. According to Lehmann Seufert (2017), there is a strong connection between students listening to background music and working memory capacity. The teachers also felt that students concentrating on the lyrics of the songs they were listening to, the volume of the music, and taking too much time to select which music they would listen to were some of the major issues that caused distractions for students during independent practice.

Theme 5 - The Focus Group participants unanimously perceived student-selected music as the best strategy to increase academic achievement for them.

According to Kiss and Linnell (2021), Students listening to their preferred background music decreased mind-wandering states and enhanced task focus. Participant 3 felt not having music would not be productive for them due to their ADHD, and music helped them and other students with special needs. Previous research conducted on the effectiveness of background music has shown that students with special needs presented better classroom behavior when background music was played during practical lessons (Savan, 2009).

Theme 6 - All participating teachers found that teacher-selected music was the best strategy because the implementation of background music can calm students and create a positive culture/climate for students within the classroom.

The teachers believed that teacher-selected music was the best strategy to increase engagement and behaviors. Du et al. (2020) highlighted that when music and cognitive tasks are delivered simultaneously, background music offers a special insight into how the brain functions. The music selection that was purposefully selected by the teachers was culturally relevant to the students and contained no lyrics. Berry (2022) suggested that students' involvement will increase, and they'll feel heard if teachers are able to select background music that is fascinating and relevant to their culture.

The teachers recognized that soft and instrumental music is the most effective music selection when creating a positive climate and culture. Bokiev et al. (2018) noted teachers can create a culture of learning to promote student growth by using music in their communication and creative process. Music activates positive output from students during the implementation of the background music. Fletcher (2014) revealed that music

has been shown to *light up* the entire brain, according to patients who were listening to music during their MRI. The MRIs of these patients showed a connection between music and the stimulation of happy emotions (Fletcher, 2014).

Implications for Practice

Three implications for practice were identified during the analysis of data. These implications are suggestions for educators to consider when implementing music in the classroom. The first two implications were expected as they were both mentioned in the significance of the study in Chapter One. The third implication became apparent during the analysis of data.

Teachers Need to Find Ways to Incorporate Music in the Classroom.

When teachers build on the concept of cognitive learning theory in the classroom students maximize their brain potential. Cognitive learning is an interactive teaching method that aims to teach students how to exploit their brain potential to the fullest (Valamis, 2022). The stimulation of both hemispheres promotes learning and enhances memory. Able (2020), claimed that music activates both the left and right brain at the same time. Participating teachers agreed that combining cognitive learning and music during independent practices may influence both academic performance outcomes and classroom behaviors of students.

Background music is an environmental stimulus for the mind known to affect cognitive performance (Threadgold et al., 2019). Within the framework of cognitive learning theory, learning occurs when a student thinks about a situation while being influenced by surroundings (Boyes, 2013). Professional development for teachers on the use of music and how to implement music in the classroom would be invaluable for student learning. Teachers can improve their ability to implement, modify, and assess

their instruction by participating in professional development opportunities (Queens University, 2022).

Students Need to Feel They Have a Voice in the Classroom.

Focus group participants felt it was important for students to have a voice and choice in their learning. Participants also felt that incorporating music in their learning environment was beneficial to their academic achievement and their classroom behavior. Many students love listening to music while doing their schoolwork (Maas, 2013). Teachers can empower students by teaching cognitive learning strategies that will allow students to effectively apply the strategies in their learning process to maximize academic achievement. According to Western Governors University (2020), the following cognitive learning techniques should be used:

1. Posing inquiries. Students enquire in order to explore meaning in greater depth.
2. Possessing the potential to make mistakes. In order to provide pupils, the chance to make mistakes and learn from them, teachers assign practical challenges.
3. Promoting self-analysis and self-examination. Teachers give their students the chance to reflect on and comprehend their thought processes.
4. Talking out loud. Teachers should provide pupils with the same chances to process and solve problems as they do.

Teachers Need to Have a Clear Process for Students to Follow During the Implementation Process to Avoid Too Many Distractions.

Through this study, there were several distractions during the implementation of music during independent practice that were observed by teachers and students.

Professional development should be provided to train teachers in different strategies that would alleviate distractions caused by the implementation of music in the classroom. Darling-Hammond et al. (2017) described professional development as systematic professional learning that leads to improvements in students' outcomes and changes in instructors' practices.

Teachers should also make sure there are clear and precise rules, routines, and procedures that are aligned with the school and district's mission and vision for student expectation. The rules should be communicated daily and posted within the classroom so students are aware of classroom expectations and the desired outcomes. Focus group participants also were adamant that teachers should also provide options for students to give students their voice and choice in how music is implemented. Some participating teachers felt it was important to control what the class was listening to. For those teachers, the class could benefit from several appropriate playlists generated by students but approved by the teacher. This would allow for music to be played on one device in the classroom instead of several individual devices.

Some of the participating teachers and all of the focus group participants felt that allowing students to listen to their own devices and their own music could be an option as long as there were clear expectations for the type of music the students were listening to. This would allow an option for those students that preferred not to listen to music during independent practice. Implementing some of these suggestions may assist teachers with a clear plan and how to eliminate too many distractions and allow for students to focus on the lessons during independent practice to promote student growth.

Recommendations for Future Research

If this research was replicated the structure of the focus group and teacher interview questions should be written to prompt in-depth responses. The research could also have benefited from a multi-year study. The school district tested three times a year and this research only looked at testing data from one testing cycle. This research only focused on background music being played during independent practice, the students may have been able to benefit from music being implemented during testing in order to make a true impact on academic achievement.

The focus group participants also discussed that they felt certain types of genres of music were more effective than others. A qualitative study which focused on the perceptions of students regarding the impact different genres of music had on classroom behavior and academic achievement would be useful. Focusing on which types of music had the greatest impact on students would be a crucial piece to the puzzle to improve academic achievement and student behavior. This study only focused on 9th-grade Algebra 1 students. A mixed methods study which included multiple grade levels and multiple subjects would be beneficial. This would allow for data to be collected to determine if there was a difference between classroom behaviors and the use of background music in the classroom.

Summary

Chapter Five included the findings from this study. Both quantitative and qualitative findings were provided. Several themes were identified in the conclusions section including; students should have a voice and a choice in how they learn, students' choice of listening to their own music during independent practice improved their ability to complete assignments accurately, music improves student behaviors, how music is

implemented by the teacher and student could become a distraction at times during independent practice, the focus group participants unanimously perceived student-selected music as the best strategy to increase academic achievement for them, and all participating teachers found that teacher-selected music was the best strategy because the implementation of background music can calm students and create a positive culture/climate for students within the classroom.

Three implications for practice were identified. The first implication was that teachers need to find ways to incorporate music in the classroom. The second implication was that students need to feel they have a voice in the classroom. The third implication was that teachers need to have a clear process for students to follow during the implementation process to avoid too many distractions. Finally, recommendations for future research were detailed including suggestions for both qualitative and mixed-methods studies.

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Appendix A

District Permission Letter

Date: XXXX

RE: Permission to Conduct Research in XXXX School District

To: XXXX Superintendent of Schools

I am writing to request permission to conduct research in the XXXX School District at XXXX High School. I am currently pursuing my doctorate through Lindenwood University and am in the process of conducting research for my dissertation. The study is entitled Moving Forward with Music to Promote Student Growth. I would like to request secondary data gathered from benchmark testing for the Algebra I classes during the 2021–2022 school year. I would also like to request permission to invite 6–10 Algebra I students to participate in a focus group discussion. The discussion group will be audio- or video-recorded via Zoom or Google Meet. The purpose of the discussion is to gather data on student perception of their academic achievement after the implementation of music during their class time independent learning. Finally, I would like to request 4-6 of the Teachers whose students are participating in the study to participate in interviews. The purpose of the teacher interviews is to gather data on teacher perception of students' behaviors after the implementation of teacher-selected or student-selected music during class time independent learning.

If you agree, please sign below, scan this page, and email to me, Willie Mae Dean at wd506@lindenwood.edu. If you prefer, you may acknowledge your consent via email. Your approval to conduct this study will be greatly appreciated. I would be happy to answer any questions or concerns you may have regarding this study.

Sincerely,

Willie Mae Dean

Doctoral Student at Lindenwood University

Appendix B

Classroom Teacher Participation Letter

Date: XXXX

Dear Algebra 1 Teachers,

My name is Willie Mae Dean. I am a doctoral student at Lindenwood University, and I am conducting a research study to determine if students listening to personally selected music during independent practice increases student achievement in Algebra l. The title of the study is *Moving Forward with Music to Promote Student Growth.*

The superintendent, XXXX, has given permission for me to conduct this study in the XXXX School District. I would like to invite you to participate in this study. Your participation would include the following:

- Providing me with Beginning and Middle of year benchmark test results for the selected Algebra 1 class.
- Participating in a 30-minute interview.
- Selecting two Algebra 1 students from your class that you feel would be representative of the class as a whole to participate in a focus group discussion with Algebra 1 students from two other classes.
- Acting as a liaison between myself and the parents of the selected students to provide them with an introductory letter to parents, a copy of the adult consent on behalf of a minor that they will sign and return to you, and a copy of the focus group discussion questions.

I have attached the Informed Consent Form and the Interview Questions. I hope you will consent to participate in this study.

Please contact me at 314-370-5135 or by email at wd506@lindenwood.edu with any questions you might have.

Thank you,

Ms.Willie Mae Dean, Ed.S.
Lindenwood University Doctoral Student

Appendix C

Letter of Participation to Parents

Date: 4/27/2021

Dear Parent or Guardian,

My name is Willie Mae Dean. I am a doctoral student at Lindenwood University, and I am conducting a research study to determine if students listen to personal selected music during independent practice increases student achievement in Algebra l. The title of the study is *Moving Forward with Music to Promote Student Growth.*

The superintendent, XXXX, has given permission for me to conduct this study in the XXXX School District. I would like to invite your Algebra I student to participate in this study by participating in a virtual focus group discussion with other Algebra I students.

I have attached the Research Information Sheet for you to read. If you choose to allow your son or daughter to complete the survey and participate in the focus group, please sign and return the consent form that was supplied by the school counselor.

Please contact me at XXXX or by email at wd506@lindenwood.edu with any questions you might have.

Thank you,

Ms.Willie Mae Dean, Ed.S.

Lindenwood University Doctoral Student

Appendix D

Adult Consent on Behalf of a Minor

LINDENWOOD

Research Study Consent Form

Moving Forward with Music to Promote Student Growth

Note: "You" in this form refers to the minor participant. If an activity or requirement refers to the parent or guardian consenting on behalf of the minor, this will be clearly indicated.

Before reading this consent form, please know:

- Your decision to participate is your choice
- You will have time to think about the study
- You will be able to withdraw from this study at any time
- You are free to ask questions about the study at any time

After reading this consent form, we hope that you will know:

- Why we are conducting this study
- What you will be required to do
- What are the possible risks and benefits of the study
- What alternatives are available, if the study involves treatment or therapy
- What to do if you have questions or concerns during the study

Basic information about this study:

- We are interested in learning about influence of music on student achievement.
- Three 9th-grade Algebra1 classes will be selected to participate.
- During independent practice time, one class will be asked to listen to their own music on their own device, one class will listen to music selected by the researcher and played by the teacher aloud in the classroom, and one class listen to no music at all.
- Each class will be randomly selected using the excel random number generator to determine which grouping the class will use
- Data gathered from the beginning of year and middle of year galileo benchmark test will be used to determine if there is a difference between the groups.
- The participating classroom teachers will be asked to select 2 students from their classroom to participate in a focus group discussion with their peers. Criteria for student selection will be that the student had at least a 90% attendance rate and that the student took the benchmark assessments.
- Risks of participation include normal academic days being altered with music and focus groups.

LINDENWOOD

Research Study Consent Form

Moving Forward with Music to Promote Student Growth

You are asked to participate in a research study being conducted by Willie Mae Dean under the guidance of Dr. Shelly Fransen at Lindenwood University. Being in a research study is voluntary, and you are free to stop at any time. Before you choose to participate, you are free to discuss this research study with family, friends, or a physician. Do not feel like you must join this study until all of your questions or concerns are answered. If you decide to participate, you will be asked to sign this form.

Why is this research being conducted?
We are doing this study to research the influence of music on academic achievement and students' perceptions of the effect music has on their performance in Algebra 1 class.

What am I being asked to do?
If you choose to be part of this study,
During independent practice time, your Algebra 1 class will be asked to either listen to their own music on their own device, listen to music selected by the researcher and played by the teacher aloud in the classroom, or listen to no music at all.
Each class will be randomly selected using the excel random number generator to determine which setting the class will be in for the duration of the research.
Data gathered from the beginning of year and middle of year Galileo benchmark test will be used to determine if there is a difference between the classes.
The participating classroom teachers will be asked to select 2 students from their classroom to participate in a focus group discussion with their peers. Criteria for student selection will be that the student had at least a 90% attendance rate and that the student took the benchmark assessments.
You may be asked to participate in the focus group discussion with four to six other 9th-grade Algebra 1 students to share your perceptions of the effect music had on your performance in Algebra 1 class.
This will conclude the research for all focus group participants.
This focus group discussion is going to last approximately 45 minutes and then it will be over.

How long will I be in this study?
The study will last about four months beginning with the beginning of year Galileo benchmark assessment and concluding with the middle of year benchmark assessments. This focus group discussion will take place after the last benchmark assessment will last about 45 minutes.

What are the risks of this study?
There will be no harm from this study.
We will not be collecting any information that will identify you.

What are the benefits of this study?
The potential benefits are the students being able to recognize the impact of music. Another benefit would be the teachers recognizing the effect music has on student achievement and/or music has on student behaviors.

What if I do not choose to participate in this research?
It is always your choice to participate in this study. You may withdraw at any time. You may choose not to answer any questions or perform tasks that make you uncomfortable. If you decide to withdraw, you will not receive any penalty or loss of benefits. If you would like to withdraw from a study, please use the contact information found at the end of this form.

What if new information becomes available about the study?
During the course of this study, we may find information that could be important to you and your decision to participate in this research. We will notify you as soon as possible if such information becomes available.

How will you keep my information private?
We will do everything we can to protect your privacy. We do not intend to include information that could identify you in any publication or presentation. Any information we collect will be stored by the researcher in a secure location. The only people who will be able to see your data are: members of the research team, qualified staff of Lindenwood University, representatives of state or federal agencies.

How can I withdraw from this study?
Notify the research team immediately if you would like to withdraw from this research study.

Who can I contact with questions or concerns?
If you have any questions about your rights as a participant in this research or concerns about the study, or if you feel under any pressure to enroll or to continue to participate in this study, you may contact the Lindenwood University Institutional Review Board Director, Michael Leary, at (636) 949-4730 or mleary@lindenwood.edu. You can contact the researcher, Willie Mae Dean directly at (314) 370-3135 or wd506@lindenwood.edu. You may also contact Dr. Shelly Fransen at sfransen@lindenwood.edu.
I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

_____	_____
Parent or Legally Authorized Representative's Signature	**Date**
_____	
Parent or Legally Authorized Representative's Printed Name	

_____	_____
Signature of Principle Investigator or Designee	**Date**
_____	
Investigator or Designee Printed Name	

Appendix E

Adult Consent Form for Teachers

LINDENWOOD

Research Study Consent Form

Moving Forward with Music to Promote Student Growth

Before reading this consent form, please know:

- Your decision to participate is your choice
- You will have time to think about the study
- You will be able to withdraw from this study at any time
- You are free to ask questions about the study at any time

After reading this consent form, we hope that you will know:

- Why we are conducting this study
- What you will be required to do
- What are the possible risks and benefits of the study
- What alternatives are available, if the study involves treatment or therapy
- What to do if you have questions or concerns during the study

Basic information about this study:

- We are interested in learning about influence of music on student achievement and behavior.
- The study will include three classes randomly assigned to either allow students to listen to their own music on their own devices, students allowed to listen to music selected by the PI played over the classroom speakers, or students listening to no music at all.
- The beginning of year and middle of year galileo benchmark assessment will be used to determine any significant difference in achievement between the three classes.
- A student focus group discussion will be held to gather student perceptions of the experience.
- Participating teachers will be interviewed to gather their perceptions on the effect music had on student behavior in their class.

LINDENWOOD

Research Study Consent Form

Moving Forward with Music to Promote Student Growth

You are asked to participate in a research study being conducted by Willie Mae Dean under the guidance of Dr. Shelly Fransen at Lindenwood University. Being in a research study is voluntary, and you are free to stop at any time. Before you choose to participate, you are free to discuss this research study with family, friends, or a physician. Do not feel like you must join this study until all of your questions or concerns are answered. If you decide to participate, you will be asked to sign this form.

Why is this research being conducted?
We are doing this study to research the influence of music on academic achievement and students' perceptions of the effect music has on their performance in Algebra 1 class. Also, teacher perceptions of students' behavior in Algebra 1 class. We will be asking about 4 to 6 other people to answer these questions.

What am I being asked to do?

1. Facilitate one of the three groups.
    - Students allowed to listen to their own music on their own device during independent practice.
    - Students listening to music on the classroom speakers selected by the PI during independent practice.
    - Students listening to no music during independent practice.

    A random number generator will be used to determine which group your class will be assigned to.
2. Send a participation letter and a parental consent on behalf of a minor form home with students. You will also be asked to collect the signed consent forms and give them to the PI.
3. Provide and collect the minor assent forms that you will give to students before the research begins.
4. Administer the Algebra 1 Galileo beginning and middle of year benchmark assessments. After the assessments are completed you are being asked to remove the testing data for any students that did not return the parental consent form or failed to sign the minor assent form. You are also being asked to deidentify the data by giving each participating student a numeric code. Once the data has been deidentified you are being asked to email the PI the deidentified data
5. Participate in an interview.
6. Finally, you are being asked to select two students from your class to participate in a focus group discussion. Students will be selected using

the following 2 criteria; participants must have at least 90% attendance during the study and have taken both benchmark assessments.

How long will I be in this study?
This study is going to last approximately four months and then it will be over.

What are the risks of this study?
There will be no harm from this study. The only potential risk is that participants normal day of school does not require teacher interview.

We will not be collecting any information that will identify you.
What are the benefits of this study?
The potential benefits are the students being able to recognize the impact of music. Another benefit would be the teachers recognizing a correlation between music and student achievement and/or music and behaviors.

What if I do not choose to participate in this research?
It is always your choice to participate in this study. You may withdraw at any time. You may choose not to answer any questions or perform tasks that make you uncomfortable. If you decide to withdraw, you will not receive any penalty or loss of benefits. If you would like to withdraw from a study, please use the contact information found at the end of this form.

What if new information becomes available about the study?
During the course of this study, we may find information that could be important to you and your decision to participate in this research. We will notify you as soon as possible if such information becomes available.

How will you keep my information private?
We will do everything we can to protect your privacy. We do not intend to include information that could identify you in any publication or presentation. Any information we collect will be stored by the researcher in a secure location. The only people who will be able to see your data are: members of the research team, qualified staff of Lindenwood University, representatives of state or federal agencies.

How can I withdraw from this study?
Notify the research team immediately if you would like to withdraw from this research study.

Who can I contact with questions or concerns?
If you have any questions about your rights as a participant in this research or concerns about the study, or if you feel under any pressure to enroll or to continue to participate in this study, you may contact the Lindenwood University Institutional Review Board Director, Michael Leary, at (636) 949-4730 or mleary@lindenwood.edu. You can contact the researcher, Willie Mae Dean

directly at XXXX or wd506@lindenwood.edu. You may also contact Dr. Shelly Fransen at sfransen@lindenwood.edu.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above by participating in the interview.

Appendix F

Teacher Interview Questions

1. In what ways if any do you feel teacher-selected music for students to listen to while completing independent work might make an impact on student behavior?
2. Do you think students listening to their own selection music during independent practice improved their accuracy on class assignments? Why or Why not?
3. In what ways do you feel students listening to their own selection of music during independent practice might improve their behavior in class?
4. How do you feel each of the following strategies will affect students' classroom behavior?
    A. Teacher-selected music during independent practice.
    B. Student-selected music during independent practice.
    C. No music at all during independent practice.
5. In what ways do you feel music might be a distraction during independent practice?
6. During the implementation period of this study, do you feel your written referrals have increased, decreased, or stayed about the same? And why?
7. What other benefits did you observe as a result of utilizing music in the classroom during independent practice?

Appendix G

Letter of Participation for Focus Group Discussion

Date: XXXXXX

Dear Student,

My name is Willie Mae Dean, and I am requesting your participation in my doctoral dissertation research project at Lindenwood University. The study is entitled *Moving Forward with Music to Promote Student Growth*. Participants will be asked to complete a 45-minute focus group discussion. We are conducting this study to identify if the students feel implementing music of their choice has a positive or negative impact on their academics.

I have been granted permission to conduct research in the XXXX Public School District and by your parents or guardian. In order to conduct my research, I would like to invite you to participate in a focus group discussion with your peers. The discussion should take 45 minutes or less to complete.

Your participation in this research study is voluntary, and you may withdraw at any time. All information obtained through this research will be reported anonymously. Data codes or pseudonyms will be used to lessen the possibility of identifying focus group participants. You will indicate consent by participating in the interviews and signing an informed consent form provided on the day of the focus group discussion.

Thank you in advance to those willing to participate and support this study. I hope the results of this study will identify a correlation between music, student growth and students' choice. If you have questions, you can contact me at wd506@Lindenwood.edu. Dr. Shelly Fransen, the dissertation chair for this research project, may be contacted at sfransen@lindenwood.edu.

Thank you for your time,

Willie Mae Dean, Ed. S.

Doctoral Candidate Lindenwood University

Appendix H

Minor Assent Form

LINDENWOOD

What is research?
We are going to do a research study. A research study is when a researcher or doctor collects information to learn more about something. During this research study, we are going to learn more about the influence of music on academic achievement and students' perceptions of the effect's music has on their performance in Algebra 1 class. Also, teacher perceptions of students 'behavior in Algebra 1 class. After we tell you more about this study, we would like to ask you about being part of it.
We are asking 75 to 90 people to be a part of this study.

What will you ask me to do?
If you choose to be part of this study,
During independent practice time, your Algebra 1 class will be asked to either listen to their own music on their own device, listen to music selected by the researcher and played by the teacher aloud in the classroom, or listen to no music at all.
Each class will be randomly selected using the excel random number generator to determine which setting the class will be in for the duration of the research.
Data gathered from the beginning of year and middle of year Galileo benchmark test will be used to determine if there is a difference between the classes.
The participating classroom teachers will be asked to select 2 students from their classroom to participate in a focus group discussion with their peers. Criteria for student selection will be that the student had at least a 90% attendance rate and that the student took the benchmark assessments.
You may be asked to participate in the focus group discussion with four to six other 9th-grade Algebra 1 students to share your perceptions of the effect music had on your performance in Algebra 1 class.
This will conclude the research for all focus group participants.
This focus group discussion is going to last approximately 45 minutes and then it will be over.

Will I be harmed during this study?
There will be no harm from this study.

Will I benefit from being in this study?
The impact the research will have on instructional practices and student learning will be phenomenal. I would anticipate that if the data proved that a certain genre of music improved student engagement, accuracy, achievement, and behavior, educators could improve student learning and close the achievement gap.

A direct benefit is the students being able to recognize the impact of music. Another benefit would be the teachers recognizing a correlation between music and student achievement and/or music and behaviors.

Do I have to be in this research?
No, you do not. If you do not want to be in this research study, just tell us. You can also tell us later if you do not want to be part of it anymore. No one will be mad at you, and you can talk to us at any time if you are nervous.

What if I have questions?
You can ask us questions right now about the research study. You can ask questions later if you want to. You can also talk to someone else about the study if you want to. And you can change your mind at any time. Being in this research study is up to you.
If you want to be in this research study, just tell us. Or, you can sign your name in the blank below. We will give you a copy of this form to keep.

_____	_____
Minor Participant's Signature	**Date**
_____	
Minor Participant's Printed Name	
_____	_____
Signature of Principle Investigator or Designee	**Date**
_____	
Investigator or Designee Printed Name	

Appendix I

Student Focus Group Questions

1. How do you feel about having a choice in how you learn in the classroom?
2. Do you think listening to your own selected music during independent practice improved your accuracy on class assignments?
3. Do you feel listening to your own selected music during independent practice improved your behavior? Why or why not?
4. How do you feel each of the following strategies will affect achievement on classroom assignments and which do you feel is the most effective for you?
    A. Teacher-selected music during independent practice.
    B. Student-selected music during independent practice.
    C. No music at all during independent practice.
5. In what ways do you feel music might become a distraction during independent practice?

Vita

Willie Mae Dean was born in Centreville, Illinois on June 1, 1969. She graduated with honors from Cahokia High School in 1989. She obtained her Undergraduate Degree in Behavioral Science from National Louis University in 1999, her Master's in Special Education from Fontbonne University in 2006, and her Educational Specialist Degree in leadership from Webster University in 2019.

Willie Mae has worked with children and families for the past 27 years. While attending school she has worked the past 15 years with Special School District in Ferguson Florissant as a teacher. She will start a new journey as an Area Coordinator in the Hazelwood School District for the 2023–2024 school year.