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Differentiated Instruction, Teacher Immediacy, and Students' Mathematic Success

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Differentiated Instruction, Teacher Immediacy, and Students' Mathematic Success

by

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MA, University of Phoenix, 2006

BA, William Paterson University, 1976

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

This study investigated the role of both arts-integrated instruction (art activities as part of math instruction) and teacher immediacy (teacher caring behaviors) levels on students' math achievement. Although students from low socio-economic culturally diverse school districts have shown improvement in academic test scores, their scores are still significantly lower than scores of students from other school districts. Research has shown that when there is an increase in teacher immediacy, students' academic success increases. Despite this known correlation, there is a lack of literature on the ways that arts integration, combined with teacher immediacy, can affect academic success. Constructivist theories, experiential learning building upon what the student knows and hands on activities, were the framework for this study. The sample population for this quantitative study was high school students from a low-socioeconomic, culturally diverse school district. Data from a student survey (n=119) were entered into a hierarchical multiple regression analysis to determine whether measures of teacher immediacy and arts integration predicted students' New Jersey Assessment of Skills and Knowledge standardized math scores. The results did not allow for rejection of the null hypotheses, contradicting past research for both the arts and teacher immediacy on academic success. Due to the limitations of this study, further research is needed to determine the relationship between arts-integrated lessons and teacher immediacy on students' success in culturally diverse low-socioeconomic school districts with low academic achievement.

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Dedication

This is dedicated to my children and grandchildren. Set your goals and follow your dreams. Hold high your expectations, deal with the disappointments and setbacks, but be steadfast in your quest toward achieving your dreams. No excuses, just executions of solutions. I thank my mom, children, and grandchildren for their support and understanding of my absence during family time as I forged to complete the dissertation process. Thank you all for your love and encouragement.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

The National Board for Professional Teaching Standards (2013a) expects teachers to demonstrate proficient skills in teaching students from culturally diverse backgrounds. Proficiency skills include establishing a culture of higher expectations for learning and achievement and differentiating instruction based on students' needs and background (Tomlinson, 2003). Despite these expectations, many urban school districts with high culturally diverse and low socio-economic populations report lower standardized test scores than suburban affluent school districts (Miles, 2010)

The National Assessment of Education Progress (NAEP), which compares students' achievement based on U.S. benchmarks, reported that only 27% of eighth graders were proficient in math. Students' math scores differ by location, with some states reporting a larger gap than in the past and some states reporting less (Vanneman, Hamilton, Baldwin, Anderson, & Rahman, 2009). The states with larger gaps than in the past have demonstrated an increase in enrollment of immigrant students.

Increased enrollment impacts school climate and influences the responsibility of school districts, which include teachers who have the proficiency to teach a class that is culturally diverse. Schwartz and Stiefel (2006) noted that school districts with increased culturally diverse classrooms have increased changes in school group structure and climate, increased challenges for schools to meet federal and state accountability, and increased economic burden if all students do not achieve academically. The lack of equality in academic success sets the proclivity for low achieving students to become part of society's economic burden (Schwardtz & Stiefel, 2006). Statistics report that

minorities have the highest dropout rate and most urban cities with low socio economic status are made up of minorities (Shader, 2008). The lack of student academic success impacts society's monetary responsibility to unemployment, health care, and rehabilitation (McEvoy, 2008). Therefore, to achieve equality in academic achievement among White and non-White students, there is a need to investigate instructional strategies of teachers who address specific students' needs in their classroom. It is crucial that teachers are intentional in selecting teaching strategies to meet the needs of all of their students (Goodwin & Hubbell, 2013).

To improve test scores for students, more research is needed on teachers' instructional strategies in their classroom (Tabasco, 2007). For example, differentiated instruction has been used to address the needs of diverse classroom (Tomlinson & Imbeau, 2010). The differentiated instruction theory is a way for teachers to assess the needs of each student based on ability, interest, and learning profile and to implement strategies in the classroom that will provide each child with high quality instruction for success (Tomlinson, 1995). Researchers have also demonstrated that students' academic achievement has been increased when the arts are part of the curriculum (Catterall, 2009; Krilov, 2007; Winner & Hetland, 2003); yet research investigating the arts, not only as a discipline but also as a teaching strategy of differentiated instruction, warrants further research. One such area where arts integration may aid in transference of learning would be with teacher immediacy.

The relationship between arts-integrated activities and students' perceptions of teacher immediacy, defined as students' perception of their teachers' availability to them

on a psychological level (Wilson, 2007), has not been investigated. Arts-integrated activities may change the classroom climate of interpersonal relationships, which includes students' perceptions of teacher immediacy (E. Winner, personal communication, March 2013). The lack of empirical evidence on the effectiveness of differentiated instruction strategies and their impact on students' test scores needs to be further investigated (Hall, Strangman, & Meyer, 2003). When budget cuts are common, the arts are often the first subjects to be eliminated (Maliconico, 2011), so it is important to understand the effectiveness of the arts not only as a discipline but as a strategy of differentiated instruction upon academic success. There are potential consequences when the arts are eliminated from classroom instruction in classes where students show a lack of academic achievement on their state standardized test scores than their peers.

Background of the Study

Although researchers have demonstrated successful instructional strategies impacting student perceptions for learning, there is a lack of literature showing the relationship between teacher instruction and the affective domain of learning within individual classrooms (Miller, 2005). The affective domain of learning refers to students' emotional responses, which include motivation and enthusiasm, feeling and attitudes, and values and appreciation (Krathwohl, Bloom, & Masia, 1973). Students' perceptions of teachers' caring are based on students' emotional responses to their perception of teachers' behaviors and are part of the affective domain of learning.

The variables for the study are teacher immediacy, which is represented by students' perceptions of teacher caring, along with subsets of academic caring, fairness

caring, and interpersonal caring, and the predictor variable of arts-integrated lessons as part of math instruction on students' math achievement. The study examined the relationship among arts integration as a predictor variable and teacher immediacy as a second predictor variable on students' math success. A brief review of literature on the variables in the proposed study is presented in the following subsections.

Teacher Immediacy

Teacher immediacy has been measured by students' perceptions of teacher availability on a psychological level (Docan-Morgan, 2011). For example, classrooms that students perceive to be safe, trusting, and caring set the classroom climate for affective learning whereby students' attitudes, motivation, and values are influenced by their perceptions which become school experiences.

The quality of inter-personal relationships between teacher and students impacts the quality of students' perceptions of teacher caring (teacher immediacy). Teacher behaviors that elicit students' responses of feeling safe, accepted, noticed, and that one's interests and self are acknowledged (Maslow, 1943; Tomlinson, 2003) increase student/teacher relationships. Further research has been suggested in affective learning such as students' perception of teacher caring during a classroom setting that includes socio-behavioral engagement in small group instruction, and dialogue with a socio-context, to determine affect responses that increase student engagement and academic success (Linnebrink-Garcia & Pekrum, 2011).

Studies have been completed on teacher immediacy in a diverse cultural setting and have reported a positive correlation between students' perceptions of teacher

immediacy and students' academic achievement (Isotalus & Muukkonen, 2002; McCroskey, Fayer, Richmond, Sallinen, & Barraclough, 1996). Studies also have demonstrated that students' racial/ethnic background and gender influence their perception of teacher immediacy, or caring (Banks, 2009; Tosolt, 2008). Yet further research, as suggested by Linnnebrink-Garcia and Pekrum (2011) on the relationship of affective learning (students' perceptions of teacher immediacy) during small group instruction is still needed. Research has shown that teacher immediacy has been related to affective learning (Cheesebro, 2003; Witt &Wheeless, 2001). In contrast, another study of high school students has not identified a relationship between teacher immediacy and mathematics and the outcomes of that study suggest a lack of students' motivation and a lack of teacher immediacy behaviors as factors mediating the relationship between teacher immediacy and mathematics (Mottet et al., 2008).

Teacher immediacy has also been studied as students' perception of teacher caring behaviors. Teacher caring behaviors have been categorized as teacher fairness caring behaviors, teacher inter-personal caring behaviors, and teacher academic caring behaviors (Tosolt, 2008a).

Differentiated Instruction

Differentiated instruction is a style of teaching that gathers information on students' learning and about students' readiness, interests, and learning preferences and then applies this information in the learning environment, instruction, and assessment to increase learning (Tomlinson, 2003). Differentiated instruction is a style of teaching that teachers must know the individual learning needs of each student in the classroom and

implementing multiple experiences that will provide each student with multiple methods of cognitive and affective learning to increase learning (Tomlinson, 1995). Differentiated instruction is teaching students not only in whole group but in pair or group instruction so that student/teacher dialogues are more frequent (Tomlinson, Brimijoin, & Navaraez, 2008), which sets the proclivity for conversation and increased teacher immediacy.

Differentiated instruction can also include integrating the arts into academic course instruction. Arts integration has been shown to increase affective learning (McCroskey, Richmond, & McCroskey, 2006) Herring (2010) suggested the need for further research on teacher immediacy and affective learning and Tabasco (2007) suggested further research on teacher strategies and affective learning. Arts integration and its impact on students' academic achievement and its impact on students' perception of teacher immediacy upon students' academic achievement has not yet been investigated. How arts integration is connected with other components of the classroom can be further explained by understanding the theories which are part of the differentiated instruction theory.

Differentiated instruction theory (Tomlinson, 2003) is basedon the theories and research of Gardner (1983, 1999, 2009), Sternberg (1985, 1997, 2003,), Vygotsky (1974). Classroom needs include grade level readiness, beliefs, attitudes, perceptions, self-efficacy, and personal interests of students. Teachers chose to differentiate instruction on students' readiness, interest, and learning profile within four components of classroom instruction: content (what is being taught), process (how it is being taught), products

(evidence of what is learned), and learning environment (the classroom) (Rebora, 2008; Tomlinson, 2003).

The four components of differentiated instruction: content, process, products, and learning environment (Rebora, 2008; Tomlinson & Imbeau, 2010) are often observed during arts instruction when art is being taught as its own discipline because instruction often changes the learning environment to a physical classroom that includes whole-class to small-group, pairing, and grouping tasks (Edwards, Carr, & Siegel, 2006). This is particularly important for culturally diverse classrooms. According to social cognitive theory (Bandura, 1986, 2002, 2013), students' self-efficacy is based on collective or individual perceptions, which in part are based on cultural differences. Various group instruction provides the opportunity for dialogue between and within the students and teachers and increases collaboration and problem solving through experience (Vygotsky, 1934). Experiential education is evident during differentiated instruction, reaching students through different learning modalities (Gardner, 1999) and interests for student engagement (Sternberg, 1997). Students taught with strategies directed to all of the learning styles will receive the highest opportunity for learning (Swanson, 1995). More importantly, research demonstrates how learning style preference of native speakers of English differed significantly from the learning styles of non-native speakers of English and students from industrial and non-industrial countries differ in preferred learning (McCarthy, 2002, 2010; Reid, 1987).

Learning Preferences

Although students use a variety of learning styles, they tend to have a preferred learning style that best aligns with their personality (Felder, 1995). By understanding the various styles of learning, as well as what influences students' learning, teachers may increase their insight of their students' individuality and develop teaching strategies to meet the needs of all students

Differentiated instruction provides the opportunity to reach various learning preferences (Tomlinson, 1995). Arts integration is one area of instruction that provides teachers the opportunity to differentiate instruction to meet Kolb's (1984) development of his experiential learning theory (learning model based on cognitive processes). From Kolb's experiential learning theory, over 71 different learning styles models were developed (Litzinger, Lee, Wise, & Felder, 2007). Both Gardner (1983) and Sternberg (1985) created their own multiple intelligence theory that includes the arts and creativity.

Arts Integration

Arts-integrated lessons embrace students' interest, and particularly, their learning style (preference). Arts supporters note that individual learning needs are best addressed with the use of hands-on activities and other strategies to meet the diversity of learning processes and intelligences (Gadzillla, 2003; Gadzilla, Gunther, & Williamson, 1986; Gardner, 1999). Arts-integrated lessons provide the opportunity for increased problem solving as well as opportunities for assessing students' strengths and weakness to determine their readiness. Ongoing assessments allow teachers to design classroom instruction that includes scaffolding. The new instruction being introduced also allows

students to connect with their previously learned knowledge (Vygotsky, 1986), and allows teachers to reflect on various strategies to meet students' individual needs. Differentiated instructional strategies such as arts-integrated lessons address the strengths and weaknesses of individual students (Sternberg, 1997) while maintaining ongoing assessment and instruction (Tomlinson & Imbeau, 2010).

Although arts-integrated lessons demonstrate sets of strategies to meet students' individual needs, the arts most often are separated from other disciplines. Schools, for many years, were subject based, separating the disciplines with little focus on the arts as a major contributor to students' achievement. This style of fragmented instruction continued while present educators and psychologists, influenced by Dewey (1934, 1938), published empirical research and developed theories to support experiential education reform (Gardner, 1999; Tomlinson, 1995).

Multiple theorists support the idea that the arts encourage academic development in students (Catterall; 2009; Eisner; 2002; Gardner, 1999; Gullatt, 2008; Sternberg; 1997). Catterall (2005, 2009) demonstrated that the arts influence students' self-efficacy, creativity, critical thinking, and problem solving. According to Eisner (2002), the arts provide flexibility for teachers in strategies to reach a diversity of students. The arts increase students' academic success (Catterall, 2013; Deasey, 2003; Gardner, 1999; Krilov, 2007) by demonstrating a positive relationship between arts integration and students' academic success in diverse classrooms. Furthermore, students' academic achievement increases when artists work with classroom teachers (Stevenson & Deavy, 2005), when art educators collaborate with math educators (Krilov, 2007), and when

classroom teachers' arts efficacy increase through arts- integration professional development, thus increasing arts-integrated lessons as part of their classroom instruction (Garrett, 2010). Finally, the arts increase social interactions, and engage the mind (Eisner, 2002). Arts- integrated activities, for example, provide a concrete, personal, problem-solving. and learning-centered activity which allows teachers to facilitate and to foster a learning environment reflective of affective learning, a learning environment that allows increased student-led learning, as well as increased teacher/students dialogue (Taylor, 1998). However, how the arts influence students' achievement is open to further research (Winner & Hetland, 2003).These strategies and their impact on student learning are covered more thoroughly in the review of the literature in Chapter 2.

Problem Statement

Students from low socioeconomic, culturally diverse school districts demonstrate lower academic achievement than their more affluent peers (U.S. Dept. of Education, 2009, 2013). From 1999 to 2007, math scores increased slightly among all groups of students, yet low socioeconomic students, predominately minority students, still score lower than affluent, predominately White, students (US Department of Education, 2011). The gap has been attributed to not adapting curricula to meet students' needs (Vigdor, 2013) and the need to increase instruction time and to differentiate instruction (Cortes, Goodman, & Nomi, 2013). Studies have shown the importance of students' perceptions of teacher immediacy (McCroskey et al., 2006). Separate studies have also shown the importance of the arts (Catterall, 2009; Gardner, 1999) in students' academic

achievement. However, there are no studies examining the combined impact of teacher immediacy and arts-integrated instruction on math scores for students.

Purpose of the Study

The purpose of the study is to examine (a) whether math instruction using the arts as part of differentiated instruction has an impact on students' academic success and (b) whether there is a relationship between arts-integrated lessons and students' perceptions of teacher immediacy on academic success in math. The results from this study may provide increased knowledge of the teaching and learning practices being used in low socio-economic culturally diverse school districts with lower students' math achievement. This knowledge can help inform decisions about using arts integration and incorporating teacher immediacy characteristics to improve mathematics achievement

Research Questions and Hypotheses

The research questions and associated hypotheses follow.

Research Question 1. What is the relationship between students' participation in an arts-integrated classroom and students' math achievement, as measured by the New Jersey Assessment and Skills score?

*H*0: Students who were in an arts-integrated classroom will not have significantly higher math achievement scores in a subsequent grade than those students who were not in an arts-integrated classroom.

*H*1: Students who were in an arts-integrated classroom will have significantly higher math achievement scores in a subsequent grade than those students who were not in an arts-integrated classroom.

Research Question 2: Is there a relationship between teacher immediacy, as defined by students' perceptions of teachers' academic caring, fairness caring, and interpersonal caring, and students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction?

*H*0: There is no relationship between teacher immediacy, as defined by students' perceptions of teachers' academic, fairness caring, and interpersonal caring, and students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction..

*H*1: There is a relationship between teacher immediacy, as defined by students' perceptions of teacher academic caring, fairness caring, and interpersonal caring and students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction.

Nature of the Study

The quantitative study used a cross-sectional correlation design, a 2-tail *t* test, and a multiple regression statistical analysis to determine the relationship among the study's variables of arts integration, student achievement in math, and teacher immediacy. The sample population comprises high school students, aged 14 to17 years, from a low socio-economic, culturally diverse urban school district. Participants completed an online reflective survey on their experience in the middle school math class of their favorite math teacher.

Many researchers have used retrospective surveys, citing that they are a positive way to measure self-reported behavior change (Raidl et al., 2004). Reflective surveys have been used in other educational settings (MacMillan, 2007), where teachers can collect students' perception data relating to effective teaching (Marzano Research Laboratory, 2012). The goal of this study's data collection was to obtain student responses about as many middle school math teachers as possible. This goal was logistically addressed through a retrospective study of high school students whose population is from multiple middle schools in the district rather than directly sampling middle school students. Experiential education is evident during differentiated instruction, reaching students through different learning modalities (Gardner, 1999) and interests for student engagement (Sternberg, 1997). The three selected high schools have students from throughout the district and provided a convenience sample that represented students who had attended as many as 25 middle schools in the district.

Theoretical Foundation

The study is designed to determine whether arts-integrated activities as part of differentiated instruction, during a middle school math class of the favorite math teacher, are a predictor for increased student perception of teacher immediacy and academic achievement in subsequent math classes. The study uses the theoretical base of differentiated instruction, which includes the cognitive-contextual theory of multiple intelligence model (Gardner, 1999), socio-constructivist theory on cognitive development (Vygotsky, 1934, 1974), and the triarchic theory of intelligence (Sternberg, 2003).

Each theory will be briefly summarized here. According to the theoretical base of differentiated instruction, students show improvement in academic achievement when teachers design instructional strategies to meet students' learning profiles based on multiple intelligence theory, which includes the arts as part of classroom instruction (Gardner, 1986). The social cognitive model aligns teacher instruction with students' level of ability, scaffolding, and initial teacher assistance to students' mastery of learning (Vygotsky, 1934, 1986). Finally, the triarchic theory of intelligence supports differentiated instruction through its reference to creative/synthetic intelligence, as well as the ability to apply previous knowledge to new applications (Sternberg, 1986, 2003; Sternberg & Williams, 1998).

Definition of Terms

Academic caring behaviors: Teacher caring behaviors based on teachers responses on students' academic progress, and academic success (Tosolt, 2008).

Arts integration: Includes arts as its own discipline, arts as a teaching strategy in other curricula, and arts embedded within a whole group process (Silverstein & Layne, 2010).

Culturally-diverse classroom: A classroom of students with ethnic, race, gender, physical, emotional, and cognitive diversity (Voltz et al., 2010).

Differentiated instruction: This instruction addresses students' individual needs by instruction that includes content; what students' need to learn; activities which students are engaged; projects that ask the students to apply what they have learned; and learning environment, the way a classroom works and feels (Tomlinson, 2013).

Fairness caring behaviors: Teacher caring behaviors that students perceive as being equally fair to all students in the classroom (Tosolt, 2008).

Interpersonal caring behaviors: Teacher caring behaviors that students' perceive as teacher caring based on students' personal likes (Tosolt, 2008).

New Jersey Assessment of Skills and Knowledge: Yearly formative-based assessment test to determine students' growth in state standards of mathematics and language arts (New Jersey Department of Education, 2005).

Teacher immediacy: Students' perceptions of teachers' availability to them on a psychological level (Wilson, 2007).

Self-efficacy: confidence and competence in a certain area is their sense of self-efficacy (Bandura, 1986).

Students' academic achievement: Students' level of attainment of the content and skills presented by educators and measured quantitatively to determine the degree of students' success in mastering the content and skills (Armstrong, 2009).

Assumptions

It was assumed that participants would have sufficient recall and would answer the self-reflection survey questions to the best of their recollection. An additional assumption was that the students would be sufficiently motivated to provide accurate information.

Scope and Delimitations

Studying the role of ethnicity and culture on students' perceptions of teacher caring was not be possible for this study, nor were English language learners be part of the study.

Limitations

The limitations of the study are related to the reliability of the participants' responses to the questions of the reflective survey. Retrospective studies may contain two types of recall errors, either omission or commission. To control for these recall errors, I used certain cues in the retrospective survey to prompt for recall and elicit other memories. Although there has been little research to determine whether cues to assist recall have increased recall, a study on unemployment suggested that certain cues may trigger recall (van der Vaart, 2009). This study questions were designed to ask students to reflect on their favorite teacher as a positive cue for recall. This assisted with the focus and motivation of the participant (Strahan & Layell, 2006). Another limitation was the use of high school students and the time gap as it has on memory. Additionally, the use of arts during middle school math class by the favorite math teacher was all that was being asked. The amount of art integrated during math instruction is unknown and not controlled.

Significance of the Study

The findings of this study may provide information to help teachers increase their knowledge about arts integration as a part of teaching and learning strategies in differentiated instruction and its impact on teacher immediacy and its relationship to

students' academic achievement. If the gap in math achievement between culturally diverse, low socio-economic status schools and those that are more culturally homogeneous and in a higher socioeconomic status can be reduced through arts integration, then school districts, especially those with a culturally diverse, low-socio-economic status population will have another tool to help students succeed.

Dissemination of my research findings may change teachers' attitudes with regard to using the arts as differentiated instructional strategies for their class instruction. Teachers may seek professional development in arts integration as well as differentiated instruction and teacher immediacy. Furthermore, the findings of this study may suggest further research to determine if the arts-integrated activities act as transference of learning through other variables of classroom climate

Summary

This chapter defined the research problem and purpose of the study as determining the relationship between arts integration in math classes, improvement in math scores, and teacher immediacy and how the information can be used to improve math achievement in culturally diverse, low socio-economic school districts. In this chapter, a summary of past research was presented on the impact of arts-integrated activities and teacher immediacy on students' academic achievement. These variables were then discussed in relationship to the differentiated instruction theory based on the research of Vygotsky, Sternberg, and Gardner. This chapter also discussed how the study was designed to answer the research questions and concluded with the significance of the study for social change.

In Chapter 2, studies on arts integration and students' academic achievement will be reviewed in greater detail, as well as findings of students' perceptions of teacher immediacy and students' academic achievement. Discussion of differentiated instruction will be reviewed through Gardner's theory of multiple intelligences, Sternberg's triarchic theory of intelligence, and Vygotsky's social cognitive model. Chapter 3 will present the methodology for the study. Chapter 4 will present the results of the study. Chapter 5 will present the discussion, conclusions, and recommendations for future research.

Chapter 2: Literature Review

Introduction

The purpose of this study is to examine (a) whether math instruction using the arts as part of differentiated instruction has an impact on students' academic success and (b) if there is a relationship between teacher immediacy, as defined as students' perceptions of teachers academic caring, fairness caring, and interpersonal caring, on students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for arts integration. For this study, the instructional strategy focus is with students' favorite teachers' implementation of arts-integrated activities as part of their math instruction. The literature suggests that students from culturally diverse low-socioeconomic districts have lower academic test scores than their peers from more affluent, low minority school districts (Miles, 2010). Researchers have also found that the arts increase students' academic achievement (Catterall, 2009; Gardner, 1999) and that increased teacher immediacy increases students' academic achievement (Herring, 2010). However, which instructional strategies and teachers' behaviors are most effective in a culturally diverse low-socioeconomic school districts with lower state test scores have not been studied.

This literature review explores the topics of learning styles; differentiated instruction, specifically arts integration as it relates to students' academic success in mathematics; students' perceptions of teacher immediacy; and culturally diverse classrooms. Studies relating to mathematics and risks associated with students' lack of academic success in mathematics are also included as well as the social cognitive model

and Gardner's multiple intelligence. The subtopics investigated are teacher immediacy, both verbal and nonverbal, and its impact on student learning with a focus on math success and differentiated instruction focusing on arts integration and students' academic math success.

Literature Search Strategy

Literature for the review was searched through the following databases: ProQuest Dissertations and Theses, ERIC, Academic Search, Psyc INFO, Soc Index, PsycArticles, SAGE, and Education Research Complete. Other sources of information for the study are personal conversations with Winner and Gardner, presentations and workshops, books, and government publications. Key search terms include *differentiated instruction, arts integration, math, students' perceptions of teacher immediacy, teacher caring, confidence, teacher trustworthiness, affective learning, cognitive learning, diverse learners, American students' math assessments and attitudes, Gardner, multiple learning styles, multiple intelligences, ethnicity, Vygotsky, zone of proximal development, Sternberg, triarchical theory, social cognitive theory,* and *Bandura*. Inclusionary and exclusionary criteria for determining whether to include an article in the dissertation include that resources were published between 2008 and 2014, were scholarly, and were peer reviewed.

Differentiated Instruction

According to the National Board for Professional Teaching Standards (2013b), teachers are expected to be aware of current research and best practices for teacher strategies for their culturally diverse classrooms. Cultural influences that affect human

dynamics include ethnic customs, traditions, beliefs, gender, socio-economic, sexual orientation, geographic, religion, and race (Hays, 2008). Differentiated instruction was designed to meet students' needs in a classroom with a diversity of learning styles, multiple intelligences, ethnicity, race, and gender (Tomlinson, 1995). Differentiated instruction, developed and supported by theories of Gardner (1999), Sternberg (1986), and Vygotsky (1934, 1974), includes arts integration as part of classroom instruction. Teachers may implement differentiated instruction based on students' readiness, interest, and learning profile within four components of classroom instruction: content, process, products, and learning environment (Tomlinson, 2003). Furthermore, differentiated instruction aligns teacher instruction to multiple intelligences (Gardner, 1983) and to triarchic intelligences (Sternberg, 1985), and aligns instruction with students' level of ability and mastery of learning (Vygotsky, 1934, 1974). It also provides students the opportunity to apply previous knowledge to new applications (Sternberg, 2003).

Gardner's Multiple Intelligences

Gardner (1983) developed various categories of intelligence: linguistic intelligence, logical and mathematical intelligence, musical intelligence, kinesthetic intelligence, intrapersonal intelligence, interpersonal intelligence, visual-spatial intelligence, and naturalist intelligence. Linguistic intelligence includes written and spoken language. As a child develops and matures, so does the development of his or her linguistic intelligence. Logical and mathematical intelligence is the ability to be analytical in problem solving and as a child develops, so do the problem solving skills. Musical intelligence is applied to performance, composition, and appreciation for music patterns.

Kinesthetic intelligence relates to the whole body or parts of the body to solve problems. Interpersonal intelligence is demonstrated through understanding and interacting with others through various group activities. Intrapersonal intelligence is the ability to self-reflect and understand oneself through understanding emotions, goals, and abilities. Visual-spatial intelligence is being aware of the physical space of the environment and includes visual drawings and various types of imagery. Naturalist intelligence includes problem solving and cultures. Intrapersonal intelligence is the ability to self-reflect and understand oneself through understanding emotions, goals, and abilities (Gardner, 1999).

Gardner (2001) developed three meanings of intelligence. The first is genetic composition, which refers to the biological makeup of an individual; the second is trait or characteristic of individuals; and the third is the value system that dictates the decisions on achieving a goal or task. Value systems are developed through cultural influences which impact social systems behavior (Finch, 2010).

Sternberg's Triarchic Theory of Intelligence

Sternberg triarchic theory of intelligence consists of three sub theories: analytical, creative, and practical (Sternberg, 1985). The analytical intelligence is based on problem solving and how an individual relates to his inner world. Those who fall under this group will spend more time analyzing a situation but then reach a solution faster. The creative intelligence is based on the experiential, which is how an individual connects his inner world to the external world. Those who fall under this group will apply existing knowledge to a new problem. The practical intelligence is based on the real world. Those who fall under the group will focus on adaption or changing their environment to meet a

goal. Assessment of intelligence is based on performance and each type of intelligence has its own performance measures to determine sub-theory intellect. Analytical intelligence is measured by the ability to complete mental calculations and compare information and retrieving informing from long-term memory. Creative intelligence is based on the ability to apply be given a situation or task and how to deal with the demands and ability to problem solve. Practical intelligence is measured by the ability to decode non-verbal messages. Intelligence is referred to as thinking styles. Whereas learning styles are students' preferences in the presentation of material for instruction and teachers style of teaching should reach all students' learning styles, thinking styles (multiple intelligences) are preferences and not based on students' abilities (Sternberg, 1997). Understanding thinking styles help teachers to develop diverse instructional strategies so all students demonstrate an increase in their learning (Sternberg, 1997). These styles are not a student's ability to complete a task but a preference; they are interchangeable and are learned though social actions (Sternberg, 1997). Arts integration an academic classroom provides students a different experience in learning a lesson and for those students who may not 200have the ability to be creative, arts integration provides the opportunity to experience an instructional strategy that allows them the opportunity to be involved in the creative style of thinking (Sternberg, 1997).

Multiple Intelligence and Arts Integration

Both Sternberg and Gardner have researched and developed a multiple intelligence theory. Both theorists are part of Tomlinson's differentiated instruction theory because of the findings of their research.

Gardner, the chair of the Project Zero Steering Committee (1995–present) has documented research through Project Zero between 1950 and 1999 on learning, thinking, and creativity in the arts and the impact of the arts on academic performance (deLusé, 2009). The project reviewed 11,457 articles, books, theses, conference presentations, technical reports, and unpublished material (Winner & Hetland, 2003). Gardner collected 187 research reports written on the arts and academics, which were used to create 10 meta-analyses. There were three areas from the analyses in which a causal link between arts and academics was found: listening to music improved spatial-temporal reasoning, learning to play music increased spatial reasoning, and engaging in classroom drama increased verbal skills. It was suggested that arts educators promote the importance of the arts as a valuable discipline rather than the secondary focus in education. One of the conclusions of the REAP project was that although research showed the arts alone did not improve test scores, schools with a strong arts program, both discipline-based and arts-integrated academic courses, reported higher test scores than schools without strong arts programs (Winner & Hetland, 2003)

The conclusion of the REAP recommended further research, first, to determine if the arts act as a transfer of learning using theory of the arts and non-arts outcomes. Second, the study recommended further research through theory-driven experiments, such as what other ongoing processes may promote higher academic success. Third, the study recommended further research to determine ways in which the arts promote learning (Winner & Hetland, 2003). Deasy (2002) further suggested investigating how the arts influence school climate and how teachers integrate the arts into learning. More

recently, Winner, Goldenberg, and , Vinent-Lancrin, 2013), suggests research to determine a connection between the arts and non-arts skills and subject matter to better understand teaching and learning practices for the 21st century curriculum. The arts may act as a transfer of learning in the affective domain of learning (E. Winner, personal communication, March 2013).

Social Cognitive Model in Math Instruction

The third theoretical foundation of differentiated instruction is Vygotsky's social cognitive model. According to the social cognitive model of learning (Vygotsky, 1934), culture influences learning. Culture includes the first source of a child's socialization and teaching: the family. It is from family members' modeling behavior and thinking processes that learning is developed. Shared experiences of problem solving with others build on each other; they also provide opportunities for individuals to grow, make decisions, and complete tasks without help. Vygotsky calls this the *zone of proximal development.* As teachers introduce new concepts to students, they assess and assist those who need more assistance until students are able to complete the process without any assistance. For a classroom with cultural diversity, Vygotsky suggested finding a starting point of comfort for each student, which is what the student already knows through the understanding of their individual culture and learning processes, to then introduce new content. Introducing various tools for learning that are based on social influences such as culture may be included as part of the process to complete the product of an objective in a lesson (Richard & Lipka, 2010).

Social influences in learning include art as a tool for learning. Vygotsky (1934) discussed the use of tools in learning and the importance of culture and artifacts as these tools. His theory included the idea that these tools are a means to reconstruct thinking processes (Vygotsky, 1934). As students develop, they are able to move from one task to another, eventually being able to perform tasks unassisted. Building on previous knowledge and experiences as a connection or the introduction of new tasks to students' learning is the instructional strategy called scaffolding. Introducing arts integration as part of instructional strategies provides students with the opportunity to build on what was learned.

Arts-Integrated Lessons and Students' Academic Math Success

Integrating the arts as part of classroom instruction has been found to meet the needs of a diverse classroom. Research has shown that arts-integrated lessons as part of differentiated instruction have increased students' academic success (Felder, 1995; Gardner, 1985). Furthermore, students' social and emotional development has been shown to increase through the use of the arts (Catterall, 2009). Students' involvement with the arts at school has been shown to increase their self- esteem, creativity, critical thinking, and problem solving (Deasy, 2002). Richards (2003) reported that students who have an academic curriculum with arts-integrated projects are more academically successful than students who do not have arts integration in their curricula.

Arts-integrated lessons in academic curricula have provided low achieving students the opportunity for academic success (Gullatt, 2008). One study using arts integration included culture focused on Native American students and teaching Math in a

Cultural Context (MCC). The program included local cultural knowledge by adding arts-integrated activities with math instruction. The results of the study indicated that MCC increased students' success in mathematics over traditional curricula (Richard & Lipka, 2010). Students learn better when instructional strategies include a connection with personal experience and connect with their world (Dewey, 1938; Gardner, 2001, 2004).

Another area where the arts can increase spatial and proportional skills applied in geometry class is with art lessons involving perspective, which include spatial and proportional skills. One of the principles of art education is proportion. Although integrating the arts have shown to increase spatial and proportional skills, skills needed in science and math (Catterall, 2009), students continue to have low proportional reasoning skills. Difficulty with proportional reasoning skills has been shown to impact students' academic success and their decision to enter mathematics and science careers (Heller, Ahlgren, Post, Behr, & Lesh, 1989).

Catterall (2009) completed a 10-year study tracking more than 25,000 students' level of proportional reasoning skills through the arts and found increased academic success as students. This study of students from Grades 8 through 12 examined arts across all disciplines and art as a single discipline (e.g., music and theatre). The results of this study led to the conclusion that a connection existed between music and cognitive development students from Grades 8 through 12 and that these student participants had better mathematics skills than those not involved in the arts. Furthermore, the study's results reported increased motivation and engagement in school, increased academic involvement, and increased success (Catterall, 2005).

Catterall suggested further research to determine the impact of the arts on spatial reasoning ability and the arts and their impact on mathematic achievement by neuroscientists. Gardner (2004) earlier suggested, as did Catterall (2005), for further research in cognition and neuroscience, but also included the need for further research to understand the various ways in which learning takes place and what teaching strategies are used for instruction.

A third area where students showed an increase in math achievement through the arts was revealed in a study conducted by an art educator with a high level of self-efficacy in the arts and who was proficient both in skills and knowledge of curriculum for math and art instruction (Krilov, 2007). A study of Grade 5 students in a southern New Jersey school district with a certified art educator integrating geometry in art lessons to augment their fifth-grade mathematics geometry standards was completed to determine whether there would be significant differences in the students' attitudes about math and academic success. The research included the facilitation of three art projects aligned with the district's math geometry curriculum for the experimental group of Grade 5 students. The projects were facilitated by the art educator during the Grade 5 art period. The test scores of the experimental group were compared to a control group of Grade 5 students from other schools, and showed a significant increase in students' success in geometry as well as an increase in positive attitude about math for those students who received art lessons as part of their Grade 5 math instruction (Krilov, 2007). The art lessons for this study were conducted not by a math educator integrating the arts in a math lesson but an

arts educator integrating art as part of their math instruction and one who has a high self-efficacy in arts education and an ability to integrate the arts.

Arts-integrated instruction as part of academic class instruction is not mandated. However, middle school teachers are instructed to include differentiated instruction in their classrooms. Various activities of arts-integrated classrooms include applications of students' knowledge of positive and negative numbers; this application might be tested by having students listening to a story and then having them illustrate positions of the story objects. Arts-integrated activities might also include exercises that test students' knowledge of proportional reasoning skills through fractions such as 1:2, 1:4 or 4:8 by creating their own pizza with special toppings and demonstrating proportional relationships with pizza slices. Arts-integrated activities test students' knowledge of geometric shapes by asking students to design their own basketball, create an origami cat and discuss what shape is created with each fold, or make a paper box and then measure the sides to determine its volume (C. Douglas, personal communication, January, 22, 2013).

Math educators, although not mandated to integrate the arts, are asked to differentiate instruction. Often, those math educators who integrate the arts as part of their math class instruction because they have a high perception of his or her ability to achieve this task (Bandura, 1986).

Teacher Immediacy

Teacher immediacy, described as students' perceptions of teachers' availability on a psychological level through verbal and nonverbal communication, has been shown to

affect academic success, where the higher the level of teacher immediacy, the higher the academic success for students (Wilson, 2007). Teacher immediacy has been studied through verbal and nonverbal communication and includes students' perceptions of teacher caring (Tosolt, 2008). Students' perceptions of teacher immediacy predict students' motivation and involvement in the lesson as well as their academic success (Christophe & Gorham, 1995). The following paragraphs discuss studies that include affective learning and students' behaviors that have been influenced by teacher instruction and students' perceptions during learning.

Studies on teacher immediacy have been primarily conducted with students in higher education and have shown the relationships between teacher immediacy and other variables. Thweatt and McCrosky (1998) studied teacher immediacy (both verbal and nonverbal communication); credibility, defined as teacher competence, trustworthiness, and goodwill; and misbehaviors, defined as cancelling class without notice, not following the syllabus, and being unprepared for class. The findings from this study of 188 participants demonstrated that immediacy has a statistically significant correlation on all three areas of credibility and that the higher the immediacy, even when there were misbehaviors, the higher the teacher credibility demonstrating that even with misbehaviors, students still viewed the instructor as a credible instructor by responses relating to competence, trustworthiness, and goodwill.

Additional studies examined students' perception of teacher caring and its relationship to cognitive learning. Tabasco (2007), for example, investigated the relationship among teacher immediacy, creativity, and cognitive learning. Tabasco ran

several combinations of correlations. The first combination was the correlation between teacher verbal immediacy, creativity, and originality. The second correlation included teacher nonverbal immediacy, creativity, and originality. The third correlation presented findings between teacher verbal immediacy, flexibility, and creativity. The fourth correlation study used teacher nonverbal immediacy, flexibility, and creativity. The results of the study presented an increase in teacher immediacy with nonverbal immediacy and a decrease of teacher immediacy with creativity. Tabasco recommended further research to include instructional strategies. Instructional strategies include integrating the arts as part of differentiated instruction in an academic classroom.

Affective Learning

Recommendations for further research on instruction that reach the affective domain of learning have been reported with suggestions to include teacher immediacy with teacher instruction. In addition, findings have not always been consistent, yet relationships have been found with affective learning and students' academic success as well as affective learning and motivation. Finally, it has been reported that students' perceptions are different depending on their personal life experiences which are based upon the culture and behaviors of the family. Initially, McCroskey (1998) suggested that to increase students' perceptions of teacher immediacy, teachers need to implement instructional strategies and behaviors where students perceive excitement and caring from the teacher. The study by Chory and McCroskey (1999) on affective learning and teacher nonverbal immediacy included a correlation study using a college professor's management communication style. The study reported an increase in teacher immediacy

increased affective learning demonstrating a relationship and therefore suggested further research to include teacher immediacy with investigating teacher instruction style and affective learning (Chory & McCroskey, 1999). According to McCroskey et al. (2006), affective learning includes the attitude and beliefs developed through cognitive and psychomotor learning.

Tevin and Hanson (2004) studied the effect of teacher caring and teacher immediacy on students' attitude and belief of teacher credibility, trustworthiness, and competence. They measured teacher immediacy through nonverbal communication, and caring was measured through verbal communication. Competence, trustworthiness, and perceived caring defined teacher credibility. The research compared methods of treatment to determine students' perceptions of teacher immediacy. First, the students who participated were able to select their choices of evaluation from written scenarios. During the second part of the treatment, students were able to observe video tapes and perceive behaviors of high and low teacher immediacy. The credibility measure (Tevin & McCroskey, 1997), the perceived caring measure (Tevin & McCroskey, 1997), and the nonverbal measure (Tevin, 2001) were the measures for this study. The result of the study was that there was a significant influence of teacher caring (nonverbal communication) and teacher immediacy (verbal communication) correlated with students' attitude and belief of teacher credibility, trustworthiness, and competence (Tevin & Hanson, 2004). This study concluded with suggestions for further research, to include teacher caring (nonverbal communication) and teacher immediacy (verbal communication) with student learning and classroom interactions (Teven & Hanson,

2004). A more recent study was completed with middle school students and teacher caring but did not include student learning as recommended by Teven and Hanson.

Witt, Wheeless, and Allen (2004) investigated a potential relationship between students' perceptions of teacher immediacy and students' learning. Teachers' behaviors in the classroom impact students' perceptions of teacher immediacy and are a predictor of motivation and academic success (Witt et al., 2004; Witt & Wheeless, 2001). Teacher behaviors are perceived by students according to their cultural experience and understanding of communication (Bandura, 1986; Tosolt, 2008; Vygotsky, 1934). Witt was involved earlier in another study that supported the recommended the use of the confidence test as a learning assessment. The confidence testing measure, results from 72 sophomores and junior communication students in college, found a significant relationship between students' perceived teacher immediacy and students' perceptions of learning. Although King and Witt (2009) most recently studied teacher immediacy and affective learning with a focus on the relationship of immediacy and students' confidence, a correlation between the confidence test with grades and learning demonstrated no significant association with perceived teacher immediacy and students' grades.

Graff (2012) completed a mixed methods study with 153 middle school students to determine what percentage of Grade 7 and 8 students perceived teachers/adults at school care for them and what would be the five most frequent named caring behaviors perceived by the Grade 7 and 8 students. The student population in this study was predominately White (88%), and the rest were minority students. The researcher

modeled the construct of the Tolsolt survey (2008), categorizing student written responses into three categories that were divided further into subcategories: interpersonal, caring academic caring, and fairness caring. The results provided information for teachers and other school community stakeholders to understand what behaviors were most important to students and for the staff to apply this knowledge to achieve a higher caring classroom environment for their students.

Student Behaviors

A study to determine the relationship of students' perceptions of teacher immediacy and students' negative behavior included factors of procedural, power play, and practicality challenges (Goodboy & Myers, 2009). The results of the study, a correlation created by the revised verbal immediacy measure (McCroskey et al., 1996) and the Critical Incidents Frequency Report (Simonds, 1997), reported a negative relationship between students' perceived teacher immediacy and students' challenging behaviors (Goodboy & Myers, 2009). Further research was suggested to determine the relationship between teacher instruction and negative students' attitude and behavior on students' perceptions of teacher immediacy. With the knowledge those students' perceptions of communication are based on their cultural experiences (Vygotky, 1986) and with the knowledge that the arts increase collaboration and communication (Catterall, 2009), research is warranted to determine if the arts act as transference of learning by increasing students' perceptions of teacher immediacy and consequently increasing students' academic success.

Culturally Diverse Classrooms

Teachers' behaviors (verbal and nonverbal communication), which are culturally influenced, and a culturally diverse classroom have been variables for several studies of teacher immediacy. Zhang (2005) sought to determine if there was a significant difference between teacher immediacy and apprehension and culture. This research showed mixed results with cultural differences and mixed findings when compared with previous research. This study provided information that immediacy did not have a significant impact on United States students, but higher immediacy was found with Chinese students. Zang (2005) concluded with suggestions for further research on teacher practice and instructional strategies in the diverse classroom. Tosolt (2008) comp4leted a correlational study among students' racial, ethnic, and gender backgrounds' influence on students' perceptions of teacher caring in middle school. These findings further explained the influence of culture on students' perceptions of teacher immediacy. Although Tosolt responded to Zang's research by expanding his study to racial, ethnic, and gender backgrounds and teacher immediacy, Zang's suggestion on completing further research on teacher practice and instructional strategies in a diverse classroom (Zang, 2005) was not included in the Tosolt study.

Research on the impact of one's own teaching style is warranted. Teachers bring their own values, beliefs, and biases from their cultural background, and instructional strategies selected by teachers from one culture may not be as successful for students from a different culture (DeVita, 2001). The 4MAT system is based on understanding one's own preferred teaching style and provides teachers with teaching to all of the

modalities of learning (McCarthy, 2010). Teaching to the diversity of student learners in the classroom resonates with Bandura's (1986) social construct theory, which posits that students learn from observation, imitating, and modeling others and that students are individual or collective in their self-efficacy, demonstrating cultural influences in learning (Vygotsky, 1934),

For example, an earlier cross-cultural analysis of students' perceptions of teacher immediacy found similarities and differences in students' responses to category questions depending on the students' cultural influence. White students favored teachers who had a sense of humor and were knowledgeable of their subject, whereas African American students liked how teachers who assisted them with their work and who supported them to be successful (Hayes et al, 1994). Studies have already shown that teacher immediacy increases classroom management, student success, and psychological arousal (Titsworth, 2001). Instructional strategies implemented as class instruction and how these strategies impact students' perceptions of teacher immediacy in a culturally diverse low socio-economic classroom with students scoring lower than affluent, White peers warrants further research

Tosolt's (2008) review of the literature on teacher immediacy found that caring is a relationship more than an act or personal trait. There needs to be a relationship where one individual (e.g., a teacher) acts in a caring way toward another individual (e.g., a student), and that action is perceived as a caring behavior (Noddings, 2005). Although Tosolt reviewed the research on teacher caring, most of the research was based on teacher caring practices and responses by teachers and other sources, rather than students'

perceptions of teacher caring. To address this limitation in past resaerch, Tosolt based her survey on students' responses to teacher caring. In addition, Tosolt found through her review of the literature on caring and culture that there was a need to investigate further the influence of students' cultural understanding of teacher behaviors (Delpit, 1992, 2006) because students may expect caring to look different (Noddings, 2005). Therefore, Tosolt further investigated students' responses based on their personal culture: ethnic, race, and gender, and found that responses of students' perceptions of teacher caring differed among Whites and non-Whites with minority status. Differences were found between students' perceptions of teacher caring among White and non-White (minority status); in addition, differences in student' academic achievement demonstrate a gap in achievement among White and non-White students. A more recent study using Tosolt's survey was completed in 2011 with the focus only with Hispanic students.

Simmons (2011) investigated what teacher caring behaviors were perceived by 7th grade Hispanic students and10th grade Hispanic students perceive as teacher caring. The study was conducted in a large rural school district located in east Texas that serves a large population of Hispanic students and few Hispanic educators. The results indicated only 3 behaviors out of the 50 as behaviors that Hispanic students perceived as caring. The researcher translated the survey from English to Spanish. The results of the findings recommended further studies where Hispanic educators would consider what would be perceived a teacher caring behaviors for a survey. The result of studies that assist with the understanding of the cultural impact on students' perceptions of teacher caring to assist

teachers in culturally diverse classrooms where White and non-White students still have a gap in their math achievement.

Math Achievement in Urban and Low-Socioeconomic Areas

Within the United States education infrastructure, urban culturally diverse, low socioeconomic school districts have students demonstrating lower academic achievement than students from higher socio-economic districts. This achievement gap also includes an even higher margin among Black and Hispanic students and predominantly male students (U.S. Dept. of Education, 2011, 2009). From 1999 to 2011, math scores increased among all groups of students, yet the gap between the scores of affluent students (predominately White) and low-socioeconomic students (predominately minority) still remains (US Dept. of Education, 2011).

The National Assessment of Educational Progress (NAEP) compares students' achievements within the United States. It is based on benchmarks for the United States (U S Dept. of Education 2009). Results of U.S. benchmarks report a social issue of inequality among students' academic achievement within the United States based on race and ethnicity. In 2009 at Grade 8, 15 states had a smaller Hispanic-White gap than the national gap average, and six states had a gap that was larger. At Grade 8, in 14 of the 15 states for which 1990 data were available, the mathematics scores of Hispanic and White students were higher in 2009 than in 1990. In both Connecticut and Rhode Island, the gap was narrower in 2009 than in 1990. In three additional states, Delaware, Hawaii, and Missouri, the gap narrowed between Hispanic and White students since the first year for which Hispanic student results are reportable. In Maryland, the gap was wider in 2009

than in 1990, as White eighth graders' scores increased more than those of their Hispanic peers. In Utah, the gap was wider in 2009 than in 1992, the first NAEP assessment year for that state. Because not all states participated in the Grade 8 NAEP mathematics assessment in 1990, the first NAEP assessment year varies (Vanneman et al, 2009).

Although not all states participated in testing 1992, the results do not diminish the need for all education stakeholders to understand how a growing racially and ethnically diverse student population can impact achievement trends. In 2010, Hispanics are about 50.5 million, or about 16% of the U.S. population, up 43% from the 2000 census. The increase of over 15 million Hispanics from 2000 to 2010 accounted for more than half of the total population increase in the United States during that time (Humes et al, 2011). The Nation's Report Card (2011) reported that although 8th grade Hispanic students showed an increase in math scores from 2009, there is still a significant gap from their scores and the scores of White, more affluent students.

As culturally diverse school districts' population increases, cultural diversity increases with respect to language and the culture of students' home country. The impact of increased minority students attending low socio-economic urban school districts compounds the challenges of classroom instruction to meet students' individual needs and the needs of a diverse classroom setting. Teachers must ensure academic achievement opportunities for all students. Additionally, the increased number of immigrant students impact both schools' responsibility for accountability and classroom teachers' accountability as mandated by No Child Left Behind Act of 2001. Schwartz and Stiefel (2006) noted four effects on school districts from the increase of immigrant

students: equity and how to address the needs of immigrant students, impact on native-born students within the changing school group structure and climate, increase challenge for schools to meet federal and state accountability, and society's economic burden if immigrant students who are not achieving academically. Today, even with the Common Core Standards, the disparity between minority and non- minority students' test scores still remains (U.S. Dept. of Education, 2011).

The disparity among students' academic achievement is a social justice issue of equality and the lack of equality among ethnic minority students as demonstrated by statistics reporting that ethnic minorities have the highest drop-out rate (Miles, 2010). This lack of students' academic achievement impacts low achieving students personally by impeding their quality of life and personal achievement. Additionally, the lack of students' academic success impacts society's monetary responsibility to unemployment, health care, and rehabilitation. Risk factors of anti-social behavior and academic failure need to be addressed by teachers through specific changes in classroom climate (McEvoy & Welker, 2000) and the implementation of differentiated instruction (Tomilinson & Imbeau, 2010;Tomlinson, 2003).

The lack of student academic achievement, particularly within the economically disadvantaged, minority school districts, not only increases risk factors toward juvenile delinquency (students' quality of life) and the community's monetary responsibility of rehabilitation (Haag, 2012) but impacts the United States' position as a leader in the global economy.

The focus for U.S. school districts to increase students' mathematic success by increasing math scores is based on several problems resulting from students' low math test scores. First, the United States is faced with global economic competition and lack of students' math success demonstrated by low test scores places a serious burden on the U.S. society and economy. Statistics from the U.S. Department of Education (2011) have shown students' math test scores are lower than those in other countries. The results of the Trends in International Mathematics and Science Study (TIMSS), given every 4 years to assess students in fourth and eighth grades, show that in 2008, out of 45 nations, United States students ranked 12th in math for fourth grade and 15th in math for eighth grade (National Center for Education Statistics, 2011b). Comparing the United States's students' scores to those of Singapore students, only 7% of the United States's eighth graders met the benchmarks for advanced math, compared to 44% of Singapore eighth graders, while only 64% of the United States's students met the benchmark for intermediate math, compared to 98% of the Singapore students.

An even higher deficit in math assessment scores is found in culturally diverse poor urban school districts (Miles, 2010). Thus, the correlation of lower math scores with higher academic failure increases the proclivity for these students to have increased risk factors toward poor choices in their life. Students' lack of success in school correlates with an increase in the risk of juvenile delinquency, with an increase of students' use of drugs, with increase of students' dropout rates, and with an increase of students' committing crime (Kearney & Thaker, 1994), thus increasing the monetary burden on society for remediation. Additionally, according to Vigdor (2013) the United States has

fewer students selecting math-related careers as a higher education study and the proportion of college graduates majoring in mathematics between 1972 and 2011 did not increase significantly. Ninth grade is considered the transitional grade for math success (Dedmond, 2005), with students selecting their high school classes for college and their field of interest. A lack of math academic success prior to ninth grade and during high school math courses influences the number of students interested in math as a career as an accountant, educator, or any career that would involve the use of math (Jacobs et al, 1998).

Summary and Conclusions

Arts-integrated math activities are differentiated instructional strategies for traditional math instruction classrooms. Differentiated instruction allows students to understand their learning and thinking preferences while teachers develop instruction based on student-centered learning such as arts-integrated academic lessons (Tomlinson, 1995). At this time, educators act as facilitators during arts activities. Differentiated instructional strategies include working individually, in pairs, or in groups. Increased collaboration and problem solving through experience (Vygotsky, 1986) is met by implementing arts- integrated activities as part of classroom instruction. Arts integration increases opportunities for students' academic success (Gardner, 1999). Studies have shown that arts integration demonstrates a diverse influence on students, success among different academic areas (Richards, 2003), and demonstrates the potential of reaching the classroom diversity of middle school (Tomlinson, 1995). Finally, arts- integrated

lessons, including sensory stimuli, have increased dopamine levels which increase the proclivity for learning (Hudgins, 2010).

Teacher immediacy has shown to increase students' academic success. Teacher immediacy is measured by students' perceptions of teacher availability through verbal and non- verbal communication (Wilson, 2007). Most research located on students' perceptions of teacher immediacy (inter-personal relationships) has been documented from higher education studies. The findings documented that students need to feel there was a connection with their teacher (Yazzi-Mintz, 2007), and a higher level of teacher immediacy has been found to increase students' academic success (McCroskey, 1998, 1995; Tevin & Hanson, 2004; Wilson, 2007).

Creating connections to increase teacher immediacy occurs through interpersonal relationships and is part of the classroom climate. Teaching and learning in a classroom is also part of the classroom climate and includes arts-integrated lessons as part of differentiated instruction. Schools with a higher level of the arts in their curriculum have shown a higher level of students' academic success (Catterall, 2009; Gardner, 2001, 2009). Although research has shown a relationship between arts integration and students' academic success (Catterall, 2009), identifying how the arts influence other classroom dynamics is open to further research (Winner, 2013). Catterall (2009) and Gardner (2004) suggested further research to determine how differences of instructional strategies impact students' academic success. Therefore, arts-integrated lessons in an academic classroom may influence interpersonal relationships by creating connections between students and teacher that change the climate of the classroom and may increase students' perceptions

of teacher immediacy. Thus, one of the questions for this study is what relationship exists between students' participation in an arts-integrated classroom and students' math achievement scores in a subsequent grade, as measured by the New Jersey Assessment and Skills score. The other question for this study is whether there is a relationship between teacher immediacy, as defined by students' perceptions of teachers' academic and interpersonal caring, and students' math achievement, as measured by the New Jersey Assessment of Skills and knowledge standardized test scores, after controlling for art-integrated instruction.

A study of arts-integrated lessons as part of differentiated instruction may provide an understanding of how the arts influence classroom dynamics toward academic achievement. This study seeks to examine the impact of arts- integrated activities on students' perceptions of teacher immediacy (students' perceptions of teacher caring behaviors) and on students' academic achievement. This study is formulated on the premise that increased teacher immediacy will also increase students' academic success (McCroskey, et al, 2006), that students' culture/ethnicity of influence their perception of teacher immediacy (Tosolt, 2008), and that further research was suggested to include instructional strategies (Tabasco, 2007) such as arts-integrated instructional strategies, which have shown to increase students' academic achievement (Gardner, 1999) to determine how the arts act as a transference of learning (Winner, 2003, 2013).

Chapter 3: Research Method

Introduction

The purpose of this study was to examine the relationship of arts integration and teacher immediacy on students' academic math achievement. The study was analyzed by examining arts-integrated lessons during math instruction and its influence on student's perceptions of teacher immediacy and their influence on academic achievement. These findings hoped to provide increased knowledge of how the arts increase students' academic achievement and if the arts provide a transference of learning via students' perceptions of teacher caring. Teachers may take an active role and purposefully change their class instruction to increase students' motivation for learning and subsequent academic achievement

Major sections of this chapter include the research design and rationale; the methodology, which includes discussion of the population, sampling, and sampling procedure; recruitment; data collection; instrumentation; threats to validity; assumptions; and ethical procedures. An explanation of the sample size is provided, along with a brief discussion of the Tosolt survey, the proposed instrument to measure the independent variables of teacher immediacy.

Research Design and Rationale

Research has demonstrated that the arts increase students' academic success (Barone & Eisner, 2013; Catterall, 2013; Gardner 1999; Krilov, 2007; Winner, Goldstein, & Vincent-Lancrin, 2013). Since Winner and Hetland (2003) completed their meta-analysis of 50 years of quantitative studies in arts education, linking arts instruction with

cognitive and academic achievement, most researchers of art education have used qualitative methods (D. Blandy, personal communication, April 24, 2014). Blandy, editor of the leading arts research journal, reported that most art education studies submitted for publication are not of quantitative design and he argued further that arts education researchers need to understand the importance of quantitative or hypothetical studies (National Art Education Association, 2009). Blandy further explained that questions and issues associated with art education require multiple methods of investigation, and that quantitative methods are not being represented in efforts to address the pressing issues and questions associated with contemporary art education such as demonstrating a causal relationship between the arts and students' academic success. Quantitative methods provide trends between groups by providing descriptive data that provide a snapshot of the population (Madrigal & McClain, 2012). For the study, it was important to pursue deductive reasoning than inductive or an exploratory process. There was also a need to determine the impact of arts integration as a predictor of students' perceptions of teacher immediacy and students' academic success. These relationships were determined using a hierarchical regression analysis, which is a quantitative method design.

The study was designed, first, to determine if arts-integrated lessons (the independent/predictor variable) as part of middle school math instruction impact students' math achievement (dependent variable). Students' academic achievement scores from their favorite middle school math teacher were compared with an independent *t* test of those teachers who integrated the arts in their math lessons and those who do not. Second, this study examined how arts integration (the independent/predictor

variable) and teacher immediacy (the independent/predictor variable) jointly predict students' academic achievement (dependent variable). This examination was achieved by using a hierarchical regression to determine the relationship between students' perceptions of teacher immediacy and students' academic achievement after controlling for arts integration.

Research Questions

The research questions are presented below:

Research Question 1. What is the relationship between students' participation in an arts-integrated classroom and students' math achievement, as measured by the New Jersey Assessment and Skills score?

*H*0: Students who were in an arts-integrated classroom will not have significantly higher math achievement scores in a subsequent grade than those students who were not in an arts-integrated classroom.

*H*1: Students who were in an arts-integrated classroom will have significantly higher math achievement scores in a subsequent grade than those students who were not in an arts-integrated classroom.

To assess Research Question 1, an independent samples *t* test was conducted to determine if statistically significant differences exist on math achievement scores between participants who had arts integrated class and those who did not. The independent sample *t* test was the appropriate statistical analysis because the dependent variable being measured, math achievement scores, is continuous (interval/ratio) and th independent variable, arts-integrated classroom or not, is dichotomous (Pagano, 2009).

Research Question 2: Is there a relationship between teacher immediacy, as defined by students' perceptions of teachers' academic caring, fairness caring, and interpersonal caring, and students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction?

*H*0: There is no relationship between teacher immediacy, as defined by students' perceptions of teachers' academic, fairness caring, and interpersonal caring, and students' math achievement as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction.

*H*1: There is a relationship between teacher immediacy, as defined by students' perceptions of teacher academic caring, fairness caring, and interpersonal caring and students' math achievement as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction.

To assess Research Question 2, a hierarchical regression was conducted to determine if arts-integrated instruction and teacher immediacy effectively predict math achievement scores. The first independent variable, art-integrated instruction, was entered into the first block of the regression. In the second block, the teacher immediacy Score (academic caring, fairness caring, and interpersonal caring) was added in along with art-integrated instruction. Arts-integrated instruction was treated as a dichotomous variable and teacher immediacy scores was treated as a continuous variable. The dependent variable, math achievement scores, was treated as a continuous variable.

Significance of teacher immediacy scores in predicting math achievement scores after controlling for art-integrated instruction was interpreted with a 95% confidence interval ($\alpha = .05$).

Instrumentation and Operationalization of Constructs

Arts Integration

Students' experiences in an arts-integrated classroom was measured on a dichotomous scale, with students selecting either "Yes" or "No" to indicate their past experience. Participants were asked to report on their experience of their favorite middle school math teacher to ensure a sample population that includes as many middle school math teachers from the district. To assist with recall, participants were asked to report on their favorite middle school math teacher, and whether or not they received arts instruction with that teacher.

Teacher Immediacy

Teacher immediacy was investigated by collecting data from a student self-report survey. The first part of Tosolt's (2008) survey consists of demographic questions including ethnicity, country of origin, and gender. The teacher immediacy questionnaire consists of 50 Likert-type items in which participants respond to how caring a teacher is based on statements describing specific teacher behaviors. For each statement, participants will select one of the following four choices: *This shows a teacher is very caring; This shows a teacher might be caring; This does not show if a teacher is caring; or A caring teacher would not do this.* Three additional questions were included to validate the participant's responses to the other 50 items in the questionnaire. A student's

responses to these three questions should correlate with whether the student responded with a preference to the fairness caring, interpersonal caring, or academic caring items within the teacher immediacy questionnaire (Tosolt, 2008). Tolsolt's pilot study showed significant differences in responses by students based on student race and ethnicity, reflecting construct validity (Creswell, 2004). Validity was determined by using two focus groups. Tosolt further explained that both set of students of the focus groups understood the survey items and could not think of any other survey responses. Tosolt determined the level of internal reliability of her factors by running a reliability analysis which provided Cronbach's alphas that indicated a reasonable level of internal reliability. For the proposed study, I calculated a reliability coefficient to establish consistency in participant responses by following Tolsolt's process in her survey.

Math Achievement

Students' math achievement was measured through their New Jersey Assessment of Skills and Knowledge (NJ ASK) standardized test scores during the year of their self-reported favorite math teacher. The NJ ASK is a standardized test that is designed to measure the state Core Curriculum of New Jersey There are two major types of test questions: multiple-choice and open-ended questions. All of the questions have been reviewed by trained professionals and educators and have undergone statistical analysis to ensure that there was no bias, and the questions were field tested in May, 2003. Thereafter, statistical items were reviewed and the test's validity was determined based on the alignment of the test to the curriculum, the design of the test, and the results of the field test (NJ Department of Education, 2005). The test is given once each year in the

spring to Grades 4 through 8. Test results from 2009 demonstrated high reliability in math, with coefficient alpha scores of 0.91, 0.89, and 0.92 for Grades 6, 7, and 8, respectively (NJ Dept. Education, 2005) For the study, each participant's NJ ASK mathematics scaled score was obtained for the year that corresponded to his or her middle school year (Grades 6, 7, and 8) with their favorite teacher. Participants' NJ ASK mathematics scores were provided by the district's assessment department.

Operationalizing the Variables in Relation to the Research Question

Question 1 contained only one independent variable; the presence or absence of arts integrated lessons and one dependent variable, math achievement. The level of measure was dichotomous and nominal with a possible range of 0 to 1 for the independent variable with data collected from a demographic questionnaire. The dependent variable was measured from scaled scores ranging from 100-300 reported on Performance Matters for NJ ASK.

Question 2 included three subgroups of teacher immediacy as the second variable with a sum of item level of 0-100 taken from students' perception of teacher caring survey of Tosolt (2008). Independent variable 1 was the presence or absence of arts-integrated lessons as described in Research Question 1. The dependent variable was the scale scores of math achievement as described in Research Question 1 (see Table 1).

Table 1

Operationalizing the Source of the Variables in Relationship to the Research Question

Question 1:	Definition	Level of measurement	Possible values Types of values, ranges, scores	Instrument used
Independent variable	Presence or absence of arts-integrated lessons	dichotomous nominal	0,1	Demographic questionnaire
Dependent variable	Math achievement	Scaled scores continuous (interval/ratio)	100-300	located on performance matters NJ ASK Mathematics scaled score
Question 2:				
Independent variable 2	Teacher immediacy	Sum of item level scores Continuous (0-100)	0-100	Student perception of teacher caring survey (Tosolt, 2008)
Independent variable 1	Presence or absence of arts-integrated lessons	Nominal dichotomous	0, 1	
Dependent variable	Math achievement	Scaled scores	100-300	NJ ASK Mathematics scaled score

Methodology

Population

The sample population of this study was taken from three high school academies of the district's population of 28,4000 students, which is a culturally diverse, low socio-economic urban school district located in Northern New Jersey. According to the Comprehensive Annual Financial report for year ending June 30, 2014 of the school district, the school district reported that the district included a 0.2% student population of American Indian or Alaskan native, 4.4% Asian, 26.3 % Black or African American, 5.8% White or Caucasian, and 47% Hispanic or Latino. According to the United States Census (2013), the city is composed of 31.7% Black or African American residents, 1.1% American Indian and Alaska Native residents, 3.3% Asian residents, 76.5% Hispanic or

Latino residents, 9.2% White or non-Hispanic residents, and 5.3% Multiracial residents. For 29.3% of the population, a language other than English is spoken at home, and the median household income is $34,302, with 27.1% of persons living at or below poverty level (United States Census Bureau: State and County QuickFacts, 2013). The chosen school district is the district in which I am an art educator. The student population is composed of predominantly minority students from low socioeconomic families and student test scores are lower than those of their more affluent non-minority surrounding suburbs.

Sampling and Sampling Procedures

High school students were the population recruited for this study for several reasons. First, collecting data from the high school population made it easier to obtain the sample size required. There are three high school academies with a total population of 500 student versus 25 middle schools in this district (each with an average student population of 250), which means that for a convenience sample, more participants could be recruited using fewer schools than would be necessary if recruiting within the middle schools. Second, the ease of obtaining permission to collect data from three high schools (as opposed to 25) also justified this approach. Last, the procedure for collecting data in the high school environment was less intrusive for the students than it would in the middle school environment. (J. Basillicato, personal communication, February 5, 2013). Therefore, for this study, the district's research committee approved data to be collected from high school academies. A copy of the approval letter is in Appendix D.

Students in Grades 9 through 12 were recruited to complete an online survey using SurveyMonkey, and there were two specific groups for analysis: students who have and students who have not had arts integration during their favorite math teachers' math class. Participants were filtered for inclusion by first selecting students with the shortest time span between their present grade and the grade of their favorite math teacher; this approach increased the accuracy of the retained data. The sample was collected to ensure that both arts and no arts population are equal in number from the 128 participants required for the analyses. Students' NJ ASK math scores were added to their score after they finished Tosolt's survey.

The anticipated population within the three high school academies was over 200 students, which was greater than the suggested sample size determined for a hierarchical regression with two independent variables and a two-tailed *t* test. To determine the minimum suitable sample size, a power analysis was conducted using G*Power 3.1.7 (Faul et al, 2013). The sample size required to find significance for a regression while controlling for one variable was assessed by examining the R^2 increase. Using a medium effect size (f2 = .15), and alpha level of .05, and a generally accepted power of .80, the sample size necessary to achieve empirical validity for the hierarchical regression utilizing an R^2 increase was 55 participants, and the sample size for the two-tailed *t* test was determined at 128. For this study, then, a sample population of 128 was sufficient to address both research questions.

Procedures for Recruitment, Participation, and Data Collection

Students brought home a study packet including parent consent forms and student assent letters (see Appendices B and C). The schools were responsible for sending out these packets and gathering the forms at the school. The survey was in English so any students not proficient in English were excluded from the study. Both the parent and the student granted consent in order for the student to participate. Once the needed number of participants' consent and assent forms was obtained, the data collection occurred within a 2-week period. Participating students were given a random 4-digit number as their identification code. Students were made aware of the purpose of the study. They were also aware that at any time during the study, they may ask questions or discontinue participation without penalty.

Data Analysis

The first research question was examined using an independent *t* test to evaluate the variance between and within the two equal sample populations of the arts integration conditions.to determine if there was a significant difference in variance *t*-scores of between groups and if there was a significant difference in the variance within groups ($p < .05$). The results of their academic achievement was an independent samples *t*-test that compares the dependent variable of math academic achievement based on the presence or absence of arts integration instruction, the independent variable.

There were two assumptions to address with a *t* test. One assumption was that normally distributed population; the other assumption was equality of the variances of the sample populations. With regard to the *t* test, the focus was to ensure that the sample

population taken from a population was normally distributed and that the variances of the populations to be compared are equal.

Because research has shown that both the arts and students' perceptions of teacher caring (teacher immediacy) increase student achievement, the second question examined the impact of arts-integrated lessons during math class on students' perceptions of teacher immediacy. By following a hierarchical multiple regression analysis, arts integration was entered in the first block as the predictor to students' math achievement and then teacher immediacy with the 10 sets of five responses was entered in the equation.

The second research question and set of hypotheses required a hierarchical regression analysis, predicting academic math achievement based on arts integration and teacher caring variables. In the first block, the predictor variable of arts integration was entered, followed by a second block that includes the predictor variable of teacher immediacy, defined as responses of students' perceptions of academic caring, fairness caring, and interpersonal caring scores.

For the multiple linear regression, the assumptions were that the data would reveal normal linearity, homoscedasticity, no multicollinearity, and were of a sufficient sample size. To test the assumption that the variables were normally distributed, a scatterplot was conducted to determine the relationship pattern between the variables and I then identified the outliers by plotting the scores in a scatterplot and converting the scores to identify those scores that were extreme (i.e., those scores that were greater than 2 standard deviations above and below the mean were removed). Homoscedasticity was determined by analyzing the results of a scatterplot to determine if error between all of

the independent variables and the dependent variable were the same. The scatterplot of the residuals against the independent (predictor) variables should be correlated. If they are not, the data will be heteroscedastic. The assumption of multicolinarity was addressed by running multicolinarity tests and analyzing the data by first running the regression coefficients. The predictability of the independent variables was assessed in relation to the dependent variable. A perfect $r = 1$ is known as singularity and multicolinarity and anything above 9 demonstrates multicollinarity. If there was multicolliarity, the regression would need to be completed twice: once with teacher immediacy and then again with arts integration. The absence of multicollinearity assumed that predictor variables are not too related and were assessed using Variance Inflation Factors (VIF). VIF values over 10.0 suggest the presence of multicollinearity (Stevens, 2009).

Additionally, the differences of students' responses of teacher caring were examined and compared to the results of the Tosolt study, where the results showed differences in responses of White and minority students on teacher caring behaviors. This assessment was completed through an informal comparison between responses of academic caring, fairness caring, and interpersonal caring. In Tosolt's (2008) study, Whites responded higher to teacher interpersonal caring behaviors and minority students responded higher to teacher academic caring behaviors. This study should parallel the results of the Tosolt survey. Since the survey is only presented in English, English language learner students were omitted as participants and since the study's focus is on students' favorite math educator in an academic math class, special education students

taught math by their special education instruction in a self-contained class were also be omitted as participants..

Threats to Validity

The Tolsolt (2008) survey measured students' perceptions of teacher caring using three categories: academic, interpersonal, and fairness categories. Tosolt's survey was measured and performed to be psychometrically valid and reliable by strategies that Tosolt set up in the survey. For example, Part 3 of the survey' responses should match the responses of students in Part 2, meaning that the caring categories should match. This ensured content validity. Tolsolt's survey has since been used in other studies. Therefore, considering the results of the findings so far with the Tosolt survey, validity and reliability should remain the same for this study as with Tosolt's study with regard to content validity on the survey. The results of this study did match the findings of Tosolt's study where minority students selected academic caring behaviors as the most important to them, whites selected interpersonal caring behaviors as the most important. The fairness caring category was not selected as a significant choice of ethnic groups. Reliability for this study did not match the level on Tosolt's study.

. The second threat to validity was the use of high school students as participants instead of middle school students and the impact on recall bias. Although this use of an older sample was a concern, I made every attempt to collect participants with first the least time lapse of students as well as the question that asks students to recall their favorite teacher in middle school math. However, the low sample size made it impossible to implement this strategy. The time lapse of high school students' grades to middle

school grades ranged from 0 years (students just entering freshman year) to 3 years (students entering their junior year).

Ethical Considerations

Prior to recruiting research participants or collecting data, approval was acquired by Walden's Institutional Review Board (IRB approval # 06-01-15-0046521). To reduce the risk of coercion, only students not presently in my class were asked to participate in the study. Also, Walden's IRB required that participants would be minimally inconvenienced in their involvement in the study. To ensure this minimal interruption, the survey took approximately 20 minutes and was administered during non-instruction time. NJ ASK math scale scores for all students of three approved participating high school academic were available on Performance Matters for students' teachers and I was provided by central office's director of testing and assessment access to these test scores of students. Once the participants selected their favorite middle school math teacher, I entered the students NJ ASK scaled math scores for the year of their favorite middle school math teacher. The scaled score were matched with each participant's numeric code identification.

All information collected is kept in a passcode protected personal laptop to ensure participants' confidentiality. The district's assessment office granted permission to access the participants' NJ ASK scores for the study. The district research committee gave permission to complete the data collection at the district as of March 2013. Tosolt gave permission to use her Teacher Caring Behavior Survey (2008) in 2011.

Dissemination of Findings

I plan to present the results of my dissertation with my district administrators and as a professional development seminar for educators. I will post the information as a professional development workshop and website so interested participants and parents can view the outcome of the study. I intend to develop an arts-integration curriculum, one that is aligned to the core curriculum math standards that may be used in the middle school classroom. It is also my goal to publish this study.

Summary

This study investigated the role of both arts-integrated instruction and teacher immediacy levels on students' math achievement. The dependent variable was students' math achievement, as measured by the NJ ASK scale score, and the predictor variables were students' experience with arts-integrated instruction (yes or no) and teacher immediacy which is defined as students' perceptions of teacher caring, as measured by their perceptions of teachers' academic caring, fairness caring, and interpersonal caring. Both arts-integration (Gardner, 1999) and teacher immediacy (Richmond et al, 2003) have shown to increase students' academic success, yet no study has investigated the roles of both of these variables on students' academic achievement.

Chapter 4: Results

Introduction

The purpose of this study was to examine the relationship of arts integration and teacher immediacy on students' academic math achievement. In this chapter, I discuss the results from the study, including a description of the sample demographics, analyses of the data, and challenges with collecting the data.

To address the research questions, an independent samples *t* test and a hierarchical linear regression were conducted. The dependent variable was students' math achievement, as measured by the NJ ASK scaled score. The predictor variables were students' experience with arts-integrated instruction and teacher immediacy as measured by their perceptions of teachers' academic caring, fairness caring, and interpersonal caring.

Data Collection

IRB approval (#06-01-15-0046521) was granted for data collection. Participant recruitment was scheduled to take place over a 2-week time frame during the spring, allowing parents to complete the consent form and return it to the school with sufficient time for students to participate in the study before the school year ended. However, recruitment could not be initiated until the final few weeks of the school year. The rate of return for parent consent forms ($N = 119$) was lower than expected ($n = 200$) of the over 400 distributed parent consent forms. It was possible that parents might not have understood the need for them to provide consent in addition to the student's consent. Therefore, parents were contacted by phone during the summer break to answer any

questions they might have had regarding the return of consent forms. Students were given an opportunity to complete the surveys during the summer, but only a few more responded to add to the total of (N = 129). Despite the distribution of over 400 study packets to parents, the relatively low rate of return, combined with changes in school district leadership, resulted in data collection being terminated in September 2015.

Reliability

To determine the internal consistency of the three subscales of caring used for the following analyses, Cronbach's alpha coefficient of internal consistency was conducted. Cronbach's alpha coefficients were .55 for fairness caring, .96 for interpersonal caring, and .96 for academic caring. As such, academic caring and interpersonal caring were found to have highly consistent responses within each set of questions. The coefficient of .55 for fairness caring suggested that the responses to this scale were not consistent, and the reliability of this scale was poor. This was not consistent with Tosolt's Cronbach's alpha coefficients, where .72 was found for fairness caring, .77 for interpersonal caring, and .83 for academic caring (Tosolt, 2008). Tosolt found that for minorities, academic caring was more important than interpersonal caring. There was no significant difference in fairness caring behaviors as the lowest choice behaviors selected by both this survey and the Tosolt survey. Fairness caring was not internally consistent in this study, yet it is still included because this study has a higher minority population than the Tosolt study.

The change in reliability may be attributed to the higher proportion of minority students in this study and the smaller population of minority student participants in Tosolt's study or the difference in the ages of each study (high school participants vs.

elementary participants). Further analysis for fairness caring reliability was then implemented using a split-half analysis.

Split-half analysis was then conducted to assess the reliability of the fairness caring variable within the sample. The split-half was calculated for the seven items comprising the fairness caring scale (i.e., makes the other kids behave so I can learn; spells and says my name correctly; gets involved when other students are being to one another; takes it easy on me when I'm in a bad mood; gives me second chances; listens to my side of the story; and listens to all sides of the story before he or she decides what to do about a problem). Split-half measures the equivalence of parallel forms of a battery of questions to reliability assess a variable within the sample. The Spearman-Brown coefficient (unequal length) was .64. Table 2 includes the results of the split-half analysis for fairness caring.

Table 2

Results of the Split-Half Analysis for Fairness Caring

Analysis	*n*	Coefficient
Spearman Brown	7	
Equal length	7	.640
Unequal length	7	.644
Guttman	7	.614

The fairness caring variable's correlation with other measures of caring suggested that it is still valid, even though it demonstrated it was not within the measures to be considered reliable. Fairness caring by teacher was found to hold equal importance for White and minority students.in past research was not selected as a preference by either Whites or minorities. Again, further investigation may demonstrate that the difference in reliability outcome may be due to the differences in each study's population. However, academic caring was the preference for minorities while interpersonal caring behaviors were the preference of White student participants in the Tosolt study.

For this study, which is composed of predominately minority students, academic caring again was the selected behavior as most important to the student participants. The results of the selection of academic caring as the highest for minority students for both studies provides a sound basis for validity and the reliability of the study as it posits with Tosolt's findings. Fairness caring behaviors can be reviewed as not the most important for students in their perception of teacher caring behaviors.

Descriptive Statistics

Of the over 400 study packets that were distributed, 129 participants completed the consent form and responded to the questionnaire. Among these participants, 15 were removed from the study because they failed to complete the survey or because they met one or more of the exclusionary criteria (e.g., not attending middle school in the same school district or not recalling if they had a favorite math teacher). Therefore, 114 participants were included in the study.

It was also decided that participants who could not recall if they received arts integrated lessons during their math instruction would be categorized as not having received arts instruction. Either they did not participate in any arts activity (and hence could not adequately recall any memory of arts instruction) or the arts activities were not sufficiently memorable as to impact their math performance. In order to reproduce the art activity in relation to math performance, students need to first be able to recall the activities that were demonstrated (Bandura, 2006).

The lack of control over this variable may have influenced the results of the study and provide a reason why this study did not show the same findings as past research involving arts and students' success. Krilov (2007) controlled the type and number of arts lessons and demonstrated an increase of students' math success. The salience of those activities may have been necessary to have an effect on learning. One limitation of the current study's quasi-experimental design is that the number and type of art instruction could not be controlled as it was in Krilov's study.

Therefore for this present study the students who selected "I do not remember" were categorized with the student participants who selected "No" for arts integrated lessons. Student participants who answered "Yes" were able to recall what type of art activities they had during their math class. By including the "I do not remember" responses with the " No" responses, there were 68 participants (60%) who reported receiving arts integrated math lessons and 46 participants (40%) who did not recall receiving arts integrated lessons.

With regard to how the sample size was representative of the population, Table 3 demonstrates proportion of race and ethnicity of the participants is comparable to the district's population. The analysis demonstrated that 3% were American Indian or Alaskan Native, 5% reported were White or Caucasian, 14 % stated they were Asian, 25% reported they were Black or African American, 47% were Hispanic or Latino origin, and 6% of mixed ethnicity.

Table 3

Ethnic Groups

ID	*N*	% study	% district population *
American/			
Alaskan Native	3	3%	.2 %
White	6	6%	5.8%
Asian	16	14%	4.4 %
Black	28	25%	26.3%
Hispanic/			
Latino	54	47%	63.3%
Hawaian/Pac	0	0%	.1%
Mix	7	6%	nr
Total	114	100%	100%

*Taken from MIS enrollment end of year enrollment report June 2014

There were 84 female and 30 male participants. The ratio of female to male student participants does not represent the high school female/male population of the school district nor does it represent the general population of male to female students. This is because most of the participants were from one of the district's academies where the female population is higher than the norm of other district high schools. Table 4 shows the proportion of males and females in the study and in the school district population.

Table 4

Proportion of Males and Females in the Study and in the Population

Gender	*N*	% study	% population
Male	31	27%	51.4%
Female	83	73%	48.6%
Total	114	100%	100%

Table 5 contains the means and standard deviations for the NJ ASK math scores and the teacher immediacy variables. The mean of 200.41 for NJ ASK math score notes proficiency, which is not indicative of the district population where the mean NJ Ask score is lower. The mean for the three teacher immediacy variables were relatively equal, with Fairness Caring being the lowest (3.33). The pattern of teacher immediacy scores is similar to that found by Tosolt (2008).

Table 5

Means and Standard Deviations for NJ ASK Teacher Immediacy Variables

Variables	*Min.*	*Max.*	*M*	*SD*
NJASK middle school math scores	125.00	285.00	200.41	34.37
Academic caring	2.04	4.00	3.55	0.42
Fairness caring	1.83	4.00	3.33	0.52
Interpersonal caring	1.93	4.00	3.51	0.51

Inferential Statistics Results

Research Question 1: Independent *t*-Test Results

What is the relationship between students' participation in an arts-integrated classroom and students' math achievement, as measured by the New Jersey Assessment and Skills score?

To address Research Question 1, an independent sample *t*-test was conducted to assess the relationship between students' participation in an art-integrated classroom and students' math achievement. An independent sample *t* test is an appropriate statistical analysis when the goal of the research is to assess for differences in a continuous dependent variable between a dichotomous independent variable (Pagano, 2009). The dependent variable in this analysis corresponds to student's math achievement scores, as measured by the NJ ASK score. The independent grouping variable corresponds to participation in an art-integrated classroom (yes or no).

Prior to analysis, the assumptions of normality and homogeneity of variance were assessed. Normality was assessed by examining the distribution for student's math achievement scores. The assumption of normality was met as the data closely followed the empirical bell-shaped curve, as illustrated in Figure 1.

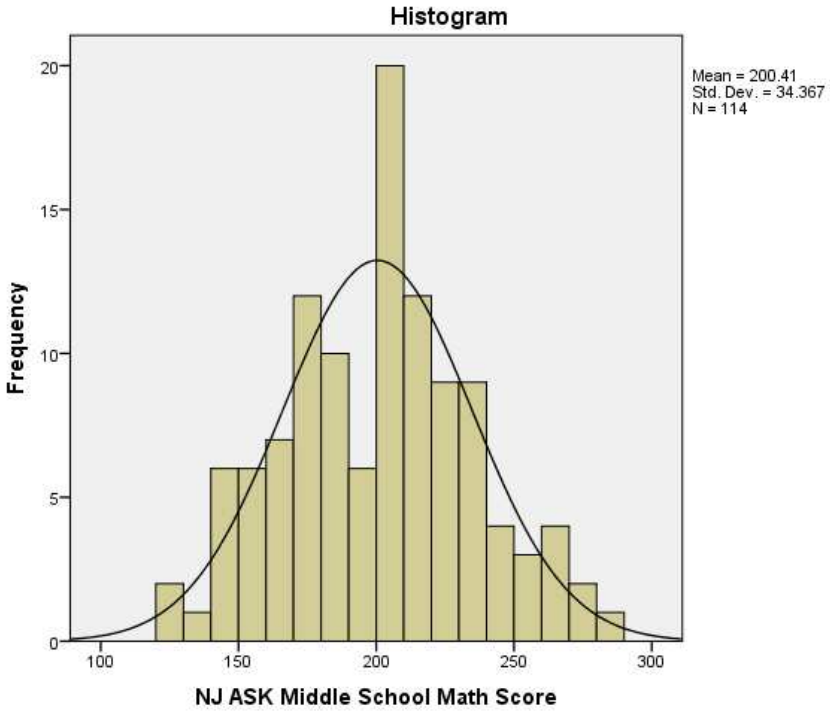

Figure 1. Histogram of NJ ASK scores.

The assumption of normality was confirmed using a one sample Kolmogorov Smirnov (KS) test, where the data were not found to be significantly different from a normal distribution (p = .200). Equality of variance was assessed by Levene's test. Results of Levene's test did not indicate significance (p = .975); thus, the assumption was met and the equal variance assumed test statistic was used (Howell, 2010).

Results of the independent sample t test indicated that there were no differences in NJ ASK middle school math scores by participation in art-integrated instruction, $t(112) = 0.27$, p = .791. Mean NJ ASK middle school math scores were 199.71 for students who did participate in art-integrated instruction, and were 201.46 for students who did not participate in art-integrated instruction. Thus, the null hypothesis for Research Question 1 cannot be rejected.

Research Question 2: Linear Regression Results

Is there a relationship between teacher immediacy, as defined by students' perceptions of teachers' academic caring, fairness caring, and interpersonal caring, and students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction?

To address Research Question 2, a two-step hierarchical linear regression was conducted to assess the relationship between teacher immediacy (teacher academic caring, fairness caring and interpersonal caring) and student's math achievement scores, while controlling for participation in art-integrated instruction. A hierarchical linear regression is an appropriate statistical analysis when the goal of the research is to assess. the predictive effect an independent variable has on a continuous dependent variable, while controlling for the effects of additional variables (Tabachnick & Fidell, 2012). The independent variables correspond to the teacher academic caring, fairness caring, and interpersonal caring. The dependent variable corresponds to NJASK middle school math scores. The covariate for this analysis is participation in art-integrated instruction. The first step (block) of the hierarchical linear regression assessed how much variance in the dependent variable is accounted for by the covariate – participation in art-integrated instruction. Although there was no significance between arts and no arts, it was added to follow the steps to the hierarchical regression as planned and for further research. The second step (block) assesses how much additional variance is accounted for by the

addition of the independent variables: academic caring, fairness caring, and inter-personal caring.

Prior to conducting the hierarchical linear regression, the assumptions of normality, homoscedasticity, and absence of multicollinearity were assessed. A normal P-P plot was used to assess the normality of residuals among the predictor's variables and the dependent variable. Homoscedasticity assumes that the scores are nearly equally distributed about the regression line. Homoscedasticity was interpreted through the standardized prediction versus standardized residual regression scatterplot. The presence of a rectangular distribution, one without a recognizable pattern, indicated homoscedasticity was present; thus, the assumption was met. The scatterplot for interpreting homoscedacity is found in Figure 2.

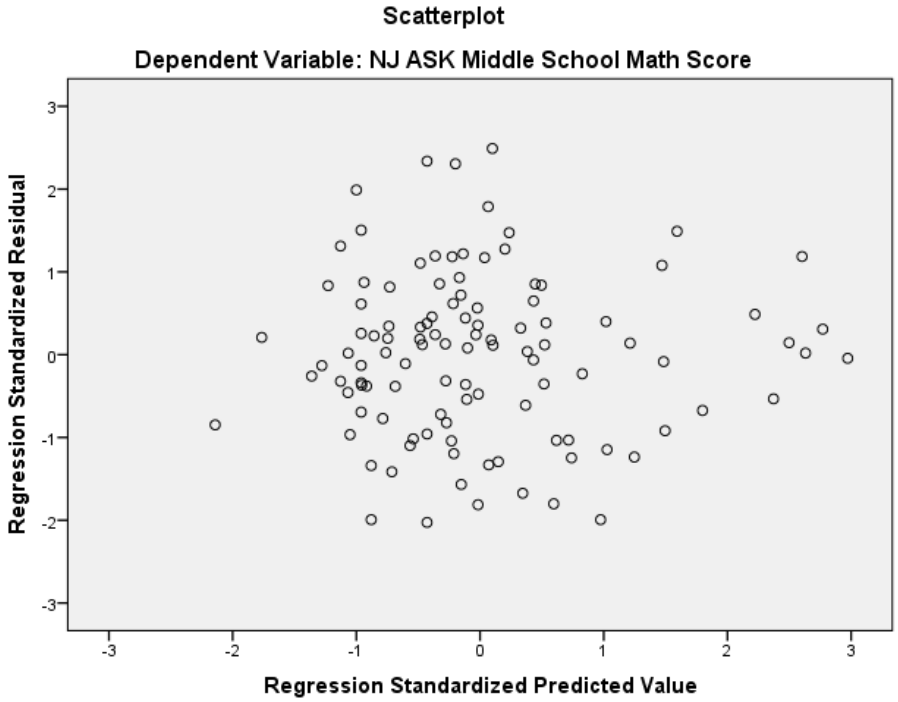

Figure 2. Scatterplot for homoscedasticity interpretation.

The normal P-P plot is presented in Figure 3.

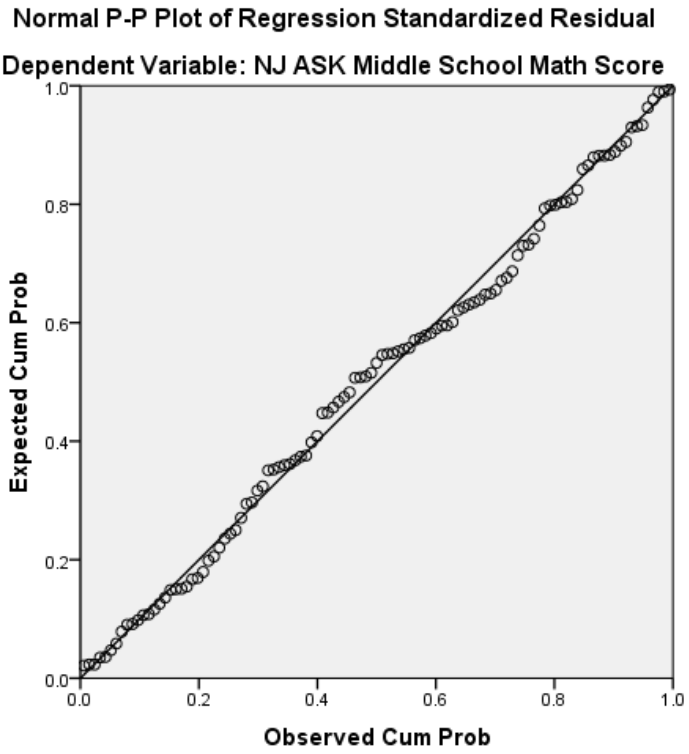

Figure 3. Normal P-P plot of regression standardized residual dependent variable: NJ ASK Middle School Math Score.

The absence of multicollinearity assumes that the predictor variables are not too closely related and was assessed using Pearson correlations. Though all three of the predictor variable correlations were significant, none of the correlation coefficients were above 0.90; thus, the assumption for absence of multicollinearity was met (Pallant, 2010). To confirm this finding, variance inflation factors (VIFs) from the regression model were assessed. None of the VIFs exceeded 4.47, and Stevens (2009) suggested that issues of multicollinearity are unlikely when VIF values are below 10. These VIFs can be found in

the regression output in Table 8 while results of the Pearson correlation are presented below in Table 6.

Table 6

Pearson Correlations to Assess for Multicollinearity Among Predictor Variables

Variable	1)	2)	3)	4)
1) Participation in art-integrated instruction	1			
2) Academic caring	-.02	-		
3) Fairness caring	-.02	.80*	-	
4) Interpersonal caring	-.08	.86*	.78*	1.00

*Correlations are significant at the 0.05 level (2-tailed)

Results of Step 1 (Block 1) of the hierarchical regression indicated that the covariate, participation in art-integrated instruction, does not significantly predict NJASK middle school math scores, $F(1, 107) = 0.24$, $p = .623$, $R^2 = .002$. The R^2 – coefficient of determination – value suggests that 0.2% of the variability in NJ ASK middle school math scores can be explained by participation in art-related instruction. Results for Step 1 of the hierarchical linear regression are presented in Table 7.

Table 7

Results of Hierarchical Linear Regression With First Block (Participation in Art-Integrated Instruction Predicting NJ ASK Middle School Math Scores)

Source	*B*	*SE*	β	*t*	*p*
Participation in art-related instruction	-3.31	6.70	-.05	-0.49	.623

Note. Step 1: $F(1, 107) = 0.24$, $p = .623$, $R^2 = .002$

Results of the second step (Block 2) of the hierarchical linear regression indicated that the covariate (participation in art-integrated instruction) and independent variables (academic caring, fairness caring, and interpersonal caring) also did not significantly predict NJ ASK middle school math scores, $F(4, 104) = 2.01$, $p = .099$, $R^2 = .072$. The R^2 – coefficient of determination – value suggests that an additional 7% (7.2%-0.2%) of variability in NJ ASK middle school math scores can be explained by the inclusion of the predictor variables. Due to the overall model not indicating significance, the individual predictors were not examined further. There is insufficient evidence to reject the null hypothesis for research question two. Results for the second block of the hierarchical linear regression are presented in Table 8.

Table 8

Results of Hierarchical Linear Regression With Second Block (Participation in Art-Integrated Instruction, Academic Caring, Fairness Caring, and Interpersonal Caring Predicting NJASK Middle School Math Scores)

Source	*B*	*SE*	B	*t*	*p*	VIF
Participation in art-integrated instruction	-4.89	6.61	-.07	-0.74	.461	1.02
Academic caring	35.20	16.35	.43	2.15	.034	4.47
Fairness caring	-17.09	11.07	-.25	-1.54	.126	3.04
Interpersonal caring	-21.35	12.96	-.32	-1.65	.103	4.28

Note. Step 2: $F(4, 104) = 2.01$, $p = .099$, $R^2 = .072$

Summary

The purpose of this study was to examine the relationship of arts integration and teacher immediacy on students' academic math achievement. Results for the independent ample *t*-test for research question one indicated that there was not significant differences in NJASK middle school math tests scores by participation in art-integrated instruction.

The null hypothesis for research question one could not be rejected. Results for the hierarchical linear regression for research question two indicated that there was not a significant relationship between teacher immediacy and students' NJASK middle school math test scores, while controlling for participation in art-integrated instruction. The null hypothesis for research question two could not be rejected. These results will be discussed in the following chapter, with connection to the literature, and suggestions for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The National Board for Professional Teaching Standards (2013a) expects teachers to demonstrate proficient skills in teaching students from culturally diverse backgrounds. Proficiency skills include establishing a culture of higher expectations for learning and achievement and differentiating instruction based on students' needs and background (Tomlinson, 2003). To improve test scores for students, more research is needed on teachers' instructional strategies in their classroom (Tabasco, 2007). For example, differentiated instruction has been used to address the needs of diverse classroom (Tomlinson & Imbeau, 2010). Researchers have also demonstrated that students' academic achievement has been increased when the arts are part of the curriculum (Catterall, 2009; Krilov, 2007; Winner & Hetland, 2003); yet research investigating the arts, not only as a discipline but also as a teaching strategy of differentiated instruction, warrants further research. One such area where arts integration may act as a transference of learning would be with teacher immediacy. Studies on teacher immediacy in a diverse cultural setting have reported a positive correlation between students' perceptions of teacher immediacy and students' academic achievement (Isotalus & Muukkonen, 2002; McCroskey et al., 1996).

Interpretation of the Findings

Interpretation for Research Question 1

Although Catterall (2009) found a correlation between the arts and academic success, the findings of this research hypotheses could not be rejected. Thus the findings

for this study showed that students who were in arts-integrated classrooms did not have significantly higher math achievement scores in a subsequent grade than those students who were not in arts-integrated classroom. There are several possible reasons for this outcome. One reason could have been that the minimum sample size for a medium effect was 128, however, the sample size for the current study was 114, with 68 in the arts group and 46 in the comparison group. Additionally the comparison group included those who responded they either did not receive arts-integrated lessons or could not remember receiving them. Research had demonstrated that the arts increased students' academic success (Catterall, 2009; Gardner 1999). Therefore, the amount of arts actually integrated as differentiated instruction during math class is questionable and for this study only based on student recall of art or no art during their math instruction. It also did not include what arts integrated lesson was part of a specific math standard. Further research should include documented arts integrated lessons as part of specific math standards. Survey study of math teacher instruction and arts integrated lessons during math instruction is suggested as well as quasi- experimental designs of specific selected art lessons for specific math objectives. There may be a threshold required in the quantity and quality of arts- integrated instruction in order for it to have an effect on learning.

Interpretation for Research Question 2

The second research question asked whether there was a relationship between teacher immediacy, as defined by students' perceptions of teachers' academic caring, fairness caring, and interpersonal caring, and students' math achievement, as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after

controlling for the predictor, arts-integrated instruction. The sample size for the hierarchal regression satisfied the required sample size to determine the predictive effect. The result of the first block demonstrated that arts-integrated instruction did not significantly predict NJ ASK middle school math scores. The R^2 (coefficient of determination) value was only 0.2%, suggesting that participation in arts integrated instruction was not significant.

The result of the second step (Block 2) of the hierarchical linear regression also indicated that the covariate variable of arts- integrated instruction and the independent variable (academic caring, fairness caring, and interpersonal caring) did not significantly predict NJ ASK middle school math scores. The R^2 (coefficient of determination) value was only 7.2 % of variability in NJ ASK middle school math scores can be explained by the inclusion of the predictor variables. Because of the fact that there was no significant difference, the individual predictors were not examined further. Therefore, the null hypothesis could not be rejected, and this study results show no relationship between teacher immediacy (i.e., students' perceptions of teachers' academic, fairness caring, and interpersonal caring) and students' math achievement as measured by the New Jersey Assessment of Skills and Knowledge standardized test scores, after controlling for the predictor, art-integrated instruction.

After assumptions of normality, homoscedasticity, and the absence of multicollinearity were assessed, the results were as follows. There were normal residuals among the predictor variables. Homoscedasticity was present and there was the absence

of multicollinearity. The absence of multicollinearity among the predictor variables was confirmed by assessing the variance inflation factors.

Limitations of the Study

The results of the study demonstrated that there was no significant difference in middle school math scores between students who had arts-integrated lessons with their favorite middle school math teacher and those who did not have arts-integrated lessons with their favorite middle school math teacher. The study had several limitations that may have compromised the findings.

The arts and no-arts sample size was below the required sample size for sufficient power and effect size for the *t* test. There were several difficulties in obtaining the sample population, which were discussed Chapter 4, including change of school administration, time frame for collecting data, students' vacations, potential parents' confusion in providing consent forms, and students who were unsure whether or not they had received arts-integrated lessons.

Although past research has demonstrated that the arts increase students' academic success (Catterall, 2009, Gardner 1999, Krilov 2007, Winner & Hetland 2003), this study did not produce the same results as previous research demonstrating a relationship between arts and students' academic success. One possible reason for this study showing no change in academic success with arts integrated lessons may have been students' recall error as to whether there were art lessons or no art lessons, to the point that there were not enough art lessons to be salient. Another reason may have been that art lessons were not implemented as part of differentiated instruction, at least not enough to make an

impact on learning, or the intensity of art lessons were only for specific math standards in previous studies, and this study was based on the entire NJ ASK score for math. Yet another reason may have been the fact that although the sample population was to be from three of the district's high school academies, it was not. The academy that provided the majority of returned surveys is one that has the highest academic achievement scores in the district. Additionally, this study's sample size was insufficient to meet expected power and effect size. The quality and quantity of the arts integrated activities were not investigated. The presence or absence of arts integrated activities were obtained only through student recall. Recall itself has its own limitations.

There has been little research to determine whether cues to assist recall have increased recall, a study unemployment suggested that certain cues may trigger recall (van der Vaart, 2009). However, it is suggested to develop a thorough questionnaire to reduce or eliminate recall bias (Hassan, 2005). Therefore, included in the development of this study, the cue of "favorite middle school math teacher" was included. Even with such a cue, student responses of "I don't remember" for art or no art integration were collected. The results for "I don't remember" responses may be due to recall bias or that the art integrated lessons were not salient. Another factor which may have influenced possible recall limitation is the time span of 1 year to possibly 6 years for students to recall the dynamics of their favorite middle school math teacher's instruction. Time influences recall bias, and the longer the time frame from the incident for recall the more likely a higher recall bias (Margetts et al, 2003).

Although it has been noted that both the arts (Winner & Hetland, 2003) and teacher immediacy (Wilson, 2007) are known to influence an increase in students' academic achievement, neither demonstrated significance in students' academic achievement and there was not a significant relationship between teacher immediacy and arts- integrated lessons upon students' academic success. In fact the mean was so close for both arts and no arts that it was reported as $M = 199.71$ with arts and $M = 201.46$ with no arts.

Previous studies examining teacher caring behaviors using the Tosolt's survey (Tosolt, 2008) were based on a population of students who were predominately White. Tosolt's study determined the relationships of ethnicity and culture with seleted choices of teacher caring behaviors. Tolsolt found a significant difference between ethnicity and culture and the choice of teacher caring behaviors. The study demonstrated that white participants selected interpersonal caring behaviors and minorities selected academic teacher caring behaviors as the most important. The Tosolt study was based on middle school students while this study's participants were high school based. This study did support the category choices of teacher caring behaviors according to ethnicity and found that academic caring behaviors were the most important to minority students as with the Tosolt study. However, with regard to teacher immediacy demonstrating any significance with arts integration and increased of math scores, there was no significance. The limitation may be in the design of the study.

This study did not show an increase of students' math success with arts integrated lessons. However, compared to a study completed by Krilov (2007), Krilov's study

determined the use of arts integration did increase math success. In contrast to this study which did not include a controlled arts integrated lessons for specific math standards, Krilov did implement controlled lessons for specific math standards. This study's population was high school who completed a recall survey of middle school math class. Krilov, with elementary school participants, used a quasi-control group of those with arts and those without arts and taught the arts lessons as supplement instruction for the math teachers.

In addition this study included teacher immediacy to determine the relationship between arts integration and teacher immediacy upon students' math success. Although previous research demonstrated teacher caring behaviors have been included to increased students' math achievement (Strahan & Layell, 2006), this study did not. The results of this study demonstrated there is a need for further research to continue to determine the instructional strategies implemented by teachers and students' perception of teacher immediacy (Tabasco, 2007). Where this study selected students as participants, further research is suggested to include teachers as participants to determine the connection of teacher immediacy behaviors and their teaching instructional style and affective learning (Chory & McCrosky, 1999). Further research is particularly important in culturally diverse districts because it is here that not only academic success is lower than their white affluent peers but because teachers' behaviors are perceived by students according to their culture experiences and understandings of communication (Bandura 1986; Tosolt 2008; Vygotsky, 1934).

Recommendations

This study did not determine a significant relationship between the arts and students 'academic success nor did this study determine a significant relationship between arts-integrated lessons and teacher immediacy (academic caring, interpersonal caring, and fairness caring). Further research is needed examining teachers' instructional strategies in their classrooms that could increase students' academic achievement (Tabasco, 2007) to fully understand the proficient skills in teaching students from culturally diverse backgrounds (National Board for Professional Teaching Strategies, 2013a). It is crucial that teachers are intentional in selecting teaching strategies to meet the needs of all of their students (Goodwin & Hubbell, 2013). Further research is needed to determine what strategies and what significant amount of these strategies are needed to increase students' academic success. Strategies of arts-integrated instruction as part of differentiated instruction and teacher caring behaviors as part of teachers' strategies to increase affective learning is still needed. There is still a need to determine teaching strategies of those teachers from urban school districts with high culturally diverse and low socio-economic populations reporting lower standardized test scores than their suburban affluent school districts (Miles, 2010).

There are several suggested areas for further research. One suggestion is to conduct a longitudinal study examining a pre and post middle school math scores with and without the implementation of arts in the middle school math class with the collaboration of the arts specialists and middle school math teachers using set of activities specifically focused on one or two standards of math. This study should include all three

years of middle school and compare the results with the other schools in the district that do not have this intervention. Additionally, research has found that teachers with a high efficacy in arts will integrate the arts in their classroom (Garrett, 2010). A study should include an analysis of the arts efficacy of the middle school math teachers involved in this study and provide them with professional development on integrating the arts in their instruction based upon the findings of the survey.

As a follow up for this study, it would be helpful to determine the amount of arts integrated lessons implemented in middle school math by the middle school math teachers to understand whether it was student recall, art lessons not being salient, or perhaps the lack of arts integrated lessons by middle school math teachers because of low arts efficacy that was a possible cause for the result of this study not demonstrating the same outcome as previous arts research. If through post research the outcome demonstrates that teachers are not differentiating instruction and/or teachers do not have the efficacy to integrate the arts as part of differentiated instruction, then further recommendations would be to increase professional development for teachers on differentiated instruction that includes integrating the arts.

The NJ ASK scores showed no significant relationship between arts integrated lessons and teacher immediacy upon students' math achievement. Again, past research has shown significance with arts integrated lessons upon students' math success and teacher immediacy upon students' academic success. Further research is suggested to further understand their relationship.

With regard to no significance between teacher caring behaviors except for the slight increase of academic caring behaviors, it is suggested for further research of two sample populations; one with increased teacher caring behaviors and one with no increase. Future research to determine if teachers increase their teacher caring behaviors during class instruction, would there be an increase in academic achievement. Furthermore, a study of teacher survey to determine how teacher caring behaviors and teacher implementation of arts integrated activities would further explain why there was no significance in this study which is contrary to past research in both arts and students' academic success and increases of teacher immediacy and students' academic success.

Further research is needed to determine what teaching strategies are being used as part of classroom instruction in culturally diverse socio-economic school districts who are falling short in student test scores of their more affluent school district neighbors. This majority of returned surveys for this study was from only one of the three selected academies of the district. The academy that returned the surveys is the academy with high academic success, and without a good return from the other two academies, which included one alternative academy, the results of this study showed no significance. Thus the need to implement further research on teaching strategies with this academy and other academies in the district as well as what are the other variables that may be impacting the lack of students' academic success,

Implications

Although research has shown a relationship between arts integration and students' academic success (Catterall, 2009), identifying how the arts influence other classroom

dynamics is open to further research (Winner, 2013). One such classroom dynamic is students' perception of teacher immediacy. Previous research has shown that an increase of students' perception of teacher immediacy increased students' academic achievement (Wilson, 2007). For culturally diverse, low socio economic school districts, there remains a gap between students' academic success and that of students from predominately white, upper socioeconomic districts (Miles, 2010).

The high academic failure of this district comparted to its White affluent neighbors was not represented in the sample population of this study. The majority of returned surveys were from only one of the district's three selected academies for this study. This academy has produced higher academic scores than two of its neighboring community high schools. Without the participation of the other two academies, further research is needed within this district to ensure a sample population of the district's population.

Implications for Social Change

While this study did not determine a significant difference between arts and no arts and students' math achievement in middle school math, research is needed to understand teacher instructional strategies and practices as part of differentiated instruction in culturally diverse low socio-economic school districts which demonstrate lower academic achievement than their more affluent peers. Schools can increase professional development of differentiated instruction and include arts integration and teacher immediacy as variables which have shown to increase academic success. When school districts begin to increase professional development for these two variables; arts

integration and teacher caring behaviors, teachers may increase their inclusion as part of their instruction as two major components to differentiated instruction and affective learning. Thus this increase of professional development will set the proclivity for an increase of collaboration among core curriculum teachers and arts specialist to increase core curriculum teachers' arts efficacy as well as increasing differentiated instruction in their classroom. Further professional development that expands teachers' knowledge of differentiated instruction theory may assist with the implementations of strategies to meet the needs of a culturally diverse classroom and increase students' academic success. By expanding the knowledge base of the characteristics of teacher immediacy that can be predict student engagement and attendance, student outcomes could be positively affected as well.

Conclusion

Although the study did not show a significance between arts integrated and no arts integration in middle school math instruction, it does not dismiss past research confirming that arts-integrated lessons increase students' academic success. It does not dismiss the need for further research to determine what instructional strategies are being implemented in classes located in low socio economic culturally diverse school districts where students' all short in test scores of their more affluent peers. Further research should examine teacher instruction is meeting the needs of a culturally diverse classroom. An increase in arts integration and an increase in teacher caring behaviors (academic caring, fairness caring, and interpersonal caring) have demonstrated in past research an increase in students' academic success, yet this study did not show a significance in these

two variables upon students' academic success. Further research is needed in this area to determine if this study fell short because of its limitations or if teachers are not meeting the needs of a culturally diverse classroom to increase academic success.

Teachers may need to increase arts integration as part of their classroom instruction. An increase of arts integration has demonstrated to increase students' academic success (Catterall, 2009; Gardner 1995; Krilov 2007; Winner & Hetland, 2003). Teachers may need to be prepared to exhibit behaviors of teacher caring. An increase of teacher caring behaviors increases students' perception of teachers as being caring (Tosolt, 2008) increasing teacher immediacy. An increase of teacher immediacy has increased students' academic success (Wilson, 2007). Both arts integration and teacher caring are differentiated strategies that if implemented with fidelity may increase students' academic success. Differentiated instruction as part of teacher instruction to meet the needs of a culturally diverse classroom has shown to increase students' academic success (Tomlimson, 2009)

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Appendix A: Tosolt's Caring Behaviors Categories Interpersonal Caring

-Tells jokes

- teases me and my classmates
- nicely tells me the different ways he or she feels, like happy, mad, disappointed, or sad
- admits that he or she is wrong sometimes
- asks me to help with jobs in the classroom
- compliments my appearance
- gives me compliments in private •
- greets me when I enter the classroom
- helps me when other kids are picking on me
- helps me with a problem not related to school
- hugs me •
- makes it feel like nothing bad can happen to me while he or she is there
- makes school feel like another home •
- protects me • puts stickers on my papers
- says I can talk to her or him about anything if I need to
- sets up routines that I can follow •
- smiles at me
- talks to me about things that I am worried about

Academic caring

- asks my opinion\
- assigns work that I sometimes think might be too hard, but encourages or helps me with it
- encourages me to become the best student that I can be
- encourages me to keep trying when I'm feeling discouraged
- gives me compliments out loud in front of the class
- gives me materials to use in class if I don't have them
- gives me work that fits the way that I learn best
- grades and returns my papers without taking too long
- helps the students to help each other
- holds classroom discussions where lots of students get to talk
- insists on me doing my very best work most of the time keeps the classroom neat and organized
- Knows how to keep me on task
- lets me ask lots of questions
- lets me choose whether to work alone or in a group

- makes sure I understand the directions
- makes sure most of the students understand a lesson before he or she moves on to something new
- makes the other kids behave so that I can learn
- really listens to me when I'm speaking
- sets aside time to give me individual
- help speaks to me in a way that lets me know that he or she thinks I'm intelligent
- tells me to work harder when I'm not doing my best work
- uses examples to help me understand what he or she is teaching
- writes helpful comments on my papers

Fairness Caring

- gets involved when other students are being mean to each other
- gives me second chances
- listens to all sides of the story before he or she decides what to do about a problem
- listens to my side of the story
- makes me behave so the other kids can learn
- spells and says my name correctly
- takes it easy on me when I'm in a bad mood

Appendix B: Tosolt Survey on Students' Perceptions of Teacher Caring

This survey is designed to identify the behaviors that sixth grade students feel show that a teacher is a caring teacher. The survey asks some general questions about you, such as your race, ethnicity, and gender, and then asks your opinion about some possible teacher behaviors.

Part 1

A. Please identify your race/ethnicity. If you consider yourself biracial or multiracial, check all of the appropriate races/ethnicities

___ American Indian or Alaskan Native

___ Asian

___Black or African American

___Hispanic or Latino

___Native Hawaiian or Pacific Islander

___White or Caucasian

B. Were you born in the U.S.A.? _____yes _____no

If not, where were you born? _____

C. Where both of your parents/ guardians born in the U.S.A.? ____yes _____no

If not, where were they born?_____

D. If you identify with a particular ethnicity, please write a detail information about your family's ethnicity on the lines below. If not, please leave these lines blank.

Here are some examples:

- "I am Puerto Rican and African American"
- "My mom is from the Caribbean, but my dad is white."
- "I was adopted from South Korea by White parents."
- "I am Lebanese."
- "I am mixed. Part of my family is African American, part is from Ghana, and the rest is from Cuba."

E. Please identify your gender. _____Male _____Female

Part 2

Questions 1-10 each contain a list of five behaviors. You are going to show how important each of the behaviors is to you by putting a checkmark or an "x" next to the behavior in the column that best matches your opinion about the behavior.

After each of the sets of five behaviors, you are asked which of the five behaviors was the most important to you. Use the letter in front of the behavior to answer that question

1.I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
A)...lets me ask lots of questions.				
B)…smiles at me				
C)…makes the other kids behave so I can learn				
D)…keeps the classroom neat and organized				
E)…hugs me				

Which of these behaviors is the most important to you?_____(write the letter)

2. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this

F)…speaks to me in a way that she lets me know how or she things I'm intelligent.				
G)…tells jokes				
H)…holds classroom discussions where lots of students get to talk				
I)…writes comments on my paper				
J)…spells and says my name correctly				
Which of these behaviors is the most important to you? _____(write the letter)				
3. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
K)…gives me work that fits the way that I learn best				
L)…gives me compliments out loud in front of the class				
M)…protects me				
N)…makes school feel like another home				
0)…hugs me				
Which of these behaviors is the most important to you? _____(write the letter)				
4. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this

P)…sets up routines that I can follow
Q)…compliments my appearance
R)…helps me with a problem not related to school
S)…gets involved when other students are being mean to one another
T)…asks my opinion

Which of these behaviors is the most important to you? _____(write the letter)

5. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
V)…sets aside time to give me individual help				
W)…takes it easy on me when I'm in a bad mood				
X)…makes sure most of the students understand a lesson before he or she moves on to something new				
Y)…encourages me to become the best student that I can be				
Z)…admits that he or she is wrong sometimes				

Which of these behaviors is the most important to you? _____(write the letter)

6 . I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
AA)…knows how to keep me on task				
BB)…gives me second chances				
CC)…listens to my side of the story				
DD)…uses examples to help me understand what he or she is teaching				
EE)…puts stickers on my papers				
Which of these behaviors is the most important to you? _____(write the letter)				
7. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
FF)…tells me to work harder when I'm not doing my best				
GG)…greets me when I enter the classroom				
HH)…gives me materials to use in class if I don't have them				
II)…tells me the different ways he or she feels, like mad, happy, sad, or disappointed				
JJ)…talks to me about the things I'm worried about				

Which of these behaviors is the most important to you? _____(write the letter)

8. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
KK)…asks me to help with jobs in the classroom				
LL)…teases me and my classmates nicely				
MM)…listens to all sides of the story before he or she decides what to do about a problem				
NN)…insists on me doing my very best work most of the time				
OO)…really listens to me when I'm speaking				

Which of these behaviors is the most important to you? _____(write the letter)

9 . I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
PP)…grades and returns my paper without taking too long				
QQ)…gives me compliments in private				
RR)…makes me behave so the other kids can learn				

SS)…assigns work that I sometimes think might be too hard, but encourages me to help with it				
TT)…says I can talk to her or him about anything I need to				

Which of these behaviors is the most important to you? _____(write the letter)

10. I can tell a teacher cares about me if he or she	This shows a teacher is very caring	This shows a teacher might be caring	This does not show if a teacher is caring	A caring teacher would not do this
VV)…encourages me to keep trying when I'm feeling discouraged				
WW)…make it feel like nothing bad can happen when he or she is there				
XX)…helps the students to help each other				
YY)…makes sure I understand the directions				
ZZ)…helps me when other students are picking on me				

Which of these behaviors is the most important to you? _____(write the letter)

Part 3

Number 11-13 are statements. Please choose the one of the four bolded words or phrases that best matches your opinion and circle it or write it on the line.

11) A caring teacher will _____me to achieve academically **encourage force help push**

12) I want a teacher to help me grow as a _____.

friend person student young adult

13) A caring teacher is_____.

A strong authority figure **always available to talk to** **cool and friendly**
demanding but rewarding

Appendix C: Parental Information Letter

Dear Parents/Guardian,

My name is Kathy Benevento and I'm a high school art educator in your child's school district. I am investigating the impact of the arts on students' academic achievement. I have permission from the district to complete my data collection at three selected high school academies. . I am in the process of obtaining a doctoral degree in Education Psychology.

This 20013-14 school year, I am conducting a 20 minute survey that will ask high school students about their math experience in middle school with their favorite math educator. The purpose of the study is to examine whether there were arts-integrated lessons during their math instruction or no art integrated lessons during their math instruction, and their perception of what are teacher behaviors that demonstrate teacher caring by reflecting on their favorite middle school math teacher. I am interested in understanding the relationship between arts integration and students' perceptions of teacher caring on students' academic success.

I believe the study will be beneficial to both the students and teachers by enabling us to understand what instructional practices help to increase students' academic achievement.

The 20 minute survey is online and your child's identity will be confidential. Your child may take the survey during school hours but not during instructional time.

I thank you in advance for your support and permission to allow your child to complete the survey. If you have any further questions about my study, please do not hesitate to contact me.

Sincerely,

Katherine (Kathy) Albanese Benevento

Appendix D Students' Assent Form

This study is being conducted to help understand how the arts help to increase students' academic success and what teacher behaviors show that teachers care in your classroom. Please think about your favorite math teacher in your middle school years. You are to answer questions from an online survey about whether your favorite math teacher (cite grade level and ethnic origin of your math educator) used art projects with your favorite math teacher. You will also be asked to respond to various teacher caring behaviors and respond to the teacher behaviors that you saw in your favorite teacher that showed teacher caring. You are also to add your NJASK scale score for the grade level of your favorite math educator. You may ask for your score during the survey. You also may ask any questions and they will be answered. You may stop taking the survey at any time. The survey will be given during non –instructional time. The survey will take about 20 minutes to complete. I will be the only one who will look at the answers on your survey. Your identification will be confidential. I will be assigning a four digit numeric code for every student taking the survey.

This study will be given in your classroom. It will take about 20 minutes to complete. I will be the only one who will look at the answers on the survey. If you have any questions, you can ask them at any time.

If you do not want to take part in this study, you do not have to. If you get part way through it and are uncomfortable with it, you may stop.

I agree to participate in this survey.

Student Date

I agree to follow the guidelines above.

Researcher Date

Research Assistant Date

Appendix E: Gpower

Exact - Linear multiple regression: Random model

Options: Exact distribution

Analysis: A priori: Compute required sample size

Input:	Tail(s)	=	Two
	H1 ρ^2	=	0.3
	H0 ρ^2	=	0
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Number of predictors	=	3
Output:	Lower critical R^2	=	0.004102273
	Upper critical R^2	=	0.1631442
	Total sample size	=	56
	Actual power	=	0.9539104

Exact - Linear multiple regression: Random model

Options: Exact distribution

Analysis: A priori: Compute required sample size

Input:	Tail(s)	=	Two
	H1 ρ^2	=	0.3
	H0 ρ^2	=	0
	α err prob	=	0.05
	Power (1-β err prob)	=	0.80
	Number of predictors	=	3
Output:	Lower critical R^2	=	0.006236549
	Upper critical R^2	=	0.2374630
	Total sample size	=	38
	Actual power	=	0.8066374

Appendix F: Tosolt's Approval Letter for Use of Survey

NKU NORTHERN KENTUCKY UNIVERSITY

College of Education and Human Services
Nunn Drive
Highland Heights, Kentucky 41099
www.nku.edu
http://coehs.nku.edu/

November 14, 2011

To Whom it May Concern:

I, Brandelyn Tosolt, grant permission for Kathy Benevento, a student at Walden University, to use the survey titled, "Caring Teacher Behaviors" as it appears in my dissertation, *Middle School Students' Perceptions of Caring Teacher Behaviors: An Empirical Examination by Student Minority Status*, in her own work.

Please contact me directly with further questions.

Sincerely,

Brandelyn Tosolt

Brandelyn Tosolt, Ph.D.
Assistant Professor, Teacher Education
Northern Kentucky University
BEP 254
Highland Heights, KY 41099