The Impact of Integrated Arts Instruction on Student Achievement of Fourth Grade Urban Students in English Language Arts and Mathematics

Deborah Fagan Harloff
St. John Fisher College

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The Impact of Integrated Arts Instruction on Student Achievement of Fourth Grade Urban Students in English Language Arts and Mathematics

Abstract
This study is a quantitative study of the impact of arts integration on the academic achievement in English language arts and mathematics of urban fourth-grade students. The data were the results of a federally funded Arts Education Model Development and Dissemination (AEMDD) grant project from 2006-2009 implemented in a large urban school district. This secondary analysis used the data from 2009, the third and final year of the AEMDD study. The analysis used the New York State ELA and mathematics test scores of fourth graders as the measure to determine if arts integration had an effect on student achievement in these two content areas. Additionally, this analysis was conducted to determine which art form, music, visual art, theater, or dance had the greatest impact. Data were analyzed using SPSS 16.0. The ANOVA results indicate that integrated arts instruction has a positive impact on student achievement in ELA and mathematics at grade four. The Pairwise Comparison with the Bonferroni Correction was used to determine the effect of the specific art form used as the intervention to determine which of the arts forms had the greatest effect on fourth grade student achievement in ELA and mathematics. It was determined that visual art had a significant effect on the fourth-grade students’ performance in mathematics and that music had a significant effect on the academic achievement of urban fourth graders in ELA. Teachers, school and policy makers need to support arts integration as a means of increasing student achievement.

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The Impact of Integrated Arts Instruction on Student Achievement of Fourth Grade Urban Students in English Language Arts and Mathematics

By

Deborah Fagan Harloff

Submitted in partial fulfillment of the requirements for the degree Ed. D. in Executive Leadership

Supervised by
Dr. Diane Reed

Committee Member
Dr. Bruce Blaine

Ralph C. Wilson, Jr. School of Education
St. John Fisher College

August 2011
Dedication

In addition to “trusting the process” as spoken by members of the previous cohorts, my thanks to the many individuals who have supported and guided my doctoral journey. First and foremost, I would like to thank my family for their support and encouragement. This degree would not have been possible without the ongoing support of my entire extended family.

Second, I want to thank the outstanding professors of the Executive Leadership program, in particular Dr. Bruce Blaine for his encouragement and mentorship. Finally, I want to thank my friends in Cohort Four especially my group members, DC United.
Biographical Sketch

Acknowledgements

I would like to acknowledge the contributions made by the Rochester City School District and the Association of Administrators and Supervisors of Rochester for their contributions to my studies.
Abstract

This study is a quantitative study of the impact of arts integration on the academic achievement in English language arts and mathematics of urban fourth-grade students.

The data were the results of a federally funded Arts Education Model Development and Dissemination (AEMDD) grant project from 2006-2009 implemented in a large urban school district. This secondary analysis used the data from 2009, the third and final year of the AEMDD study. The analysis used the New York State ELA and mathematics test scores of fourth graders as the measure to determine if arts integration had an effect on student achievement in these two content areas. Additionally, this analysis was conducted to determine which art form, music, visual art, theater, or dance had the greatest impact.

Data were analyzed using SPSS 16.0. The ANOVA results indicate that integrated arts instruction has a positive impact on student achievement in ELA and mathematics at grade four. The Pairwise Comparison with the Bonferroni Correction was used to determine the effect of the specific art form used as the intervention to determine which of the arts forms had the greatest effect on fourth grade student achievement in ELA and mathematics.

It was determined that visual art had a significant effect on the fourth-grade students’ performance in mathematics and that music had a significant effect on the academic achievement of urban fourth graders in ELA. Teachers, school administrators
and policy makers need to support arts integration as a means of increasing student achievement.
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Chapter 1: Introduction

Statement of the Problem

Academic achievement is of concern to students, educators, and communities in many areas of the country. Standardized test scores are reported to the Federal government and New York State. The Federal government requires the reporting of data under the No Child Left Behind Act of 2001 (NCLB). The standardized test scores in English Language Arts (ELA) and mathematics for entire grade-level populations are reported annually by the New York State Department of Education in the New York State School Report Cards. New York State ELA and Mathematics assessments are reported in four levels: level one is not meeting the learning standards, level two is partially meeting the standards, level three is meeting the standards, and level four is the highest by meeting the standards with distinction (Rochester City School District Report Card, 2007). Some communities are concerned with the decline in test scores and in the discrepancies in achievement between various ethnic or racial subgroups. These school reports are monitored by school personnel, parents, and the larger community. School communities look for ways to increase academic achievement.

Brown (2007) indicates that arts integration has emerged at the forefront of elementary education reform in response to declining test scores. Cawelti and Goldberg (1997) state “A renewed interest in arts education has been stimulated in large measure by public concern over the quality of American schools and the performance of our students. The arts are seen as a part of an effective response to that concern” (p. i.). Arts
integration uses the arts as the means of teaching the curriculum. “By relating the arts to, and making them part of the basic curriculum they become the motivating energy of learning” (Fowler, 1996, p. 184). Arts integration is a teaching strategy that can make subject matter, ideas, and concepts more easily understood by connecting discrete curricula with the arts (Krug & Cohen-Evron, 2000, p. 265). According to Rabkin and Redmond (2006), the study of the arts can have a positive impact on student achievement resulting in increases in academic achievement. Rabkin and Redmond found increases in academic performance in math and ELA and suggest that struggling students could benefit the most from instruction in the arts. The Multiple Intelligence theory is one theory that can explain the benefit of learning in the arts due to the many learning styles that the arts address.

The Multiple Intelligence (MI) theory, developed by Gardner (1993), suggests that people learn in different ways. Gardner presents eight intelligences in his Multiple Intelligence theory. He states that when children are taught classroom content while addressing their learning style, the content is more easily acquired by the student. The arts utilize many of the learning styles noted in Gardener’s MI theory.

Background of the study. The National Center for Education Statistics (NCES) of the United States Department of Education was created by Congress in 1988 and directs the National Assessment of Educational Progress (NAEP) project. NAEP conducts long-term trend assessments on the basic achievement of America's youth. These assessments are known as the Nation’s Report Card. The Nation’s Report Card provides data for children in grades 4, 8, and 12 and also at 9, 13, and 17 years of age. These are important junctures in student academic achievement. The NAEP provides data on student
achievement, instruction, and schools for large groups of students such as students by grade level. NAEP also provides data on student achievement of sample subgroups within the larger population; for example, they report data by gender and ethnicity.

*National data.* The results of the NAEP report assessment results at five levels. These five levels are 50 points apart and consist of scores of 150, 200, 250, 300, and 350. For nine-year-olds the achievement results are reported out at the scores of 150, 200, and 250. In reading, any score between 200 and 250 indicates that the student can read short uncomplicated text about specific information or information that is sequentially related. A student will be able to understand, make inferences, and combine ideas during the reading. A score of 250 indicates that the student can search for specific information in the text, make generalizations, and relate ideas from subjects such as mathematics, science, and social studies (NCES, 2009).

The NCES mathematics data represents the percentage of students scoring at each level. Level one students with a score of 150 know simple mathematic facts, level two students with a score of 200 have a beginning understanding of mathematics and can demonstrate simple skills. The students scoring at level three with a score of 250 are beginning to solve mathematical problems and numerical operations. Table 1.1 demonstrates longitudinal data from 1990 – 2008 on student performance of nine-year-olds. The data illustrates improvement in scores from 1990. The table shows the percentages of nine-year-old students that achieved the 250 scale score in reading and mathematics. (NCES, 2009).
Table 1.1

NCES Longitudinal Data (NCES, 2009).

<table>
<thead>
<tr>
<th>Year</th>
<th>Reading</th>
<th>Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>18%</td>
<td>28%</td>
</tr>
<tr>
<td>1992</td>
<td>16%</td>
<td>28%</td>
</tr>
<tr>
<td>1994</td>
<td>17%</td>
<td>30%</td>
</tr>
<tr>
<td>1996</td>
<td>17%</td>
<td>30%</td>
</tr>
<tr>
<td>1999</td>
<td>16%</td>
<td>31%</td>
</tr>
<tr>
<td>2004</td>
<td>19%</td>
<td>41%</td>
</tr>
<tr>
<td>2008</td>
<td>21%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Table 1.1 indicates that until 2008 less than 21% of all nine-year-olds in the United States achieved a score of 250, which means that more than 80% of the nine-year-olds could not search for specific information in the reading, make generalizations or relate ideas from various subjects. Table 1.1 depicts that for mathematics the averages for level three, a scale score of 250, have been steadily increasing nationally; still more than half of the nine-year-old children do not have an understanding of numerical operations and cannot solve mathematical problems.

New York State assessments. English Language Arts and Mathematics Learning Standards were adopted by the New York State Board of Regents in 1996 and indicate what students should know and be able to do. There are four ELA Standards that explain reading, writing, listening, and speaking skills. The Mathematics Standards were revised...
in 2005 and describe the skills and concepts students should know and be able to use in mathematics.

Each of the NYS Learning Standards is further defined by performance indicators. These performance indicators clearly describe what students should know and be able to do. The NYS ELA examination measures student progress in ELA as described by the NYS ELA Learning Standards (see Appendix A). The NYS Mathematics test measures progress in mathematics as described by the NYS Mathematics Learning Standards (see Appendix B). State report cards contain detailed data of student performance on these exams since 1998.

The NYS test scores are reported at four levels. Level one does not meet learning standards, student performance does not demonstrate an understanding of the content expected for the subject and grade level. Level two partially meets learning standards, the student performance demonstrates a partial understanding of the content expected for the grade level. Level three meets learning standards, the student demonstrates an understanding of the content at the grade level. Level four meets the learning standard with distinction, the student demonstrates a thorough understanding of the grade level content.

New York State ELA test score data of the five largest school districts in New York State, referred to as the “Big 5”, (New York City, Yonkers, Syracuse, Rochester, and Buffalo) depict lower scores in ELA and mathematics than the state-wide average. (New York School Report Card, 2009). Table 1.2 presents the percentage of students who scored at a level three or above on the New York State assessments. The data are presented for New York States’ “Big 5” school districts in ELA and mathematics.
Table 1.2

*Fourth Grade NYS English Language Arts and Mathematics Data*

<table>
<thead>
<tr>
<th></th>
<th>2007-08</th>
<th>2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Math</td>
<td>ELA</td>
</tr>
<tr>
<td>Statewide</td>
<td>84%</td>
<td>71%</td>
</tr>
<tr>
<td>Rochester</td>
<td>62%</td>
<td>52%</td>
</tr>
<tr>
<td>Syracuse</td>
<td>60%</td>
<td>45%</td>
</tr>
<tr>
<td>Buffalo</td>
<td>54%</td>
<td>43%</td>
</tr>
<tr>
<td>Yonkers</td>
<td>77%</td>
<td>64%</td>
</tr>
<tr>
<td>NYC</td>
<td>79%</td>
<td>60%</td>
</tr>
</tbody>
</table>


The Buffalo and Syracuse School Districts are the two lowest performing districts of the “Big 5” school districts in New York State. Averages in the 50% - 65% range mean that well over one-third to one-half of the fourth-grade elementary students are not meeting the ELA and Mathematics Standards. These urban districts are not performing as well as New York State as a whole. In fact, the district averages of students meeting level three and four on the ELA and mathematics exams are lower in all the large urban school districts than the state-wide average.

The numbers in Table 1.2 illustrate that almost half of Rochester City School District elementary students in fourth grade do not meet the NYS Learning standards in ELA and about 40% of the students do not meet the standards in mathematics.

The poor performance of this district’s students is the problem to be addressed. This urban district has a large student population so many students are impacted by these
low test scores. This district had 2,365 fourth graders in the 2008-09 school year, with 43% not meeting the standard in ELA; that equates to 1,017 students not being able to read at grade level. In mathematics the data are only slightly better; 828 students are not meeting the standard in mathematics.

The researcher’s role. As the Executive Director of Visual and Performing Arts, the researcher oversees the curriculum development of all arts courses offered in the District. The Executive Director of Visual and Performing Arts reports directly to the Assistant Superintendent of Teaching and Learning. The Executive Director of Visual and Performing Arts is responsible for ensuring that all students meet the NYS Learning Standards for the Arts through the development of curriculum that is Standards-based and that instructional practices support the Standards. The NYS Arts Learning Standards are presented in Appendix C. A component of the NYS Learning Standards is that students are aware of the connections between the various subject areas. All curriculum directors, administrators, teachers, and staff must support the goal of the District: to increase student academic achievement.

The Executive Director of Visual and Performing Arts is also responsible for obtaining grant funding as applicable. One such grant, the U.S. Department of Education, Arts Education Model Development and Dissemination (AEMDD) grant was awarded to the RCSD Arts Department in 2006. The U. S. Department of Education AEMDD program supports projects that integrate the arts into curriculum; strengthen arts instruction; and improves students’ academic and arts performance at the elementary and middle school levels. AEMDD programs support the enhancement, expansion,
documentation, evaluation, and dissemination of innovative models that demonstrate effectiveness. (http://www2.ed.gov/programs/artsedmodel/index.html)

Findings from the Arts Impact Study: 2008-09. Analyzing the 2008-09 data from the Arts Impact Study (MacGowan, Harloff, Chandler, Hunt, Southworth & Gardiner, 2010, Southworth, Gardiner, & Gulden, 2009) found significant academic gains when arts integration strategies were utilized as an intervention.

MacGowan et al. (2010) noted that statistical significance was achieved for many of the grade levels and specific subgroups (p < .02 or better). Kindergarten students in the treatment population realized a 15% gain on the Hi/Scope Child Observation Record (COR). Fifty-six percent of the students in the target schools reached level four compared to 41% of the kindergarten students in the control schools.

The CTB Terra Nova test was the measure used at the first grade level. Students in the treatment schools who received free or reduced price lunch achieved a 6% gain in reading, Language Arts, and math during the final year of the intervention. In the treatment schools, for the first grade students who were English Language Learners, the gains were even more substantial: 12% in reading, 18% in English Language Arts, and 13% in mathematics. When compared to control schools, first-grade students with disabilities in the treatment schools realized gains of 15% in reading, 6% in English Language Arts, and 8% in mathematics (McGowan et al, 2010).

Subgroups of first grade students who receive free or reduce price lunch, or are English Language Learners, realized gains in reading (p<.05), in language (p<.05) and in mathematics (p<.05) compared to students in the control schools. First-grade students with learning disabilities achieved gains (p<.05) in reading and (p<.01) in reading and
mathematics compared to the control group students (MacGowan et al., 2010, Southworth et al., 2009).

Similar results were found for subgroups of second graders: students who received free or reduced price lunches realized gains in reading (p<.05) and language (p<.05). Second-grade students who are English Language Learners realized reading gains (p<.05) and language gains (p<.02) (MacGowan et al., 2010, Southworth, et al., 2009).

The New York State Exam was used as the measure for fourth-grade students. The students in the treatment schools accomplished a 13% higher rate of achieving level three or four in English Language Arts (ELA) and a 10% higher rate of achieving level three or four in mathematics. The sixth-grade students in the treatment schools attained a 13% higher rate in ELA and 20% higher rate of achieving level three or four in mathematics (McGowan, 2010).

Findings from the 2007-08 data reveal significant differences between the achievement levels of students in the arts integrated schools compared to the control schools. These gains were seen in ELA and mathematics. Arts integration was associated with these gains. However, one limitation of the Arts Impact Study is that there was no analysis of the relative effect of the type of arts integration. Therefore, little is known about the relative impact of specific arts forms used in arts integration on student achievement.

The program evaluation will use the data obtained from the Arts Education Model Development and Dissemination project, which took place from 2006-2009 in the Rochester City School District (RCSD), a high poverty level, large urban school district.
The fourth-grade ELA and mathematics scores from the 2008-09 school year will be the measure. The program evaluation will study the impact of integrated arts instruction on urban fourth grade student achievement in ELA and mathematics. As well as assess the impact of each of the four art forms: dance, theater, visual art, and music, on student achievement in ELA and mathematics at grade four.

This district had a student population of 16,970 Kindergarten to sixth-grade students during the 2006-07 school year, the first year of the study. Demographics of the RCSD student population is 65% Black, 21% Hispanic, 2% Asian, and 12% White. During the 2006-07 school year, 79% of the students were eligible for free or reduced price lunch. The National School Lunch Program is a component of the National School Lunch Act started in 1946 and signed by President Harry S. Truman. Income guidelines are established and adjusted annually to determine eligibility for the program; during the 2009-2010 school year a family of four with an annual income of less than $22,050 was eligible for the free lunch program. (National School Lunch Program. http://www.fns.usda.gov/cnd/Lunch/)

The treatment group consisted of the fourth grade students in 9 elementary schools of the 38 elementary schools in this urban district. The data from one of the schools was not included because it is a K-2 schools. The data from another school was not included since this school participated in the AEMDD grant the first two years of the project and then dropped out. The teachers stated concerns about the effectiveness of the teaching artist as the reason for discontinuing the AEMDD project in their school. The fourth grade students in other 27 elementary schools served as the control population.
In the 2007-08 school year student performance on the statewide ELA and mathematics exams indicated that 56% of the RCSD fourth-grade student population met the NYS ELA level of three or four and 62% met the mathematics level three or four. There are some extremely low performing schools, with just over half of the grade level population meeting or exceeding level three on the NYS ELA exam. There were only two schools where the percentage of students meeting the standard for ELA was in the 80% range. Mathematics scores are better with only three schools where percentages of students meeting the standard for Mathematics were in the range of 40-50%. The remaining 35 schools scored above 69%. The treatment schools have a fourth-grade student population of 476 students. So only 267 of these students met the NYS Standard in ELA and 295 students met the standard in mathematics. Table 1.3 illustrates the average percentage of students scoring at level three and four on the ELA and mathematics exams for the 2007-08 school year.

Table 1.3

Percentage of Students Scoring at Level Three and Four for the 2007-08 School Year.

<table>
<thead>
<tr>
<th></th>
<th>RCSD</th>
<th>RCSD Treatment Schools Mean</th>
<th>Treatment School Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourth grade ELA</td>
<td>52%</td>
<td>63%</td>
<td>44%-80%</td>
</tr>
<tr>
<td>Fourth grade math</td>
<td>62%</td>
<td>69%</td>
<td>46%-93%</td>
</tr>
</tbody>
</table>

Note. https://www.nystart.gov/publicweb
The percentage of students scoring at level three and four in the treatment schools is 11% better in ELA and 7% better in mathematics compared to the District-wide.
percentage mean in both ELA and mathematics. Although this is an improvement these numbers still do not meet the statewide scores of 71% in ELA and 84% in mathematics.

During the 2007-08 school year 81% of the students were eligible for free or reduced price lunches. For that same period of time 85% of the students in the treatment school were eligible for free or reduced price lunches. Table 1.4 compares the percentage of students district-wide and in the treatment group who were eligible for free or reduced price lunch. (https://www.nystart.gov/publicweb)

Table 1.4

Students Eligible for Free or Reduced Price Lunches During the 2007-08 School Year

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCSD</td>
<td>83%</td>
</tr>
<tr>
<td>Treatment School Mean</td>
<td>86%</td>
</tr>
<tr>
<td>Treatment School Range</td>
<td>78%-94%</td>
</tr>
</tbody>
</table>

Note. https://www.nystart.gov/publicweb

During the 2007 - 2008 school year 83% of RCSD students were eligible for free or reduced price lunches. From Table 1.4 it is evident that some of the treatment schools are higher and some schools are lower than the 83%. Only four of the treatment schools had fewer than 83% free or reduced price lunch eligibility. Additionally, the overall average of the students who were eligible for free or reduced price lunches in the treatment schools was higher at 86% than the district average of 83%.

The next section of the paper will introduce the theoretical perspective that supports integrated instruction. The theory presented is Gardner’s Multiple Intelligence theory.
Multiple Intelligence (MI) Theory, developed by Gardner in 1983, suggests that people learn through various ways. MI theory suggests that there is not one form of intelligence, but as many as eight; these eight intelligences are the components of MI theory. Gardner indicates that these may not be all the intelligences that exist; there may be others as well. Gardner’s theory describes eight intelligences as the means in which people interact with information and situations, thereby explaining how one learns.

Gardner’s theory of Multiple Intelligence (1983) suggests that there are a set of intelligences that are used by individuals to answer questions or solve problems.

“…intellectual competence must entail a set of skills of problem solving – enabling the individual to resolve genuine problems or difficulties that he or she encounters and, when appropriate, to create an effective product – and must also entail the potential for finding or creating problems – thereby laying the groundwork for the acquisition of new knowledge.” (Gardner, 1993, p. 60-61)

Gardner’s theory (1993) suggests that there are a multitude of intelligences that become active or engaged when information is presented. The intelligences described by Gardner are: Linguistic, Musical, Mathematical, Visual-Spatial, Bodily-Kinesthetic, Intrapersonal Intelligence, Interpersonal Intelligence, and Naturalist Intelligence. Following is a brief description of each intelligence.

Linguistic Intelligence is the ability to understand the various meanings of words and their many connotations. It is the ability to use words to convey a message. Someone with linguistic intelligence understands grammatical structure and how to use that structure (Gardner, 1993).
The ability to match pitch, play a musical instrument, and to use the elements of music is described by Gardner (1993) as Musical Intelligence. An individual with musical intelligence will have an increased ability to relate to the musical elements of rhythm, harmony, and tempo.

Mathematical Intelligence is the ability to use logic and understand numbers and number systems. The ability to reason and plan are characteristics of a logical-mathematical intelligence. A chess player is an example of a person with logical mathematical intelligence. A chess player can determine the impact of a move on an opponent before the move is made, thereby determining ahead of time if that move is the best possible move (Gardner, 1993).

The ability to see differences and similarities in images and in text is Visual-Spatial Intelligence. A person with Visual-Spatial Intelligence is able to create mental images based on text. A sculptor is an example of such a person. A sculptor can imagine a two-dimensional drawing as a three-dimensional form (Gardner, 1993).

The person who has Bodily-Kinesthetic Intelligence can use “one’s body in highly differentiated and skilled ways” (Gardner, 1993, p. 206). Another characteristic of a bodily-kinesthetic intelligent person is the ability to use fine motor and gross motor skills to complete tasks such as repairing machines, performing operations, or being an athlete.

Intrapersonal Intelligence is one’s ability to know his feelings and to make decisions based on this knowledge. The person with Interpersonal Intelligence has the ability to notice and make distinctions about the “mood, temperaments, motivations, and intentions” of others (Gardner, 1993, p. 236).
The eighth intelligence, Naturalist Intelligence, is the ability to understand the natural world. The person with Naturalist Intelligence can classify animals, plants, and other objects in the natural world. This person has developed observational skills related to the natural environment and can interact with the environment effectively (Gardner, 1993).

Gardner’s MI Theory (1993) presents these intelligences as descriptors of how individuals answer questions and solve problems. He explains that these intelligences can be seen in various cultures around the world.

MI Theory has been embraced by educators; the theory supports teachers’ beliefs that students learn in a variety of ways. The educational system values the logical-mathematical and the linguistic intelligences, since these are the two areas that are tested on a state-wide scale and test results are reported out nationally. However, teachers have known that not all students learn in these two modalities. MI theory confirms teachers’ beliefs that students learn in a variety of ways.

Gardner, a developmental psychologist, defines intelligence as “the ability to solve problems, or to create products, that are valued within one or more cultural settings…” (Gardner, 1993, p. x). Gardner first described his MI theory in his book Frames of Mind, which was published in 1983 with a Tenth Anniversary Edition issued in 1993. The theory originally listed seven intelligences; the naturalist intelligence was added in 1999. When first introduced MI Theory was readily accepted by teachers and school administrators. The theory provided an explanation and confirmation of educators’ beliefs that not all students learn in the same way. Due to this widespread acceptance in
the educational realm, Gardner and his colleagues at Harvard’s Project Zero have conducted several educational experiments.

One criticism of MI Theory is that it is not supported by empirical evidence. Waterhouse (2006) states that theories… “should be soundly supported by empirical evidence. However, unfortunately…MI Theory has no validating data” (p. 207).

Gardner and Moran (2006) refute Waterhouse’s claim that MI Theory is not supported by empirical evidence; they claim that the theory is a “synthesis: a work from a variety of disciplines” (p. 229). The article continues to explain that as new findings are revealed that MI Theory is reviewed and revised.

Another criticism, of MI Theory is that it contains eight intelligences that are interrelated, however, one intelligence can be more developed than another. Critics of the theory state that these intelligences are really abilities. The critics claim that they cannot be intelligences unless they can be assessed. Gardner along with colleagues did develop some “intelligence-fair” assessments. Gardner and Moran (2006) stated that for an assessment to be “intelligence-fair” it must assess the intelligence in its most natural setting. However, this work in assessment development has not continued. (Gardner & Moran, 2006, p. 230).

In *Multiple Intelligences and Student Achievement: Success Stories from Six Schools*, authors L. and B. Campbell (1999) present information from six schools that now realize an increase in student achievement as a result of putting MI Theory into practice. Many of these schools used curricula that had a thematic focus and was taught in an interdisciplinary manner. Three of these schools are described below.
One of the six schools, the Russell Elementary School in Lexington, KY administered the Kentucky Instructional Results Information System (KIRIS) in 1992. This assessment has four levels, with novice being the lowest, which means that the student is just beginning to understand new knowledge and skills. In 1992, 50% of the Russell students scored at the novice level. In 1996, after the implementation of the MI practices not one student scored at the novice level (Campbell & Campbell, 1999, p. 24).

Similar results were obtained at the second school, the EXPO for Excellence Elementary Magnet School in St. Paul, MN. EXPO is an urban school with a student population of 720 students. In 1996, 36% of the students scored above average on the Metropolitan Achievement Test (MAT) and in 1997, 38% of the students scored above average (Campbell & Campbell, 1999, p. 38). No page number unless you use a quote.

The third school, the Skyview Junior High School, which is located in Bothell, WA, has a student population of over 900 seventh, eighth, and ninth-graders. A state mandated test, the Comprehensive Test of Basic Skills (CTBS), is given to eighth graders. The “Skyview students outperform their state and national peers by 20 percentage points in reading, language arts and math” (Campbell & Campbell, 1999, p. 49).

The teachers and administrator of the six schools presented in Campbell and Campbell’s (1999) book describe the increase in student achievement as a result of implementing MI strategies; however, this claim cannot be proven empirically.

As noted above, some critics state that there is no empirical data that support the claim that MI theory works. In contrast to this, Gardner (2006) states that the theory is built on empirical evidence. Either way, the evidence presented by the three schools
mentioned above suggests that there may be some merit to using MI practices in teaching. Gardner’s research deals with how the development of arts abilities relates to and reflects intelligence and the educational process (Doorey, 2001). Through teaching with arts integration strategies, the intelligences noted in MI theory are engaged. When a student has a natural inclination to learn in a particular modality, and that modality is addressed through the teacher’s practice, the students will be more engaged. MI Theory describes the various modalities that individuals naturally have.

Teachers have embraced MI Theory because MI explains what they see in the classroom; that not all students learn in the same manner. Through the use of MI Theory teachers have been able to create lessons that engage learners and increase student achievement. This is possible because teachers present content and prepare learning activities that address the various learning styles. Since the intelligences presented by Gardner (1993) are closely related to the arts, this theory supports the use of Arts integration strategies in the classroom. The MI theory provides a framework for the use of arts integration.

Significance of the Study

This study contributes to the body of professional knowledge of using arts integration as an intervention to raise student achievement of elementary students in grade four. There is very little empirical research on arts integration as a model for increasing academic performance of students. Many studies deal with students’ perceptions and attitudes about arts education, or the perceived impact of the arts as a motivational tool to learning.
The RCSD Arts Impact study, one of the few empirical studies, revealed significant gains in academic achievement of fourth-grade students in the treatment schools during the 2008-09 academic year: a 13% higher rate of achieving level three or four on the ELA exam and 10% higher rate of achieving level three or four on the mathematics exam. However, these data do not reveal any analysis of the effect of the specific art form used as the intervention.

As a program evaluation, this study will contribute to the research on the use of arts integration strategies as an intervention to raise ELA and mathematics scores of urban students in grade four. The study will shed light on the impact of specific art forms (visual art, theater, dance, or music) used as the arts integration strategy on the academic achievement in ELA and mathematics of fourth-grade students in an urban setting.

In 2004, the Arts Education Partnership (AEP) noted opportunities for research in arts education (Burnaford, Brown, Doherty, McLaughlin, 2007). This research may provide a greater depth of knowledge to the field of arts integration utilized as an intervention strategy, particularly the impact of specific art forms as the integration strategy on academic achievement of students in grades three through sixth.

**Purpose of the Study**

Test score data from the 2008 School Report card for the RCSD indicate that 56% of the fourth-grade student population met the NYS ELA level of three or four. These data reveal that almost one-half of the fourth-grade students do not demonstrate an understanding of the English language arts knowledge and skills expected at this grade level. The understanding of mathematical concepts is only slightly better with 62% of the students meeting level three or four on the NYS assessment.
The purpose of this study was to determine if there is a relationship between the specific art form (theatre, dance, visual art, or music) and an increase in student achievement in English Language Arts or mathematics at grade four.

The proposed investigation will add to the body of professional knowledge concerning the relationship between the specific art form used as the integration and academic achievement in an urban school setting. The research on arts integration is based on the hypothesis that there is a positive correlation between integrated arts instruction and increased student achievement in ELA and mathematics. The research examines the impact of arts integration on the academic achievement of fourth-grade students in the Rochester City School District (RCSD).

This study used the existing data from the final year of the RCSD Arts Impact Study, the 2008-09 school year. It was found that arts integration had a statistically significant positive impact on student achievement, however, it was not determined which art form had the largest effect on academic achievement. The data from the study may provide insight to the question of the effects of the specific art form (visual art, theater, dance, or music) used in arts integration on the academic performance in ELA and mathematics of elementary students in the fourth grade.

Research Questions

The research questions of this study are: 1) What is the effect on fourth-grade student achievement in ELA and mathematics when arts integration is used as an intervention?, 2) Is the effect of a specific art form (dance, theater, visual art, music) used as the intervention more effective than another art form on the academic achievement of fourth-grade students in ELA and mathematics? The following hypotheses will be explored:
1. Fourth grade ELA scores in the dance integrated intervention program will be greater than the ELA scores of the non-dance integrated group of fourth grade.

2. Fourth grade ELA scores in the music integrated intervention program will be greater than the ELA scores of the non-music integrated group of fourth grade.

3. Fourth grade scores in the theatre integrated intervention program will be greater than the ELA scores of the non-theatre integrated group of fourth grade.

4. Fourth grade scores in the visual art integrated intervention program will be greater than the ELA scores of the non-visual art integrated group of fourth grade.

5. Fourth grade mathematics scores in the dance integrated intervention program will be greater than the mathematics scores of the non-dance integrated group of fourth grade.

6. Fourth grade mathematics scores in the music integrated intervention program will be greater different than the mathematics scores of the non-music integrated group of fourth grade.

7. Fourth grade mathematics scores in the theatre integrated intervention program will be greater than the mathematics scores of the non-theatre integrated group of fourth grade.

8. Fourth grade mathematics scores in the visual art integrated intervention program will be greater than the mathematics scores of the non-visual art integrated group of fourth grade.

Definitions of Terms
1. Academic achievement - the level of proficiency as reported on the Grade four NYS School report card for ELA. Students obtaining a rating of level three or four meet the NYS Learning Standards. (http://www.emsc.nysed.gov/irts/nystart/2006/district-rpt.PDF)

2. Arts Integration - the use of art strategies and teaching practices combined with classroom content. For the purpose of this dissertation Arts integration is defined as a process of connecting curriculum by learning with and through the arts (Burnaford et al., 2007).

Summary of Remaining Chapters

The research problem this study will explore is, does a specific art form (dance, music, theater, and visual art) used in arts integration have a greater effect on the academic achievement of fourth-grade students in English Language Arts and mathematics than the other art forms? The 2008 New York State assessment scores as reported on the New York State School District Report Card will be used as the measure. The unit of measure will be the student.

A summary of the relevant literature is presented in Chapter 2. Chapter 3 is a detailed explanation of the research methodology used for the study. The data analysis and findings are offered in Chapter 4. Chapter 5 contains the implications of the study, and recommendations for future study.
Chapter 2: Literature Review

Introduction

Currently there is a reduction or elimination of arts programs in schools. Gullatt (2008) indicates that school budget cuts have occurred due to the recent slowdown in the U. S. economy. School districts that are facing budget shortages may reduce or eliminate arts programs as a cost saving measure. Budget deficits faced by many schools have led to the reduction or elimination of arts course offerings without the understanding of the educational value of the impact the arts programs have on increasing overall student achievement (Goldsmith, 2003).

Arts integration emphasizes the importance of the artistic process by placing the arts in the center of the curriculum. Arts integration is the use of art strategies and teaching practices combined with the core content of mathematics, science, social studies, or ELA. Rabkin and Redmond (2006) describe arts integration as an instructional strategy that connects the arts across the curriculum. The arts can be used as the means to motivate and to engage students, thereby increasing student achievement. The hands-on or kinesthetic nature of arts learning may provide important motivation to engage students in non-arts content. Manner (2002) stated “curriculum integration is not a new idea but that it bears re-examination in schools today, where standards-driven academic concerns may require educators to look at school subjects in isolation rather than in ways that enhance perceptions of their connections” (p.18).
Arts integration strategies tie distinct content areas together by making clear connections between them. When teachers combine arts learning strategies with non-arts content they create richer learning experiences for students. When students learn the relationships between different content areas the information is more easily learned, the transfer of knowledge may occur and the information may be more easily recalled.

Some researchers (April, 2001; Goldsmith, 2003; Richards, 2003; Finch 2004) believe that arts integration does positively impact student achievement. Other researchers (Kosky & Curtis, 2008, Richards 2003, Brogla-Krupke 2003, Burger & Winner 2000) believe that there is correlation between arts integration and student achievement, and that there are studies that indicate this correlation. There are very few experimental studies on arts integration.

Program Evaluation

Evaluating educational programs to determine if the objectives of the program have been met is a program evaluation. The program evaluation is designed to judge the value of the program to determine if the program should be removed, changed, or continued. The evaluation determines if a program has achieved the goal. (Berk & Rossi, 1999). Scriven (1967) defined evaluation as judging the worth or merit of something (as found in Worthen, Sanders & Fitzpatrick, 1997). A program evaluation can occur before the program is implemented, during the implementation of the program, or at the end of a program (Tenner 2009).

Two types of program evaluations exist, according to Scriven (1967 as cited in Worthen, et al, 1997), formative evaluation and summative evaluation. Formative evaluation is an evaluation that occurs while the program is being implemented to
provide information on the program so that adjustments can be made during the implementation. Summative evaluation occurs after the program has taken place to determine the value or effectiveness of the program.

Quantitative research. Little empirical research about the impact of arts learning and the impact of arts integration have on student achievement exists. The following is a summary of the empirical studies. The subsequent sections of the chapter describe additional studies on arts integration that depict weaker evidence of effect on student achievement.

In the Reviewing Education and the Arts Project (2001), Winner and Hetland (2001) examined the hypothesis that arts affect non-arts learning. REAP performed a meta-analysis search of all arts-integrated studies from 1950 to 1999. After advocacy pieces and programs that lacked empirical tests were removed from the sample, 188 reports were included in the synthesis. Three areas of research were found where studies demonstrated a “clear causal link” between arts education and achievement in a non-arts subjects (Winner & Hetland, p. 4).

In the first area of research, based on 26 reports (36 effect sizes), a medium-sized causal relationship was found between listening to music and temporary improvement in spatial-temporal reasoning. The second area of research, based on 19 reports (29 effect sizes), showed a large causal relationship between making music and spatial-temporal reasoning. In the third area of research, based on 80 reports (107 effect sizes), a causal link was found between classroom drama and a variety of verbal areas (Winner & Hetland, 2001, p. 4).
Butzlaff (2000) conducted a meta-analysis of the studies resulting from the REAP search. He divided the studies into two categories that met his criteria. Experimental studies were studies that had a random assignment of participants and had a pretest of reading ability (n=6). The other group of studies was correlational studies (n=24).

The correlational studies revealed that there is a “strong and reliable association between the study of music and performance on standardized reading/verbal tests” (Butzlaff, 2000, p. 172). The experimental studies did not yield a reliable effect size; there was a wide range of effect sizes, the smallest being $r=-.34$ to the largest being $r=+.64$.

To test the hypothesis that visual art instruction improves reading, Burger and Winner (2000) conducted a meta-analysis that searched multiple databases to yield 4,133 records. However, most of these studies involved some form of advocacy research or had no empirical data. Ten studies that employed an empirical design were coded and divided into two groups. One group of the studies compared arts only instruction to a treatment with a control group receiving no special arts instruction (n=9). This allowed the researchers to determine if the skills acquired during visual art instruction are transferred to reading ability. These nine studies used a reading readiness test or a reading achievement test as the measure. There were 495 participants in the nine studies. Two of the studies had random assignment of participants while the other seven studies were quasi-experimental in design. The mean effect size was $r=.05$. The researchers did not find “a reliable relationship between arts instruction and reading improvement” (Burger & Winner, 2000, p.284).
The second group of studies consisted of an arts integration study to a control group receiving reading only (n=4). This study allowed the researchers to determine if reading instruction integrated with art is more effective than reading instruction alone (Burger & Winner, 2000, p 281). The sample size of this meta-analysis consisted of four studies and 277 participants. One of the studies in the meta-analysis consisted of randomly assigned participants, the other three studies were quasi-experimental in design. The mean effect size of this study was $R=.23$ (Burger & Winner, 2000, p. 289). The researchers found marginal evidence that arts integrated reading instruction is more effective than non-arts integrated instruction to teach reading.

A meta-analysis of the relationship between music and mathematics instruction was conducted by Vaughn in 2000. Multiple searches were performed, resulting in over 4,000 references. The studies included in the meta-analysis had to test the hypothesis that study of music resulted in improved performance in mathematics. Studies were excluded if they did not include: a measured mathematics outcome, a control group, and enough statistical information for an effect size to be computed. The remaining 25 studies were divided into three categories:

1. 8 correlation studies (20 effect sizes) that examined whether students who chose to study music had higher mathematics scores
2. 5 experimental studies (6 effect sizes) that examined the hypothesis that music instruction causes increased mathematic ability
3. 12 studies (15 effect sizes) that examined the effect of listening to music while taking mathematic tests
The correlational studies compared students who had at least one high school course in music, either instrumental or vocal, to students who had no high school music instruction. The “studies covered a period from 1950-1999 with a mean n=286,907; the mean effect size r=.14” (Vaughn, 2000, p.151). This meta-analysis “demonstrated a modest positive association between the voluntary study of music and mathematical achievement” (Vaughn, 2000, p.154).

Vaughn examined the experimental studies involving music training and mathematic achievement. This study indicated that learning to read music notation does not improve mathematical ability. The final component of Vaughn’s study examined the effect of listening to music while taking mathematics tests. The study indicated that there was no effect.

Yorke-Viney (2007) conducted a correlational study involving two Pennsylvania school districts. One is a high arts focus school district as noted by the National Endowment for the Arts and the Presidential Committee on the Arts and Humanities and the other does not have this arts designation. The Pennsylvania System of School Assessment (PSSA) was used as the measure of academic achievement in reading and mathematics. The participants were from 12 fifth-grade classrooms, 6 from the high arts district (n=104 students) and 6 from the low arts district (n=54 students).

The data revealed that there were significant results in mathematics for the low socioeconomic and the individual education plan subgroups of students who attend the high arts school. The results were near significant for reading; reading scores of low economic students at the high arts school was higher with the significance being $p=.056$. 
The work of seven teams of researchers is presented in Champions of Change: The Impact of the Arts on Learning. Each of the seven studies revealed that arts integration had a correlation with increased student achievement. Fiske (1999) noted that arts integrated learning can “level the playing field” for disadvantaged students (p. viii). A panel review of the National Educational Longitudinal Survey (NELS) (NELS:88 as cited by Fiske) was conducted by Catterall, Chapleau and Iwanaga (1999). The NELS was a panel study of more than 25,000 American secondary school students over a ten-year period. The study revealed that students in grades 8-12 experienced positive academic gains when they were involved in the arts.

Learning in and through the Arts is another study presented in Champions of Change. This study conducted by Burton, Horowitz, and Abeles (1999) found significant relationships between rich in-school arts programs and the development of competencies needed for academic success (Fiske 1999). The in-school arts experiences of 2,046 students in Grades 4, 5, 7, and 8 who attended schools in New York, Connecticut, Virginia and South Carolina were studied. Students who had a high level of arts (HA) experiences outperformed the students identified as belonging in the low level of arts (LA) experiences on every measure. This study revealed that risk taking, persistence, ownership of learning, and perceptions of academic accomplishment were found in the arts-rich schools. These characteristics that are needed for academic success are present in arts-rich schools.

The study by Burton et al., (1999) suggests that the learning that takes place in the arts may help to develop skills and competencies that are needed in all learning. They suggest that the skills needed for academic achievement are similar in various subject
areas and that the results of this study on persistence, risk taking, and self-concept may carry over to other subjects. These skills measured in the Burton et al. study are necessary for academic learning. Students with higher percentages of these necessary skills are found in schools that offer high levels of arts programs.

Studies have shown that the arts can improve students’ academic achievement at all grade levels (April, 2001; Goldsmith, 2003; Richards, 2003; Finch 2004). April states that student achievement increases due to the rich and varied aspect of arts learning when connections between content areas are made. Instruction in the arts involves active learning that connects student learning style with the learning. Arts learning can take the form of visual learning, auditory learning, or kinesthetic learning; the learning styles presented by Gardner (1993). Richards (2003) states that the arts provide children with the opportunities for hands-on learning as they experience arts media and subject matter. Not all children learn in the same way or at the same rate. The arts help students to learn in their own way and at their own pace developing their intelligences (Gardner, 1993). Through participation in arts learning activities, student learners may be more engaged due to the hands-on nature of arts learning combined with the intrinsic motivation of the arts.

The Arts for Academic Achievement program, an arts integration program of the Minneapolis public schools, found that students with special education classification performed well in the arts integration program. Additionally, this study revealed that third graders were able to raise their reading scores by 1.02 points and math scores by 1.08 points (Teske, 2006).
The Chicago Arts Partnerships in Education (CAPE) program began in 1992 in the Chicago Public Schools. The schools in the CAPE program integrated the arts with core academic subjects through partnerships with teachers and teaching artists. The integration included the four art forms of visual art, theater, dance and music. These art forms were integrated with reading, science, mathematics and social studies.

The program evaluation covered a period from 1992-1998. The evaluation was conducted by the North Central Regional Laboratory (NCRL) and the Imagination Project at the University of California at Los Angeles (UCLA). NCRL and IP analyzed reading and mathematics test data. NCRL reported that during the 1996 and the 1997 school years the percentage of CAPE students scoring above grade level began to increase over the percentage of non-CAPE students scoring above grade level although the increase was not significant. By 1998 several of the comparisons on the Iowa Test of Basic Skills (ITBS) and the Illinois Goals Assessment Program (IGAP) became significant. (Catterall, 1999).

Catterall and Waldorf (1999) conducted the IP study covering the 1998-1999 academic year that examined student achievement in the (CAPE) program. The IP researchers conducted “52 test score analyses” (Catterall p. 9). Catterall and Waldorf explored whether arts integrated instruction increased academic achievement. This study examined test scores of CAPE schools and control group schools.

Some of the “comparisons involved CAPE schools versus all Chicago Public School” (Catterall, p. 9). Other comparisons involved high poverty CAPE schools, schools with 75% free or reduced price lunch. CAPE students improved academically
when the arts were integrated with reading and math (Catterall & Waldorf 1999, Fiske 1999; Burnaford, Brown, Doherty, & McLaughlin 2007).

The Iowa Test of Basic Skills (ITBS), the Illinois Goals Assessment Program (IGAP), and the Test of Achievement and Proficiency (TAP) were used as measures of student achievement. The CAPE study compared standardized test scores at every tested grade level: 3, 6, 8, 9, 10, and 11. At grades three and six the Iowa Test of Basic Skills (ITBS), and the Illinois Goals Assessment Program (IGAP) were administered. Grade 8 and 11 students took the Illinois Goals Assessment Program (IGAP), Grade 10 students took the Test of Achievement and Proficiency (TAP).

Test scores from 1992-1998 in reading and math were analyzed. CAPE schools outperformed the control schools in Reading and Math in grades K-12. (Deasy, 2002). In 25 out of 40 K-8 CAPE schools academic achievement in reading increased over non-CAPE schools reading test comparisons.

ITBS math test results from 1992 indicate that about 28% of sixth-grade Chicago Public School students scored at or above grade level compared to about 40% of the sixth-grade CAPE students. By 1998, over 60% of CAPE students scored at or above grade level compared to about 40% of the non-CAPE students. By 1998 there is about a 14% difference in students scoring at or above grade level between CAPE and non-Cape sixth graders.

The CAPE study found that the arts had a noteworthy impact on student achievement at the elementary level. However, Catterall and Waldorf (1999) note that the high school performance data is positive for CAPE schools yet due to the small sample size these data are not significant.
An arts integrated strategy that was used as an intervention strategy in an after school program was found to increase student achievement. The program was a component of the HEARTS Family Life Center. The curriculum used arts integration strategies including dance, music, drama, and visual art. The control group consisted of 57 students. Participants’ grade point average (GPA) was compared to the GPA of the control group. It was found that 57% of the participants had a .5 increase in their GPA. The comparison group had an 11% increase (Repp & Lutfi, 2006). This is a significant increase in GPA.

The SPECTRA+ pilot study by Luftig (1999) revealed similar positive effects on student achievement. All the students in grade one through six participated in the SPECTRA+ program. The study focused specifically on students in grades two, four, and five (n=615). The students were from four elementary schools in two different cities in Ohio. The SPECTRA+ program intervention consisted of art making, art criticism, understanding the cultural context of the arts, understanding the creative process, and the materials used during the creative process.

The control group for the study was the students in other schools in the district that had similar demographics. Students in the control schools received their standard curriculum without any modification. The standard curriculum may or may not have included any study of the arts. The study also consisted of a modified control group. The modified control group received changes in curriculum, materials, and parental involvement activities as well as other enhancements; none of these enhancements had arts component. The modified control group was to control for the Hawthorne Effect. The Hawthorne Effect is when a control group out-performs the target population due to the
new and stimulating educational experience. Due to the existence of the modified control
group, any positive results from the target population could be attributed to the
SPECTRA+ intervention instead of the Hawthorne Effect.

The SPECTRA+ sample consisted of second-grade boys (n=29), second-grade
girls (n=37), fourth-grade boys (n=36), fourth-grade girls (n=42), fifth-grade boys (n=34
and fifth-grade girls (n=36). The following measures were used: Torrance Tests of
Creative Thinking to measure creative thinking; Appreciation of the Arts Scale to
measure Appreciation of the Arts; and the Iowa Tests of Basic Skills (ITB) and Stanford
Achievement Tests (SAT) to measure academic achievement. The Torrance Tests of
Creative Thinking yield standard scores and percentiles. Test scoring is subjective so
inter-rater reliability is imperative. In this study, the inter-rater reliability for these tests
ranged from .92-.94. The Appreciation of the Arts Scale was designed based on two other
arts appreciation tools and also contained additional questions. This instrument consisted
of 61 items that were rated on a three-point Likert-type scale. During the pilot study a
one-week test-retest reliability ranged from .84-.89 depending on the grade level of the
child. Reading and Math data were obtained from the Iowa Tests of Basic Skills (ITB)
and Stanford Achievement Tests (SAT).

Since the two participating school districts used different standardized tests,
comparisons between the two SPECTRA+ schools were impossible. The results therefore
are separated by the two districts: District A and District B. In District A no differences
were found in academic achievement in ELA between the treatment and control groups.
In District B academic gains were realized in reading $p<.02$, comprehension $p<.56$ and
vocabulary $p<.001$. 

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For mathematics concepts, in District A, the males in the treatment group scored significantly higher than the other groups. On mathematic comprehensions, students in the treatment group scored significantly higher than the control groups. In District B, only the fifth grade students were tested. No differences in academic achievement were found between the treatment and the control groups.

Similarly, a study conducted by Fitzpatrick (2006) compared achievement test scores of instrumental and non-instrumental music students in the Columbus Schools on the Ohio Proficiency Test (OPT). The students were in grades 9 through 12 during the 2003-04 academic year. The instrumental music (IM) students (n=915) were compared to the non-instrumental (NIM) students (n=15,431). The data were reported out for the test results of fourth grade, sixth grade and ninth grade years. Each grade level was also separated into the subgroups of SES as indicated by students who paid full price for their lunch and students who received free or reduced price lunch. The study revealed that the group that received the highest scores on the all the OPT were the full price instrumental students. The free or reduced price lunch non-instrumental students scored the lowest on all the OPT proficiency tests at all grade levels and in all subjects.

Qualitative / action research. The research on arts integration may contain multiple arts forms used in the integration. Other research studies may focus on one specific art form used as the integration. This subsequent section is a presentation of studies that used multiple art forms in the integration. This is followed by specific art forms used in the integration: visual art, music, theater, and dance. Many studies on the impact of arts integration on student achievement express a correlation between the two
but do not show causation. According to Gullatt (2008), writings about arts integration have been theoretical in nature with little empirical support.

A study conducted by Ingram and Seashore (as cited in Burnaford, et al. 2007) the Arts for Academic Achievement (AAA) study implemented in the Minneapolis Public Schools found increased student achievement in math and reading. This project was to integrate the arts with reading and math. In the first year of the study, 31 schools participated in the project. By the third year, 45 schools participated: 6 high schools, 4 middle schools and 35 elementary schools. Ingram and Seashore found that the relationship between arts integration and student achievement was stronger for disadvantaged students (as cited in Burnaford, et al. 2007). Disadvantaged students are students from low income households.

Similarly, the study by Mason, Steedly, and Thormann (2008) looked at the impact of integrated arts instruction on student achievement of students with disabilities. To collect this data they conducted 34 focus group interviews. Each interview session lasted between 60 and 90 minutes. Anecdotal evidence was collected to support the use of arts integration as a teaching strategy.

The purpose of the Mason et al. study (2008) was to: 1. implement a rubric to evaluate arts learning, and 2. study how teachers implement integrated lesson plans. There were six teachers and one teaching artist in this component of the study. Conference calls were held three times with participants over the course of the eight-week implementation. Participants used a scale of 1-5 (with 5 being the highest rating) to self report if they learned new information. The mean rating was 3.8. The article records teacher comments about the positive effect of arts integration on student learning.
To examine the impact of arts integration on reading achievement, Richards (2003) describes an action research project using visual art and music in Kindergarten and first grade in the Fayette County Public Schools in KY. The study targeted academic achievement in reading. This project involved one teacher and covered a period of six years. The data indicate that in the 1998-1999 school year 90% of the kindergarteners read at or above grade level (p.19).

An action research project by Kosky and Curtis (2008) considered two things: (a) whether integrating the arts into social studies content increases student participation and motivation, and (b) does this integration lead to greater academic achievement. The Kosky and Curtis study consisted of 20 lessons; all the lessons that integrated the arts were more engaging to the students than non-arts integrated lessons. Results of the study indicate that lessons that were rated highly by the students also had high student participation. Students rated the lessons highly if they were activities that they did not normally do in class or lessons that involved the multiple intelligences. Academic achievement, as represented by student grades, increased during the period of this action research project. The overall student average before the project was 90.6%, during the study period it was 92.4%, and after the study it was 89%. This study did not have a control group so the data suggest a correlation. However, without the control group it cannot be determined if arts integration was the reason for the increased academic achievement or not.

In another study, Mason and Steedly (2006) attempted to evaluate the effects of arts integration on academic skills. Teachers in this study developed rubrics to measure artistic skill and academic skills. In this study which consisted of six teachers and one
teaching artist. The teachers reported that they learned new information on a scale of 1-5 with 5 being the highest, the mean score was 3.8. The teachers reported they learned from the development and implementation of the rubrics. There was no quantitative data on student achievement, no data was presented in numerical form. The teachers reported student achievement anecdotally.

Domain of the arts. Some researchers studied arts integration in general while other researchers studied the impact of specific arts form on student achievement. The following is a review of some of the literature on arts integration for the specific art forms of visual art, music, dance, and theater.

Visual Art. No studies specifically noted the use of visual art as the integration.

Music. Music is used as the arts integration strategy in the following studies. Music integration with reading and writing was used in a fourth/fifth grade Montessori classroom in a study conducted by Hixson (2007). One group of students (n=15) received integrated instruction, the other group (n=15) received music instruction only. Students were randomly selected for participation in one of the two groups.

The Virginia Standard of Learning test scores for English were the measure used in this study. The third-grade scores of the fourth graders and the fourth-grade scores of the fifth graders were used to measure gains. “The scores were compared by grade using analysis of variance (ANOVA)” (Hixson, p. 43). The writing pretest of the treatment group revealed a mean of 5.8537 compared to a posttest mean of 6.2294. The pretest mean of the control group was 8.3553 to the posttest mean of 6.2440.

The research study conducted by Brogla-Krupke (2003) integrated music with social studies at the fifth-grade level in one classroom in a small community in Iowa.
Classroom lessons were implemented that integrated musical activities with specific social studies content. The assessments used were pre intervention and post intervention tests. The study was implemented in one class, with pre and post assessments used as the measure; there was no control group used in this study. In each instance student achievement increased from the pretest to the post test. One such assessment was a presentation of music from various historical periods represented through musical genres. On this particular assessment 5 students received a perfect score, 12 other students received a score of between 80% and 90%. No pretest data was reported for this unit. For another unit, the pretest and posttest scores are available. These data simply state the number of correct responses for each of the questions.

Dance. The dance integration program implemented in Hannover County, VA. revealed increased student interest in content and motivation. The District saw increases in test scores on standardized tests, although Compton (2008) notes that the scores are not statistically significant.

One component of the Arts for Academic Achievement was studied at an arts focused k-5 school in Minneapolis called the Whittier Community School for the Arts. A dance program was integrated with the math program at Whittier. During the 2000-2001 academic year, third, fourth, and fifth grade students were surveyed twice a year to determine student attitudes about mathematics. The fall survey indicated no differences between the dance-math and the non-dance-math students, however, the spring survey revealed significant differences. The dance-math students reported a more positive attitude toward mathematics (Werner, 2001). Although this study explored student
attitude toward dance-math integration, it does not tell anything about the academic achievement of students when involved in arts integration instruction.

Theatre. A theatre arts integration study conducted by McFadden (2008) utilized theatre art strategies integrated with English Language Arts and social studies. In this study, a teaching artist visited fourth and fifth grade classrooms and taught the integrated unit. The study was a randomized experimental treatment and control design consisting of 521 students in the treatment group and 505 students in the control group. Scores were evaluated for subgroups of low socioeconomic students, bilingual students, and special education students. The New Jersey state assessment in Language Arts, NJ ASK, was the measure utilized.

In the subgroup of low socio-economic status students, the treatment group outperformed the control group with a difference of 6.745 point difference on the NJ ASK scale score (treatment: M=209.989, control: M=203.244). Although significant differences were not found in the two subgroups of bilingual and special education students, there was evidence of increased academic achievement found in the percentage of students of these two subgroups who were rated as proficient on the NJ ASK. Student grades from the marking periods also revealed a positive impact on student achievement as evidenced by a lower percentage of students whose grades declined in the area of language arts compared to the percentage of control group students whose grades declined.

In a similar research study, Morris (2001) describes the research project examining the level of engagement and the acquisition of knowledge in two seventh-grade social studies classes when an arts integration model was implemented. The case
The study incorporated lessons based on the 1991 Testing and Evaluation of Social Studies Students Position Statement and Guideline for the National Council for the Social Studies and teacher-developed authentic assessments based on the Social Studies lessons. The study revealed that the students’ self-reported learning new information and that the use of drama was engaging for the students. The use of drama as the teaching pedagogy resulted in the students exceeding the teacher’s expectations on the assessments.

Comments included qualitative remarks about the students’ work and the teacher’s evaluation of student work. Qualitative data indicates increased student achievement. This is in line with other research on student achievement and arts integration.

A report by Seidel (1998) is noted in Fiske’s Champion of Change, the study “Stand and Unfold Yourself”: A Monograph on the Shakespeare & Company Research Study was conducted by a team of researchers from Harvard’s Project Zero. The research questions for this study focused on the reason the program worked, finding out what the participants were actually learning and what aspects of the program were critical to the overall success. The Harvard Project Zero researchers found that no significant research existed on programs that introduced students to the works of Shakespeare and development of understanding of Shakespeare’s plays. The researchers also note that the low performance of students on standardized reading tests indicates that students do not have the ability to comprehend text. The study focused on the work of the Shakespeare & Company’s educational programs. The programs involve over 40 teaching artists and 400 high school age students in the study of Shakespeare’s play.

The researchers found that the level of comprehension and understanding of the text was increased as the students worked with teaching artists to interpret the text
through movement and theatre exercises. The researchers conducted interviews with students, teachers, and the teaching artist to determine their understanding of the impact of the teaching artist’s work with students.

The researchers did not present any quantitative data on the impact of this activity on student achievement. The study suggests a correlation between the activity and increased student achievement; however, without the data it is merely a link.

In a study cited in Critical Links, conducted by DuPont (1992), the Effectiveness of Creative Drama as an Instructional Strategy to enhance the Reading Comprehension Skills of Fifth-Grade Remedial Readers was explored. This study examined three groups of fifth-grade students who were designated as remedial readers and demonstrated similar skill levels in both the California Achievement Test (CAT) and the Reading Diagnostic section of the Metropolitan Achievement Test (MAT6). DuPont’s study consisted of a six-week course integrating drama with reading. Group One used creative drama to support story comprehension. Group Two used vocabulary exercises and teacher-led discussions to support story comprehension. The third group used the remedial reading program and served as the control group. Study results indicated that Group One was the only group to show a significant increase in pre to post test scores (Deasy, 2002).

Conclusion

Arts integration is the use of art strategies and teaching practices combined with the classroom content of math, science, social studies, or English Language Arts. Rabkin and Redmond (2006) describe arts integration as an instructional strategy that connects the arts across the curriculum. The arts can be used as the means to motivate and engage students thereby increasing student achievement. The hands-on and kinesthetic nature of
arts learning may be motivation to engage students in non-arts content. Educators that combine arts learning strategies, which also can be described as the components of MI theory: kinesthetic, musical, visual, etc., with non-arts content, create experiences that are more engaging to students.

Other researchers such as Winner and Hetland (2001) found a correlation, not causation, between arts integration and student achievement. Little empirical data exist on the impact of arts integration on student achievement. Table 2.1 illustrates the effect or the strength of the evidence demonstrated by the various research studies covered in this chapter.

Table 2.1 illustrates that only a few of the research studies that looked at the use of arts integration on student achievement demonstrated a strong effect. Seven studies demonstrated a strong effect, 7 studies showed a moderate effect, and 9 studies showed a weak effect.

In 2004, the Arts Education Partnership (AEP) noted opportunities for research in arts education (Burnaford et al., 2007). Some of the topics suggested a need to further research how the arts impact student achievement in non-arts subjects. According to Gullatt (2008) writings about arts integration have been theoretical in nature with little empirical support. Winner and Hetland (2000) indicate a “clear causal link” in meta-analysis of the literature in REAP. Arts integration research noted in Champions of Change (Fiske, 1999) suggests correlation not causation. Until recently the relationship between the arts and academic achievement has received mixed reviews (Winner & Hetland, 2000, Gullatt, 2007).
<table>
<thead>
<tr>
<th>Effect</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts integration/arts study causes student academic gains</td>
<td>1. Yorke-Viney</td>
<td>1. Winner &amp; Hetland</td>
<td>1. Vaughn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Burger &amp; Winner</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Hixson</td>
<td></td>
</tr>
<tr>
<td>Arts integration/arts study is associated with student academic gains</td>
<td>1. Mason, Steedly &amp; Thormann</td>
<td>1. Ingram &amp; Seashore</td>
<td>1. Catterall &amp; Waldorf</td>
</tr>
<tr>
<td></td>
<td>2. Richards</td>
<td>2. Repress &amp; Lutfi</td>
<td>2. Catterall, Chapleau &amp; Iwanaga</td>
</tr>
<tr>
<td></td>
<td>4. Mason &amp; Steedly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music integration is associated with student academic gains</td>
<td>1. Brogla-Krupe</td>
<td></td>
<td>1. Butzlaff</td>
</tr>
<tr>
<td>Theatre integration is associated with student academic gains</td>
<td>1. Seidel</td>
<td>1. DuPont</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. McFadden</td>
<td></td>
</tr>
<tr>
<td>Dance integration is associated with student academic gains</td>
<td>1. Compton</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Werner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts Integration is associated with positive teacher attitudes</td>
<td>1. Morris</td>
<td>1. Grant, Hutchinson, Hornsby, Brooke</td>
<td></td>
</tr>
<tr>
<td>Arts Integration is associated with perceived student attitudes</td>
<td></td>
<td></td>
<td>1. Burton, Horowitz, &amp; Abeles</td>
</tr>
</tbody>
</table>
The proposed research may provide greater depth of knowledge to the field of arts integration. The impact of dance, theater, visual art and music as the art form integrated with classroom subjects at the fourth grade level. The research on arts integration is based on the hypothesis that integrated instruction may increase student achievement for elementary students. The research will examine the impact of arts integration on the academic achievement in ELA and mathematics of elementary students in the Rochester City School District. The data from this study may provide insight to the question of the effects of arts integration on the academic performance of urban fourth grade students.

Some researchers found that arts integrated study causes increased student achievement in ELA and mathematics. Additional studies in the field of arts integration may provide data that reveal causation rather than correlation. In the Priorities for Arts Education Research, Cawelti and Goldberg (1997) suggest many areas for consideration of further research and policy development. Listed among these is the need for further research on the impact of arts integration on student achievement. Fiske (1999) states the Champions of Change researchers found that learners can attain higher levels of achievement through their engagement with the arts. Additional research may inform the field of student achievement and how the practice of arts integration with specific arts forms may impact student achievement.

This chapter provided a review of the literature on arts integration. The literature represents few empirical studies. Most studies were of an advocacy nature, promoting the use of arts in school without revealing data that support the use of arts integration as an intervention to increase academic achievement. The present study will contribute to the body of literature on arts integration by examining the impact of specific arts forms
(dance, theatre, visual art and music) on student achievement in ELA and mathematics of students in grade four. The next chapter explains the methodology used to collect and analyze the data in the study. Chapter 4 will present an analysis of the data. The final chapter consists of suggestions and recommendations for further study.
Chapter 3: Methodology

Introduction

A quantitative study was conducted on the data resulting from the Rochester City School District’s (RCSD) federally funded Arts Education Model Development and Dissemination (AEMDD) project, the Arts Impact Study. The current study used the existing data from the RCSD Arts Impact Study from the 2008-2009 school year, the third and final year of the project. Arts integration in elementary classrooms combines arts instruction in one of four art forms: dance, theater, visual art, or music, with classroom content of English Language Arts (ELA), science, social studies, or mathematics. This program evaluation studied the impact of arts integration on urban fourth-grade student achievement in mathematics and ELA. Additionally, the study evaluated the impact of specific arts forms: dance, theater, music, and visual art integration used as an intervention. To examine the effect of integrated arts instruction as an intervention on student achievement in ELA and in mathematics, New York State ELA and Math test scores were used as the measure.

As school districts and communities look for means of increasing academic achievement of their students, information on the effectiveness of arts integration used as an intervention will be useful. In the recently completed RCSD Arts Impact Study, it was found that the arts do have a positive impact on student achievement. Yet, we do not know which art form has the biggest impact on raising academic achievement. This study will shed light on the effectiveness of the various art forms used in the integration.
The research questions of this study are: 1) Is the size of the effect on fourth-grade student achievement in ELA and mathematics significant when arts integration is used as an intervention?, and 2) Is the effect of a specific art form (dance, theater, visual art, music) used as the intervention more effective than another art form?

Research Context

Eight hypotheses were used to study the effect of arts integration as an intervention on student achievement in ELA and mathematics at the fourth-grade level. These hypotheses are specific to various art forms to determine which art form had an effect on academic achievement in ELA and mathematics.

Table 3.1 illustrates the design of the study. The fourth-grade ELA and mathematics data from the 2008-2009 school year were used to determine the effect of arts integration compared to non-arts integration. Additionally the effect of the specific art form used in the intervention was compared to the effect of the other art forms used.

Table 3.1

<table>
<thead>
<tr>
<th>Design for Current Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09 Arts Integration Non-Arts Integration</td>
</tr>
<tr>
<td>Fourth grade Dance Music Theatre Visual Art Integration</td>
</tr>
<tr>
<td>ELA</td>
</tr>
<tr>
<td>Math</td>
</tr>
</tbody>
</table>

The program evaluation examined the effect of specific art forms: dance, theater, music, and visual art used in integrated arts instruction on student achievement of urban fourth graders in ELA and mathematics. The unit of analysis was done at the student level for each student in fourth grade. The analysis used the NYS achievement test scores
in ELA and mathematics as the measure. Students in the 9 treatment schools were compared to the students in the other 27 elementary schools in the District. Student scores from two elementary schools were not included in the study. One school was not included in the treatment or control group because it is an early childhood school consisting of kindergarten through second grade only. Another elementary school was not included in the treatment or control group. The school initially began the project period as a treatment school and then dropped out of the program.

During the period of the study, all 39 elementary schools in the District had NYS certified visual art and music teachers, and all students in each school received instruction in visual art and music. The 9 treatment schools had an arts integration residency taught by a teaching artist. Each arts integration residency consisted of 10 half-hour sessions in one art form (dance, theater, visual art, or music) in addition to the visual art and music classes.

Dance was the art form integrated at two schools. Two schools integrated music, theatre was integrated at two schools, and visual art was integrated at three schools. New York State ELA and mathematics exams were used as the measure to assess the effect of increased academic achievement.

The control group consisted of 28 elementary schools. These schools had a New York State Certified visual art teacher and a NYS certified music teacher. These arts teachers taught visual art or music to the students. They did not co-plan units of instruction, and they did not integrate content.

This research was conducted in a large urban school district in upstate New York. The school district is one of the “Big 5” districts in the state. This District is contained in
a city. In 2005 this city had a population of 189,312. Twenty percent of adults who are 25 years old or older in this city have a Bachelor’s degree or a higher degree. The 2000 Census data reported that the median household income in the city was $27,123 compared to the state median household income of $43,393. Retrieved from the City of Rochester website at (http://www.epodunk.com/cgi-bin/popInfo.php?locIndex=1538) May 31, 2010.

The school district has a diverse population of 32,147 students who are 65% Black, 21% Hispanic, 11% White and 2% Asian. Seventy-three percent of the student population is eligible for free lunch and 8% is eligible for reduced price lunch.

(www.nystart.gov)

Research Participants

The participants for this study came from a high poverty, urban school district in upstate New York. The school district had 39 elementary schools. Nine of the District’s 39 elementary schools participated in this program as the treatment population. The schools were randomly selected for participation and the art form to be integrated as the intervention was randomly assigned to the school. The control population consisted of the remaining 28 elementary schools. The participating schools were involved in a United States Department of Education Arts Education Model Development and Dissemination (AEMDD) program. This AEMDD program covered the period of June 2005- June 2009.

Students in the treatment schools received a 10-session artist-in-residence experience for each of the three years of the grant project. The artist-in-residence experience consisted of 10 half-hour sessions working with a teaching artist in the classroom. Teaching artists are individuals from the community who have arts skill yet
are not teachers in the school. Grade-level teams of teachers and the teaching artist co-planned the unit of instruction. The unit focused on classroom content of ELA, mathematics, science or social studies. Each classroom teacher prepared the students for the activity and did follow-up activities related to the arts experience after the teaching artist visit.

Demographics of the 2007-2008 school year are represented in Table 3.2 (www.nystart.gov).

Table 3.2

2007-2008 School Demographics

<table>
<thead>
<tr>
<th></th>
<th>New York State</th>
<th>District Schools</th>
<th>Treatment Schools</th>
<th>Control Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th Grade Student Population</td>
<td>191,681</td>
<td>2,364</td>
<td>476</td>
<td>1888</td>
</tr>
<tr>
<td>Eligible for free lunch</td>
<td>36%</td>
<td>73%</td>
<td>78%</td>
<td>79%</td>
</tr>
<tr>
<td>Eligible for reduced price</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>lunch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>19%</td>
<td>65%</td>
<td>68%</td>
<td>65%</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>21%</td>
<td>21%</td>
<td>18%</td>
<td>18%</td>
</tr>
<tr>
<td>Asian or Native Hawaiian</td>
<td>7%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>White</td>
<td>52%</td>
<td>11%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Student achievement in English Language Arts was assessed using the New York State English Language Arts exam. The New York State Mathematics exam was used to assess student achievement in mathematics. Data were collected for the 2007-08 and the
2008-09 school years. The District’s other 28 kindergarten-through-sixth-grade elementary schools were used as the control population for this study.

During the 2005-2006 school year, the NYS standardized test scores for the students in the treatment group were lower than the District average in both ELA and mathematics. Also during the 2005-2006 school year, 77% of the students in the treatment schools were eligible for free or reduced price lunch. The District average for this same period was 75% of the student population was eligible for free or reduced price lunch.

Procedures of Data Collection and Analysis

The New York State Assessment in ELA was used as the measure for ELA achievement at grade four. The NYS Mathematics assessment was used as the measure of student achievement for grade four. Scores for the 2008-2009 school year for the fourth grade and the four art forms were analyzed to determine the effect of the specific art form (dance, theater, music, or visual art) used as the intervention to determine the effect on student achievement in ELA or mathematics.

The NYS exams are reliable and valid. Reliability means that each time the test is given the results are highly consistent. Validity means that the test measures what it intends to measure. The development of the NYS assessments consisted of many steps to ensure reliability and validity. Test questions are drafted and refined by NY State teachers and content specialists. The test questions are then pretested on sample groups of students across the state. “Results from these pretests are statistically analyzed to determine question difficulty, fairness, and appropriateness for inclusion in a test. Next, "field tests" are developed, using pretested questions, and administered to large
representative samples of students across the State. Statistical analysis of the field test results ensures that different test forms are comparable in difficulty, reliable, and appropriate in length. Following the field-testing, final test forms are assembled and fine-tuned using information on testing characteristics determined from the field tests. For each examination, there is a body of statistical evidence that confirms that the examination measures one important skill. That skill, by design, is inferred to be the particular learning standards that the examination addresses.”

(http://www.emsc.nysed.gov/osa/inform/informarch/stoamemo901.pdf)

The existing data from the District were used for this research. The ELA and mathematics test score data of all fourth graders in the 37 kindergarten through sixth grade elementary schools for the academic year of 2008-09 were obtained from the District. The 2008-09 school year was the third and final year of this AEMDD project.

To complete the data analysis in SPSS, data files were created. These files consisted of the ELA and mathematics scores of all students in grade four at each of the 37 elementary schools. The data were then analyzed, comparing schools that integrated an art form, for example dance (2 schools) with the remaining 28 schools in the control group and the remaining 7 schools that integrated other art forms. This analysis took place at the student level for fourth-grade students during the 2008-2009 school year. There were a total of eight significance tests. There are three independent variables: the year, the art form, and the group, treatment, or control.

SPSS was selected as the quantitative method since it allows for variables to be defined within the program. The program allows for independent variables; these would be the various art forms (dance, music, theater, and visual art).
The results from this analysis answered the research questions of this study:
What is the effect on fourth-grade student achievement in ELA and mathematics when arts integration is used as an intervention? Is the effect of a specific art form (dance, theater, visual art, music) used as the intervention more effective than another art form?

**Data collection.** Permission from the RCSD Office of Research, Evaluation and Testing was obtained to have the existing data from the school district’s data files for the academic years 2007-2008 and 2008-2009. The data files contain the NYS assessment data for the ELA and mathematics exams. The NYS tests are administered annually during the month of May. Test scores are reported as levels one through four with levels three and four meeting and exceeding the standard, respectively. Individual school scores and the district scores are reported by the State and available on the State website. A quantitative analysis of the data was implemented to determine the impact of specific art forms used as integration on student achievement in ELA and mathematics for grade four.

**Data analysis.** SPSS Student version for Windows version 15.0 was used to analyze the data. ANOVA controlled for the differences between the groups. The results of the program evaluation answered the research questions and result in the acceptance or rejection of the eight hypotheses.

**Summary of Methodology**

The quantitative research design was the most appropriate model for this study due to the fact that the results were portrayed numerically. This design allowed for the most accurate portrayal of the effect of arts integration on academic achievement, thereby cause and effect could be determined. The quantitative research of the existing data from
the AEMDD study answered the research question on the impact of arts integration on student achievement of fourth graders in ELA and mathematics. The research examined the impact of specific art forms (dance, theatre, visual art, and music) used as the intervention. SPSS was used since the various art forms were variables to be analyzed discretely from each other. The SPSS program allowed for the various art forms to be analyzed separately. The ANOVA computed the variance in the ratio between more than two groups; in this study, the three groups were measured: the treatment group, the control group, and the population in the specific art form group.
Chapter 4: Results

Introduction

The purpose of this study was to determine the effect of arts integration used as an intervention on student achievement of urban fourth-grade students in ELA and mathematics. The study was to further explore the effect of a specific art form (dance, theatre, visual art, music) used as the intervention on the academic achievement of the students. Two New York State standardized tests were used as the measure of student achievement: the 2009 NYS Fourth Grade ELA exam and the 2009 NYS Fourth Grade Mathematics exam. This chapter describes the population, the tests of the hypothesis, and the analyses.

The data used for this study were the results of a federally funded Arts Education Model Development and Dissemination (AEMDD) grant awarded to this large urban school district in 2006. The study covered the academic years of 2006-2009. Students from nine elementary schools in a large urban school district in upstate New York participated in the study. The data used was from 2009, the third and final year of the study.

A total of 1,895 fourth grade students took the 2009 NYS ELA exam, 1,518 were in the control group, and 377 were in the treatment group. The treatment group participated in arts integrations using various art forms: 98 students in visual art integration, 111 students in music integration, 91 students in theater integration, and 77 students in dance integration. A total of 1,920 fourth-grade students took the 2009 NYS Mathematics exam, 1,531 were in the control group, and 389 were in the treatment group.
Different art forms were used in the intervention of the treatment group: 99 students in visual art integration, 113 students in music integration, 98 students in theater integration, and 79 students in dance integration. This chapter provides information on the findings with tables to illustrate the findings.

Preliminary Analysis

Initially, data were examined and cleaned (outliers and anomalies were removed). Data that were incomplete were eliminated. For example, if a student started in the District and then moved out of the district, those data were eliminated. If a student started in a treatment school and moved to a control school or if the student started in a control school and moved to a treatment school that data were eliminated. Also, if a student started in a treatment school and moved to another treatment school that integrated a different art from, those data were eliminated.

Student test data from the 2007-2008 school year were used to determine which students had moved from one school to another school during the project period. The scores for the students who had moved were omitted from the data. Preliminary analyses also addressed the three distributional assumptions underlying ANOVA:

1. the independence of scores
2. that the scores are normally distributed
3. the homogeneity of variance across treatment conditions

The scores are nested within school environments however they are analyzed independently. The schools that participated in the AEMDD study were randomly selected. This randomization minimizes the impact of school environments on the treatment and control conditions. The New York State Education Department has a protocol for administering the NYS exams. All students in New York State at the grade
level take the exam, in the same manner and on the specified dates. The NYS Education Department specifies how the tests are to be handled in a secure manner, and what items are considered to be unauthorized, such as cell phones and notes. The NYS Education Department further specifies what sections of the exam are to be administered on which date and how long the children have to complete the section. The ELA and the mathematics exams are administered following the guidelines set forth by the New York State Education Department. Therefore, despite the nested nature of the data, the state testing procedures assures independence of the scores. The ELA and mathematics data used in this study have a skewness value about zero (.06 each) so the distribution is normal. The Kurtosis value for ELA and mathematics is also close to zero indicating that the distribution of scores is approximately normal in shape.

Research question 1. What is the effect of arts integration on fourth grade student achievement in ELA and mathematics? The $F_{\text{max}}$ test was conducted to test for heterogeneity of variance in ELA and mathematics scores, respectively, across the conditions. The $F_{\text{max}}$ scores for ELA (1.02) and mathematics (1.17) were <3, there is no violation of the assumption of homogeneity of variance.

The two 1-way ANOVAs were conducted, comparing the mean score of all arts integrated schools with the control schools’ mean, for ELA and mathematics, respectively. The analyses indicate that arts integration does have a significant and positive effect on student achievement in ELA, $F(1,1893)=8.62$, $p=.003$, Cohen’s $d=.17$. The overall analyses in mathematics do not indicate a significant effect, $F(1,1918)=.75$, $p=.387$, Cohen’s $d=.049$. These Cohen’s $d$ scores (effect size) are considered small because they are <.5
Table 4.1 contains the descriptive statistics of the student ELA and mathematics scores on the 2009 NYS exam of the fourth grade students from the large urban school district that participated in this study.

Table 4.1

Descriptive Statistics for New York State 2009 Fourth Grade ELA and Mathematics Test

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1518</td>
<td>650.98</td>
<td>33.22</td>
<td>1531</td>
<td>661.21</td>
<td>33.97</td>
</tr>
<tr>
<td>Treatment</td>
<td>377</td>
<td>656.51</td>
<td>30.69</td>
<td>389</td>
<td>662.88</td>
<td>33.56</td>
</tr>
</tbody>
</table>

Note: Overall New York State ELA scores range between 485-775, mathematics scores range between 485-800.

The data presented in Table 4.1 indicate that the students in the arts integration treatment group performed better on their ELA test when compared to the control group. In ELA, the mean score of the treatment group is about five points greater than the mean score of the control group. In Mathematics, the mean score for both groups is very similar; the students in the arts integration treatment group did not perform significantly better than the control group. The effect size is small.

Research question 2. Which art form (visual art, music, theater, or dance) had the largest effect on increasing student achievement in ELA and mathematics of fourth-grade students? Prior to running the ANOVA, $F_{\text{max}}$ tests were conducted to determine heterogeneity of variance. The $F_{\text{max}}$ score for ELA was 2.41. The $F_{\text{max}}$ test score for
mathematics was 1.68. These $F_{\text{max}}$ test scores are $<3$, which assumes that the variances are homogeneous.

To determine the impact of the specific art form used in arts integration on student achievement, Pairwise Comparisons were used to compare the scores of the individual art forms. The Pairwise Comparison with the Bonferroni correction was used to correct for inflated Type I error rate. These Pairwise Comparisons indicate that the grade four ELA scale scores were on average 12.11 points higher for the music arts integration group with significance of .002. The difference is significance at the .05 level. The Pairwise Comparisons revealed that the fourth grade mathematics scale score of the visual art integration group was significant at .004 with an average increase in scale score of 12.4 points.

Table 4.2 presents the analyses of each treatment group determined by the integrated art form compared to the control group. This table indicates that the students who participated in music integration on average scored 12 points higher on the ELA exam. Similarly the visual art students, on average, had a mean score 13 points higher in mathematics.
Table 4.2

*Descriptive Statistics of 2009 Fourth Grade NYS ELA and Mathematics Exams*

<table>
<thead>
<tr>
<th>Condition</th>
<th>ELA</th>
<th>Mathematics</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>Control</td>
<td>1518</td>
<td>651&lt;sub&gt;a&lt;/sub&gt;</td>
<td>33.2</td>
<td>1531</td>
</tr>
<tr>
<td>Visual Art</td>
<td>98</td>
<td>657</td>
<td>34.3</td>
<td>99</td>
</tr>
<tr>
<td>Music</td>
<td>111</td>
<td>663&lt;sub&gt;b&lt;/sub&gt;</td>
<td>21.4</td>
<td>113</td>
</tr>
<tr>
<td>Theatre</td>
<td>91</td>
<td>652</td>
<td>37.3</td>
<td>98</td>
</tr>
<tr>
<td>Dance</td>
<td>77</td>
<td>651</td>
<td>27.1</td>
<td>79</td>
</tr>
</tbody>
</table>

*Note:* Means with differing subscript differ significantly with respect to the control condition by Bonferroni t test at p<.05.

New York State grade four ELA scale scores were increased in the music treatment group compared to the control group. The results of the Pairwise Comparison with the Bonferroni correction indicate that the music treatment group scored significantly higher on the NYS ELA assessment than the control group. The average difference between the two groups was about 12 points on the NYS ELA test, Cohen’s d= .36.

New York State grade four mathematics scale scores were increased in the visual art treatment group compared to the control group. The results of the Pairwise Comparison with the Bonferroni correction indicate that the visual art treatment group scored significantly higher on the NYS mathematics assessment than the control group.
The average difference between the two groups was about 13 points on the NYS mathematics test, Cohen’s $d= .37$.

**Summary of Results**

The purpose of this study was two-fold: 1) to determine the effect of arts integration on fourth-grade student NYS test scores in ELA and mathematics and, 2) to determine which art form (visual art, music, theater, or dance) had the largest effect on increasing student achievement in ELA and mathematics of fourth-grade students. NYS ELA and mathematics test scores of fourth-grade students were analyzed by the use of analysis of variance.

The ANOVA results indicate that integrated arts instruction has a positive impact on student achievement in ELA and mathematics at grade four. Music integration resulted in statistically significant results in ELA achievement and visual art integration had a statistically significant impact on mathematics achievement. The effect size is large; on average the effect is 12 points in ELA and 13 points in mathematics. Cohen’s $d$ scores were medium, however, from the practitioners’ perspective the gain of 12 and 13 points in ELA and mathematics, respectively, is quite large.

In conclusion, this study revealed that for both analyses, some aspects of arts integration have a positive effect on student achievement in ELA and mathematics. The data indicated that there was a significant gain in academic achievement in ELA of fourth-grade urban students when music was used as the intervention. Visual art integration had a significant effect on student achievement in mathematics. Chapter 5 will present implications of the study and make recommendations for future study.
Chapter 5: Discussion

Introduction

Arts integration is recognized by some community members such teachers and school administrators as a way to increase student achievement and ultimately raise test scores. According to Brown (2007), arts integration is at the forefront of elementary education reform. There are many studies that suggest arts integration predicts a correlation with greater student achievement. However, there are few empirical studies that can claim causation linking arts integration with increases in academic achievement. This study will add to the body of literature on arts integration. The value of this study is multidimensional. First, the study used data from a large, high poverty urban school district. Second, the data were derived from a large sample size. Third, the study used norm references standardized state assessments as the measure, and last, the study analyzed the data by specific art form. Due to the empirical design of this study, the study will add to the literature, which confirms the impact of arts integration on student academic achievement. Additionally, there is very little research on the effect of specific art forms, dance, theater, visual art, or music, used in arts integration. This study furthers that understanding of arts integration of music and visual art on ELA and mathematics.

As school districts and communities seek strategies to increase student achievement, empirical studies on the impact of arts integration need to be considered. This study expands the knowledge of the effect of specific art forms used in arts integration on the academic achievement of urban fourth graders using a design that could allow for a causal hypothesis.
The purpose of this study was two-fold: 1) to determine the effect of arts integration used as an intervention on student achievement of urban fourth-grade students in ELA and mathematics, and 2) to determine the impact of specific art forms used in arts integration on student achievement in ELA and mathematics. The data have established that arts integration does have a significant positive impact on student achievement. The current study was to further explore the effect of a specific art form (dance, theater, visual art, music) used as an intervention on the academic achievement of the students and correlation is established between specific art forms and specific areas of student achievement. Two New York State standardized tests were used as the measure of student achievement: the 2009 NYS Fourth Grade ELA exam and the 2009 NYS Fourth Grade Mathematics exam. Visual art had a significant effect on student achievement in mathematics and music had a significant effect on ELA student test scores. This chapter describes the limitations of the study and recommendations for further study.

The data acquired for this study were the results of a federally funded Arts Education Model Development and Dissemination (AEMDD) grant awarded to this large urban school district in 2006. The study covered the academic years of 2006-2009. Students from nine elementary schools in a large urban school district in upstate New York participated in the study. The NYS standardized test data for ELA and mathematics from 2009, the third and final year of the study were used.

A total of 1,895 fourth-grade students took the 2009 NYS ELA exam. Of those, 1,518 were in the control group, and 377 were in the treatment group. A total of 1,920 fourth-grade students took the 2009 NYS Mathematics exam. Of those, 1,531 were in the control group, and 389 were in the treatment group. Different art forms were used as the
intervention of the treatment group: visual art integration, music integration, theater integration, and dance integration.

Results from this study argue that arts integration has a significant positive effect on the academic achievement on fourth-grade students in ELA and mathematics. On average, the fourth graders who participated in this project scored 12 points higher in ELA and 13 points higher in mathematics than the average of the control group. Twelve and thirteen points, respectively, is a very large increase for any school district and especially for typical students in large urban school districts that have very low test scores.

In the NYS scoring system of Level 1-4, a Level 3 score is between 650 and 715 on the ELA Grade 4 exam. Level 3 is defined as meeting the standard. The average of the control group score is 651 compared to the average music integrated treatment group score of 663 (2009 NYS Performance Charts).

In mathematics, the scoring system defines a Level 3 as 650-701. The mathematics score test score of the control group was 661 compared to the visual art integration group whose average score was 674. In both cases of ELA and mathematics, the specific intervention moved students on average half-way across a 25-point range, which defines one of the four possible summary scores for the target tests. From the practitioner’s perspective, positive results were anticipated, however, the level of the positive increase was surprising.

Music has often been linked to mathematics achievement. In the current study music was found to increase academic achievement in ELA. This may be due to the vocabulary development and comprehension activities students participated in during the
artist residency. During the music residency, students learned new songs. Students sang the songs, learned the vocabulary and the meanings of the new vocabulary word. This may be the reason for the increase in ELA achievement of the music treatment group.

The visual art treatment group participated in activities that reinforced mathematics content. For example students made a model of the Erie Canal. To do this they learned about scale and proportion. Students also created artworks that incorporated geometric shapes and forms.

Background. Gardner’s (1993) Multiple Intelligences (MI) theory can be viewed as the motivational hook that engages the students in the learning. MI theory describes the eight learning styles that people have. It is believed that when information is presented in such a way that is compatible with one’s learning style, that person will be more engaged. The arts easily align with the various learning styles noted by Gardner.

The arts integration activities that students participated in aligned with Gardner’s MI theory. For example during the music residency students sang songs. While learning these songs they also learned new vocabulary and the meanings of the words. Students would also clap or move to the beat of the music thereby appealing to the kinesthetic learner.

The visual art residency consisted of activities that would appeal to the visual learner as well as the kinesthetic learner due to the hands on nature of creating the art work. Students made models of the Erie Canal, they made a see-through book of the bones and muscles of the human body, and they created dioramas of stories they had read.
These arts integration lessons provided the students with activities that appealed to their learning style and it gave them the opportunities to learn content in relevant and authentic tasks. During the arts integration lessons, the content taught was the same but the method of delivery of the content was different.

Numerous studies have determined a correlation between arts integration and student achievement, however, there are few scientific studies. The meta-analysis conducted by Winner and Hetland (2001), *Reviewing Education and the Arts* (REAP), reviewed the research on the academic outcomes of arts education covering a 49-year period up to 1999. After removing studies that were not empirical in design and studies that were advocacy pieces, 188 studies remained. These studies showed a clear causal link between study in the arts and student achievement in three areas:

1. listening to music and spatial-temporal reasoning
2. making music and spatial-temporal reasoning
3. theatre activities and verbal ability

Effect size was calculated for each group of studies in these three areas. The studies had small to medium effect sizes. The Butzlaff (2000) study reviewed the REAP data and determined that there was a reliable correlation between music instruction and increased student achievement. Butzlaff noted that 80% of the correlational studies had positive effect sizes. Although correlational studies inform the research field, the studies that are empirical in design are needed to determine causation.

One empirical study, the study conducted by Burger and Winner (2000), is a meta-analysis of over 4,000 records. After removing non-experimental studies and advocacy pieces, only nine studies remained. These studies contained a treatment group and a control group. Burger and Winner (2000) did not find a reliable relationship
between arts instruction and reading improvement (n=5). The second part of their study (n=4) looked at reading instruction and arts integration. In this group they found a marginal effect (R=.23).

Mathematics and arts integration was the focus of a meta-analysis conducted by Vaughn (2000). Over 4,000 references were found yet only 25 were included in the meta-analysis. Studies that did not have 1) a measured mathematics outcome, 2) a control group, and 3) enough information to compute an effect size were not included in the meta-analysis. Of the three studies, a modest positive effect was found in mathematics ability of students who chose to study music.

One can see from these various studies that there are numerous studies that pertain to arts integration and arts education and the impact on student achievement, however, there is a need for more studies that utilize control and treatment groups to help determine causation. The literature contains few experimental studies; the current study is based on the data from an experimental study.

This current study has found results similar to that of the work conducted by Catterall and Waldorf (1999), Hixson (2007), and McFadden (2008). All these studies found increases in academic achievement when the arts were integrated with ELA and mathematics.

CAPE study has similarities with the current study. Both of these studies used data from large districts, although Chicago is much larger than Rochester. The data used by Catterall and Waldorf was from a final year of the longitudinal study. The current study was from the final year of an AEMDD study. Both arts integration projects integrated all four art forms and data analyses was conducted on reading and
mathematics. Lastly, Catterall noted the significant results for sixth grade students in reading and mathematics in the data from the 1998-1999 academic year. The data from the current study are also significant for ELA and mathematics for fourth grade students.

This study adds to the literature in a meaningful way since it is based on data from an experimental study. This study supports and furthers the understanding of the effect of arts integration on student achievement. The current study was conducted using data from a large urban, high poverty school district. Additionally, the sample size of this study was large: 1,895 for ELA and 1,920 for mathematics. Most of the literature contains small sample sizes; the large sample size of this study adds to its value to inform the field.

These data also support the work of April (2001), who asserts that arts integration does positively impact student achievement. Very few studies exist that examine the relationship of the specific art form used in arts integration. This study furthers the field on arts integration research due to the analyses of the data based on the specific art form used in the intervention.

As indicated in the data of this study, arts integration does have a significant and positive effect on fourth-grade urban student achievement in two content areas: ELA and mathematics. Specifically, the data determined that visual art had a significant effect on student achievement in mathematics and that music had a significant impact on ELA. These results may be used by teachers, school administrators, district level administrators, and policy makers to increase academic achievement of students as measured on standardized ELA and tests.
**Implications of Findings**

The results of this study are important to teachers, administrators, and policy makers as school districts look for means to increase student achievement. These stakeholders should be aware of the research and advocate for utilizing arts integration in their schools and districts.

*Policy makers.* Policy makers need to look seriously at the arts as a means to increase academic achievement. Many studies have established a correlation between arts integration and student achievement. This study shows that arts integration has a positive effect on student learning in ELA and mathematics in urban fourth grades when using specific art forms in the intervention. Policy makers can use these data to increase arts integration in schools by creating policy that supports and funds the arts integration initiatives. School boards could ensure that all students have equal access to arts instruction and that classes are taught in an integrated manner. School boards set the policy for their districts. Therefore the school board should set policy about arts instruction and about arts integration as a teaching strategy to be implemented in the district.

Furthermore, New York State needs to incorporate language in the Commissioner’s Regulations that require that the arts be taught by certified arts specialists. Currently, the Commissioner’s Regulations make recommendations about arts instruction. The current research proves that arts integration has a significant positive impact on student achievement, so the Commissioner’s Regulations need to ensure that the arts are made available to all students in New York State. Specific language requiring arts instruction in the Commissioner’s Regulations would also eliminate the disparity in
programming between wealthy districts, which are typically suburban districts and their urban neighbors. This disparity is noted in *Reinvesting in Arts Education: Winning America’s Future through Creative Schools* (2011).

Policy makers need to consider the impact of arts integration on student achievement and demand that the curricula used in their district is arts integrated. This study revealed an average increase of 12 points on the NYS fourth grade ELA exam and an average increase of 13 points on the NYS fourth grade mathematics exam. The data from this study show that policy makers need to consider the arts as the means for increasing academic achievement in their districts.

Policy makers can support arts integration by providing funding and faculty to implement integrated arts programs in their schools. Policy makers can also require that data be collected and analyzed to study further the impact of arts integration on their student population. Policy makers need to consider the long term effect of arts integration and not look for an immediate remedy to the issue of declining test scores. The data used in this study were from the third and final year of a federally funded AEMDD project, the interventions occurred over a period of three years. Policy makers should begin this type of research with the understanding that the effect will not be immediate.

The new New York State teacher evaluation system will require that 40% of the teacher’s evaluation be based on student achievement on standardized tests and local assessment measures. These standardized measures will be ELA and mathematics. With teacher evaluations being based on student performance, policy makers need to recognize the benefit of arts integration on realizing gains in student achievement. These academic
gains could result in teachers meeting effective levels on the new teacher evaluation system.

Federal funding is frequently tied to student achievement efforts. Two good examples of this are the No Child Left Behind Act (NCLB) and the Race to the Top funding. Section 1001 of the NCLB Act also known as the Elementary and Secondary Education Act calls for educators to meet the needs of low performing students in high poverty schools. The NCLB legislation also calls for closing the achievement gap between the nation’s low achieving students and the high achieving students (NCLB).

Race to the Top funding is given to districts who demonstrate a variety of characteristics. Two of these characteristics are improving the academic achievement of students and turning around low performing schools. Using arts integration strategies can result in the increases that are required for NCLB and Race to the Top funding. The data from this current study should be utilized by district policy makers as a means to qualify for these federal funds. These data prove that arts integration is effective in raising student achievement in ELA and mathematics. Furthermore, the current study is based on data from of high poverty, urban school district. These schools are also low performing schools. The present study was able to demonstrate an average increase of 12 scale score point on the fourth grade NYS ELA exam and an average increase of 13 points on the fourth grade NYS mathematics exam leading one to understand that arts integration was effective with these students in these low performing schools, so it could be effective in other low performing schools as well.

The use of arts integration strategies in elementary schools can be viewed as an answer to the need for increasing students’ creative abilities as called for in the
Reinvesting in Arts Education: Winning America’s Future Through Creative Schools (2011). This report outlines the need for students to be creative problem solvers and critical thinkers in order for them to be competitive in the global economy. The report describes arts integration as one means to include the development of these skills in American schools.

School administrators. School Superintendents should use the data from the current study and realize the impact that arts integration can have as an early intervention for ELA and mathematics. It is imperative that children develop grade level competencies in ELA and mathematics so that they can be successful throughout their elementary and secondary education. Arts integration could be the key to building that success.

Additionally, the cost of implementing an arts integration model is considerably less expensive than purchasing a commercial intervention program for ELA or mathematics.

The cost of implementing an arts integration program could be more cost effective than purchasing a commercially produced reading program. The impact on ELA test scores of this arts integration program was significant. The cost of the intervention is minimal for the gain that was achieved. The AEMDD program grant was about $800,000 for the three year period. These funds covered the program costs for all seven grade levels (K-6) in all participating schools. The funds also covered the outside evaluation of the entire program. These costs divided by the number of students participating mean the average per pupil cost was about $67 annually. Compared to Reading Recovery with an average annually cost of $3,750 per pupil annually, arts integration is a much more cost effective program (Reading Recovery Program). District level administrators need to realize the financial gain that can be achieved when implementing an arts integration
model to increase academic achievement in ELA rather than purchasing a commercially produced product.

School level administrators should allow time for teachers to share their arts integrated lessons and collaborate with colleagues in order to strengthen lessons. School administrators can also provide planning time for teachers and arts specialists to co-plan units of instruction so that the Standards of the arts and the classroom content are met.

School administrators should plan job embedded professional development (PD) about arts integration. This PD could be in the form of a teaching artist’s residency. When the classroom teacher sees the lessons modeled by the teaching artist then the teacher has a clear understanding of how to implement arts integrated lessons.

In buildings where there is not an arts specialist, the building level administrator should seek support for this additional faculty member. Arts teachers have specialized training in the arts that enables them to teach the arts. Last, building administrators need to support arts integration work by providing additional funds to purchase the materials needed for creation of art works as a component of the integrated units.

Teachers. Recommendations for teachers would be to incorporate arts integration techniques and strategies into their teaching practice. Teachers could sing vocabulary words with students. Students could use song lyrics to learn about simile, metaphor, and personification. Teachers can integrate music by singing songs that reinforce math concept and processes. Teachers can also use art reproductions in lessons on geometric shape, geometric form, and proportion. Teachers can do this by having students locate these various mathematical concepts in art reproductions. A good way to do this would
be to search the internet for lessons that have already met with success and use these lessons.

There are a number of websites and books with information on arts integration. These resources would be a good beginning for any teacher interested in arts integration. Some websites have lesson ideas and unit plans. Teachers should also look for opportunities to participate in professional development to learn strategies to integrate the arts into the classroom content of ELA and mathematics. Conferences are a great source for professional development. There are arts integration conferences available for teachers to attend. Additionally, many teacher organizations offer workshops specifically on arts integration at their conferences.

Teachers may find opportunities to co-teach units with arts specialists in their building to create richer and more meaningful learning experiences for their students. Teams of teachers can co-plan units of instruction; in the co-planning teachers can learn from colleagues about specific content and techniques. Teachers should look to their colleagues for support and encouragement as they develop arts integrated lessons.

Arts teachers should integrate content of ELA, mathematics, science, and social studies into their lessons more effectively. The NYS Arts Learning Standards include making connections to other content areas. Imagine the impact of learning about muscles and bone structure, and kinesiology in dance class, or imagine learning about music of the Revolutionary War when one also learns about the historical and societal events of that period.

Local cultural organizations may have education department staff that can assist teachers in creating rich learning experiences that are integrated with the arts. For
example, The Memorial Art Gallery of the University of Rochester has created a tour that reinforces the social studies content of ancient civilizations. Sixth-grade students in the Rochester City School District go on this tour and see examples of Greek and Roman artwork. While there, students also see examples of African and Asian art. Students are able to compare and contrast the various artworks and the periods in history when the works were created.

Students. The research indicates that on average the fourth-grade students who participated in this study performed better on the NYS ELA and mathematics tests. These results confirm that students that participate in integrated arts instruction will do better academically. With this analysis in mind, students should have the opportunity to participate in classes that are taught in an integrated model.

Arts integration needs to be incorporated into the pedagogical practice of urban teachers especially for high poverty urban students. The use of arts integration strategies and MI theory to engage urban students may lead to continued academic growth and a narrowing of the achievement gap between white and minority students and between various demographic subgroups.

The long-term impact of the effect of arts integration on student achievement is yet unknown, however, these findings indicate that longitudinal research is needed.

Limitations of the Study

One limitation of the study was that the data were not disaggregated to look at subgroups within the treatment and control groups. Disaggregated data would have provided information about the effect of arts integration on subgroups determined by gender, SES, ethnicity, or a number of other classifications.
Another limitation of the study was that the children in this district underperformed compared to their peers in suburban district and they were below grade level. A similar arts integration study conducted with students that are already performing at grade level will help practitioners and researchers understand the impact of integrated arts instruction on student achievement. Furthermore, there were only two assessments used in this study. Further research on the impact of arts integration on student achievement in other content areas would be useful.

Additionally, the students in this district are low SES, which could have an effect on the data. These students may not have the same level of exposure to the arts that a middle class child might. Therefore the interest and motivation in the arts integrated learning activities could be greater for these children than a middle class child simply because the materials and activities are “new” to the child. Arts integration studies need to be conducted across SES groups to understand the impact on academic achievement of the various SES subgroups of a grade level population.

The data were from the third and final year of a three-year study. These data are one snapshot in time. Longitudinal studies will add to the knowledge about arts integration. It is unclear what the true effect could be when arts integration is implemented over a many years.

The various arts integration studies lead to the incomplete literature in any specific domain of the arts. Arts integration and studies on arts education are intermingled in the research, making the results even more diffused. Further study on the impact of arts integration on student achievement is needed, with attention paid to separating arts instruction from arts integration. This current study concluded that visual
art had a significant positive impact on student achievement in mathematics and that music integration had a significant positive impact on student achievement in mathematics. Although these results have confirmed the impact of integrated arts instruction on student achievement, we do not know which lessons worked. The arts integrated lessons that were implemented in each of the nine schools varied by school. Therefore, we cannot say definitively which of the integrated activities was effective. This leads us to realize that studies need to be conducted that study one specific art activity in a variety of settings to determine the overall effect.

Another limitation of the current study is that there was no assessment of the motivational factors that the arts have on the students’ willingness to learn. MI theory indicates that the arts appeal to various learning styles and therefore provide access for students to use their preferred style as the entry point to the learning. However, this study did not analyze the factors that influence motivation and how the arts can be used as the motivational tool. There is a need for assessing student motivation to learn how arts integration may enhance student motivation. Additionally, research on MI theory and arts integration would be of benefit to practitioners and policy makers.

The data used in the current study was the result of the AEMDD study that incorporated a teaching artist residency in each of the classrooms. The effect of co-teaching could have an impact on the data. The co-teaching could have resulted in teachers being more engaging and students being more motivated. Research on arts integration with a teaching artist and research on arts integration when the teacher uses arts strategies need to be conducted to understand the impact of co-teaching on academic gains.
Recommendations for Further Study

The areas of arts education and arts integration are two different fields that are currently combined in the literature. Studies on the impact of arts instruction on student achievement and the studies on the impact of arts integration on student achievement need to be separated in the literature. Moreover, as noted in the meta-analysis by Burger and Winner (2000), and Vaughn (2000), many of the studies included in the literature are really advocacy pieces. These advocacy pieces have a place in arts education literature but not in the research field on the arts. The need is for empirical research on arts education and on arts integration as separate fields.

It should not be misconstrued by the findings from this current study that arts education is not valued or that arts education must be used to bolster academic achievement in other non-art areas. The arts should be taught for their inherent value; learning in the arts is a component of a well-rounded education.

The research studies on arts integration are predominantly correlational. There is a need for additional research studies that are experimental in design. Longitudinal studies on the impact of arts integration on student achievement in other content areas will add to the literature, as would studies exploring various kinds of arts integration at various levels of education: elementary, middle school, and high school.

Furthermore, there is a gap in the literature on specific art forms used in the arts integration intervention; this study provides a starting point for such a body of exploration. Further studies on specific art forms will inform practitioners of strategies to increase student achievement using arts integration. Additionally, studies should utilize
one specific arts integration unit or group of lessons to determine which activities have the biggest impact on academic achievement.

Moreover, research on how arts integration works would be useful to practitioners and policy makers. To know that it does work is only part of the answer. How it works, specifically what characteristics about arts integration make it successful will inform the field in a substantial manner. Furthermore, longitudinal studies are needed to truly understand the impact that arts integration can have on academic achievement.

The use of arts integration strategies in schools can be one answer to increasing student motivation and reducing the drop-out rate. These two factors of the decline in the American education system are noted in *Reinvesting in Arts Education: Winning America’s Future Through Creative Schools* (2011). This report describes the “national drop-out rate of 25-30%” (p. 28). The report further describes the problem as being related to students’ feeling bored and that classes are not interesting. The arts may be the answer to this concern, both by increasing arts education opportunities in schools and or by incorporating arts integration teaching practices in the classroom content.

Replication of the original Rochester Arts Education Model Development and Dissemination project will lend credence to the findings of the Rochester Arts Impact Study. Further analyses of the data from various grade levels will also be useful for practitioners and policy makers.

This study focused on fourth-grade students. Further study needs to be done on other grade levels to more fully understand the effect of arts integration on student achievement and on students in other districts with different demographic profiles.
Analysis of the data should also be done on subgroups with each of the grade level populations.

**Conclusion**

Some school districts in our country perceive the arts as a luxury and in times of budget troubles an expensive luxury. Arts integration is one means to increase academic achievement of students as well as engage them in the learning of the arts. The cost of implementing an arts integration model to increase student achievement is considerably less than many of the commercial remediation programs. Additionally, when teachers learn how to integrate the arts they are increasing their pedagogical skill which will be of benefit to them throughout their career.

More empirical studies need to be conducted on the impact of arts integration on student achievement. Since this study has determined that arts integration does have a significant positive effect on academic achievement of urban fourth graders in ELA and mathematics, more studies need to be conducted to add to the field of arts integration.

School teachers, administrators and policy makers need to ensure that the arts are not lost as districts face budget deficits. The impact of arts integration is relatively inexpensive when compared to the cost to society of low graduation rates, high dropout rates and low academic achievement. Federal and State level policy makers need to lead the way in ensuring that the arts hold a prominent place in the education of our children.

This study supports teachers, administrators, and policy makers who make extremely careful and targeted choices about how to integrate the arts into classroom subjects of ELA and mathematics for the best outcomes for students.
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Appendix A

NYS ELA Learning Standards

Standard 1: Students will read, write, listen, and speak for information and understanding.

As listeners and readers, students will collect data, facts, and ideas, discover relationships, concepts, and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they will use oral and written language to acquire, interpret, apply, and transmit information. (New York State Education Department)

Standard 2: Students will read, write, listen, and speak for literary response and expression.

Students will read and listen to oral, written and electronically produced texts and performances, relate texts and performances to their own lives, and develop an understanding of the diverse social, historical, and cultural dimensions the texts and performances represent. As speakers and writers, students will use oral and written language for self-expression and artistic creation. (New York State Education Department)

Standard 3: Students will read, write, listen, and speak for critical analysis and evaluation.

As listeners and readers, students will analyze experiences, ideas, information, and issues presented by others using a variety of established criteria. As speakers and writers, they will present, in oral and written language and from a variety of perspectives, their
opinions and judgments on experiences, ideas, information and issues. (New York State Education Department)

Standard 4: Students will read, write, listen, and speak for social interaction. Students will use oral and written language for effective social communication with a wide variety of people. As readers and listeners, they will use the social communications of others to enrich their understanding of people and their views. (New York State Education Department)
Appendix B

NYS Mathematics Learning Standards and Performance Indicators

The Mathematics Standards for Elementary students, which were revised in 2005 are:

1. Students use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument. Students:
   • use models, facts, and relationships to draw conclusions about mathematics and explain their thinking.
   • use patterns and relationships to analyze mathematical situations.
   • justify their answers and solution processes.
   • use logical reasoning to reach simple conclusions.

2. Students use number sense and numeration to develop an understanding of the multiple uses of numbers in the real world, the use of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas. Students:
   • use whole numbers and fractions to identify locations, quantify groups of objects, and measure distances.
   • use concrete materials to model numbers and number relationships for whole numbers and common fractions, including decimal fractions.
   • relate counting to grouping and to place-value.
   • recognize the order of whole numbers and commonly used fractions and decimals.
   • demonstrate the concept of percent through problems related to actual situations.
3. Students use mathematical operations and relationships among them to understand mathematics. Students:

• add, subtract, multiply, and divide whole numbers.
• develop strategies for selecting the appropriate computational and operational method in problem solving situations.
• know single digit addition, subtraction, multiplication, and division facts.
• understand the commutative and associative properties.

4. Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships. Students:

• use concrete materials to model spatial relationships.
• construct tables, charts, and graphs to display and analyze real-world data.
• use multiple representations (simulations, manipulative materials, pictures, and diagrams) as tools to explain the operation of everyday procedures.
• use variables such as height, weight, and hand size to predict changes over time.
• use physical materials, pictures, and diagrams to explain mathematical ideas and processes and to demonstrate geometric concepts.

5. Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data. Students:

• understand that measurement is approximate, never exact.
• select appropriate standard and nonstandard measurement tools in measurement activities.

• understand the attributes of area, length, capacity, weight, volume, time, temperature, and angle.

• estimate and find measures such as length, perimeter, area, and volume using both nonstandard and standard units.

• collect and display data.

• use statistical methods such as graphs, tables, and charts to interpret data.

6. Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations. Students:

• make estimates to compare to actual results of both formal and informal measurement.

• make estimates to compare to actual results of computations.

• recognize situations where only an estimate is required.

• develop a wide variety of estimation skills and strategies.

• determine the reasonableness of results.

• predict experimental probabilities.

• make predictions using unbiased random samples.

• determine probabilities of simple events.

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Appendix C

New York State Arts Standards

Standard 1: Creating, Performing and Participating in the Arts

Students will actively engage in the processes that constitute creation and performance in the arts (dance, music, theatre, and visual arts) and participate in various roles in the arts.

Standard 2: Knowing and Using Arts Materials and Resources

Students will be knowledgeable about and make use of the materials and resources available for participation in the arts in various roles.

Standard 3: Responding to and Analyzing Works of Art

Students will respond critically to a variety of works in the arts, connecting the individual work to other works and to other aspects of human endeavor and thought.

Standard 4: Understanding the Cultural Dimensions and Contributions of the Arts

Students will develop an understanding of the personal and cultural forces that shape artistic communication and how the arts in turn shape the diverse cultures of past and present society.

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