Comparing state mandated test scores for students in programs with and without fine arts in the curriculum

Cynthia Garcia
Superintendent, Driscoll ISD

Don Jones
Texas A&M University - Kingsville

Carrie Isaacson
Hardin Simmons University

ABSTRACT

As a result of the No Child Left Behind Act (NCLB) of 2001, many school districts have reduced instructional time for the arts in order to focus on reading and mathematics. Accordingly, fine arts programs across the nation have become subject to budget cuts or elimination in order to meet federal accountability measures. Hit especially hard are small, rural school districts.

The purpose of this study was to determine the impact of a fine arts program on the reading and math achievement, as measured by the Texas Assessment of Knowledge and Skills (TAKS) test, of third- through eighth-grade students in a small, rural school district. The theories of constructivism, multiple intelligences, and brain-based learning served as the bases for the alternate treatment posttest-only nonequivalent group design quantitative study. An analysis of variance (ANOVA) was utilized to determine if significant differences existed among the reading and math TAKS scores of all students across the levels of fine arts implementation in 2007 (Level 1), 2008 (Level 2), 2009 (Level 3), and 2010 (Level 4). The levels of fine arts implementation corresponded to 0, 1, 2, or 3 years of fine arts added to the curriculum. Additional analyses were repeated to examine the difference by students' ethnicity and socioeconomic status. Results from the study indicated participation in the arts increased reading achievement for all students and increased reading and math achievement for both the Hispanic and the economically disadvantaged populations.

It is recommended that these results be shared in an effort to expand the knowledge base of rural educators and to assist in closing the achievement gap for at-risk students enrolled in small, rural school districts.

Keywords: Fine Arts, Accountability, NCLB, School Finance, Budget, School Funding

INTRODUCTION

Since the passage of the No Child Left Behind Act of 2001, educators have struggled to meet the 2013-14 deadline to close the achievement gap between disadvantaged students and minority students and their peers in reading and mathematics (Ruppert, 2006). The No Child Left Behind (2002) legislation coupled with state laws and policies supporting this effort have put increased pressure on public educators and administrators to hold them accountable for student performance in these curricular areas (Arts Education Partnership [AEP], 2004).

While rigorous public education that leaves no child behind regardless of his or her race, ethnicity, or income is ambitious and noble, many unintended consequences have emerged since the inception of this legislation. One such consequence is the state of fine arts in public education. In 1995, the 74th Texas Legislature recognized the importance of fine arts instruction by requiring the State Board of Education to clarify the essential knowledge and skills of the both the foundation and enrichment curricula. As a result, the Texas Administrative Code was revised to state, "Districts must ensure that sufficient time is provided for [K-5 and middle school] teachers to teach and for students to learn" fine arts as well as other disciplines (Center for Educator Development in Fine Arts [CEDFA], 2009). Language specific to students in high school grades was also included which required districts to offer courses from at least two of the four fine arts areas of art, music, theatre and dance. From this commission emerged the Texas Essential Knowledge and Skills (TEKS) for Fine Arts which articulate the achievement of high expectations for all students throughout the state (CEDFA, 2009). While the Fine Arts standards did not recommend a specific program, methodology, or strategy for teaching fine arts, these guidelines did provide a framework for local districts to develop curricula designed to meet the particular needs of each district's students and communities (CEDFA, 2009).

Years later, then Texas Governor George W. Bush was named the 43rdPresident of the United States and signed into federal law the No Child Left Behind (NCLB) Act of 2001. This legislation once again reaffirmed the significance of including fine arts instruction in the education of all youth across the country. The intent of this act was to improve reading and math test scores for students across the United States by requiring schools and districts to focus their attention on the academic achievement of traditionally underserved groups of children such as low-income students, students with disabilities, and minorities (AEP, 2005b). In doing so, NCLB defined the "core academic subjects" as: English, reading; language arts; mathematics; science; history; geography; economics; civics and government; foreign languages; and the arts [NCLB 9101(11)]. Including the arts in the list of "core subjects" which federal law requires all schools and districts across the nation to teach would appear to boost the opportunity for all students to receive instruction in the arts, especially for NCLB's targeted populations: the economically disadvantaged, disabled and or member of a minority group.

Unfortunately, opportunities in the arts have not been consistently available to all students in public education. Many schools and districts across not only the state of Texas but the nation as a whole have struggled to meet curricular and accountability mandates prescribed by NCLB amidst limited resources and dwindling budgets. Many educators perceive the arts as taking time and resources away from instruction in reading and math as required by NCLB.

This is especially true when examining curricular opportunities, such as fine arts, for students in smaller rural schools. According to the Art and Education Report (2004), researchers noted that schools in rural areas were likely to be hit harder during these times, and that the students in these schools lose access to arts programs more quickly than those attending

suburban schools (AEP, 2004). Fine arts programs in rural schools are often subject to budget cuts or elimination during times of economic downturn or when policy changes, such as NCLB, require schools to focus on specific programs or needs (AEP, 2004).

Nearly 40% of America's school-age children attend public schools in rural areas or small towns with populations of less than 25,000 (Johnson & Strange, 2007). Forty-nine percent of the nation's public schools are located in rural areas and small towns, and 41% of public school educators teach in rural community schools (National Education Association [NEA], 2009*)*. Research by NEA (2009) suggested that although rural and small schools educate nearly 40% of America's students, they receive less than 25% of the total federal, state, and local spending on public education. AEP (2004) concluded many rural schools struggle to balance budgets and accountability mandates and often minimize or eliminate funding for the arts, thus diminishing fine arts opportunities for rural students.

The challenges faced by rural schools are compounded by the nature of these schools' locations. Rural schools tend to be located in areas with low property values and few industries, making it more difficult to raise additional revenues (Kruez, 2005). Fewer industries equates to fewer job opportunities, causing families to move to larger more suburban or urban areas to find employment. The depopulation of a community is the precursor to declining enrollment which can negatively impact a district's revenue. For rural school districts, the impact can be significant.

Securing qualified teaching staff to teach content specific areas presents an additional challenge for rural schools. Small, poorer rural communities lack social amenities that would attract and retain recent college graduates, who are statistically young and single (Alexander, Andrews, Proffit, & Sale, 2003). Limited shopping, entertainment, and opportunities for social interaction may discourage young applicants from applying for jobs in rural districts (Kruez, 2005). Unless they are committed to a rural area by family ties or by choice, top teaching candidates may be tempted by suburban or urban areas that offer amenities not available in most rural areas: an expanded social life, a nearby university, more housing options, more services within the community, and greater opportunity for spousal employment (McClure et al., 2003). As a result, rural school districts not only struggle to financially support a fine arts program, they also lack the expertise and capacity of their urban and suburban counterparts to staff a fine arts position.

Though the NCLB (2002) includes the arts as a core subject, the focus on reading and mathematics accountability has altered priorities, causing many administrators to reduce arts education opportunities in response to the challenges posed by this act (Arts Education in Maryland Schools Alliance [AEMS], 2006). In doing so, critical links to academic success are nonexistent for many students, especially those attending rural schools. However, the extent to which the lack of these opportunities limits the crucial cognitive skills students in rural schools need to achieve at high levels on mandated reading and math assessments is presently unknown. In the following section, we present in detail the theoretical base and variables that were examined in this research study.

PURPOSE OF THE STUDY

This study sought to provide evidence which would determine if a statistically significant difference existed among the third- through eighth-grade reading and math state assessment scores in Texas of all students who participated in a fine arts program, and the third- through

eighth-grade reading and math scores of students who did not participate in a fine arts program across levels of fine arts implementation during the 2007, 2008, 2009, and 2010 school years in a small, rural south Texas school district. Utilizing these same levels of fine arts implementation 2007, 2008, 2009, and 2010, this study also examined additional subgroups within these third- through eighth-grade student scores and conduct additional analyses by ethnicity (Hispanic and White) and socioeconomic status (economically disadvantaged and non-economically disadvantaged) to determine if a statistically significant difference exists among their reading and math TAKS scores.

Differences in reading and math achievement, as measured by state assessments across these levels by ethnic subgroups (Hispanic and White) and by socioeconomic status (economically disadvantaged and non-economically disadvantaged) were examined across grade levels..

Though this study separated itself from previous research on fine arts and achievement due to the rural setting of the sample, similar research conducted by Stevenson and Deasy (2005) examined the impact of fine arts on what they referred to as "high poverty schools" (p. 12), eight located in the northeastern United States and two schools located in the southwest. They defined high poverty schools as schools with at least 50% of the student population identified as economically disadvantaged. Stevenson and Deasy (2005) found that fostering student study and/or creation of various works of art, teachers at these schools created engaging learning environments. With significantly higher percentages of economically disadvantaged and Hispanic students, my study sought to determine if a similar outcome could be achieved in a small, rural school district in south Texas using a quantitative design approach.

RESEARCH QUESTIONS

The focus of this alternate treatment posttest-only nonequivalent groups design quantitative study was to determine if the state mandated assessment scores in reading and math differ significantly based upon the level of implementation of a fine arts program in a small, rural south Texas school district. The outcome of this research study addressed the following guiding research questions:

RQ1: Is there a difference in reading and math achievement, as measured by the Texas Assessment of Knowledge and Skills (TAKS) test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for all students in third through eighth grades enrolled in a small, rural south Texas school district?

> H_1: There is a significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for all students in third through eighth grade enrolled in a small, rural south Texas school district.
>
> H_{01}: There is no significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for all students in third through eighth grade enrolled in a small, rural south Texas school district.

H_2: There is a significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for all students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{02}: There is no significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for all students in third through eighth grade enrolled in a small, rural south Texas school district.

RQ2: Is there a difference in reading and math achievement, as measured by the Texas Assessment of Knowledge and Skills (TAKS) test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for ethnic subgroups (Hispanic and White) in third through eighth grade enrolled in a small, rural south Texas school district?

H_3: There is a significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for Hispanic students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{03}: There is no significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for Hispanic students in third through eighth grade enrolled in a small, rural south Texas school district.

H_4: There is a significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007,2008, 2009, and 2010 for Hispanic students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{04}: There is no significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for Hispanic students in third through eighth grade enrolled in a small, rural south Texas school district.

H_5: There is a significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for White students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{05}: There is no significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007,2008, 2009, and 2010 for White students in third through eighth grade enrolled in a small, rural south Texas school district.

H_6: There is a significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for White students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{06}: There is no significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for White students in third through eighth grade enrolled in a small, rural south Texas school district.

RQ3: Is there a difference in reading and math achievement, as measured by the Texas Assessment of Knowledge and Skills (TAKS) test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for socioeconomic subgroups (economically disadvantaged and non-economically disadvantaged) in third through eighth grades enrolled in a small, rural south Texas school district?

H_7: There is a significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{07}: There is no significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_8: There is a significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008,2009, and 2010 for economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{08}: There is no significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_9: There is a significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for non economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{09}: There is no significant difference in reading achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for non-economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{10}: There is a significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for non-economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

H_{010}: There is no significant difference in math achievement as measured by the TAKS test, across levels of fine arts implementation 2007, 2008, 2009, and 2010 for non-economically disadvantaged students in third through eighth grade enrolled in a small, rural south Texas school district.

A detailed discussion of the methodology and the quantitative approach employed will be presented in section 3 of this proposal.

RESEARCH DESIGN AND APPROACH

The intent of this alternate treatment posttest-only nonequivalent group design quantitative study was to determine what difference, if any, participation in the arts had on the reading and mathematics TAKS scores of students in a small, rural south Texas school district across the levels of implementation 2007, 2008, 2009, and 2010. This design was selected because of the complexities associated with the data analysis of the various comparison groups. According to Creswell (2003), "…examining the relationships between and among variables is central to answering questions and hypotheses through experiments" (p. 153). Collecting data on a predetermined instrument that yields statistical data and employing surveys or experiments as strategies of inquiry are the primary tools for quantitative investigation. The quantitative approach includes true experiments and less rigorous experiments called quasi-experiments, correlational studies, and specific single-subject experiments (Creswell, 2003), and this approach involves complex experiments with many variables and treatments such as the alternate treatment posttest-only nonequivalent groups design.

The quantitative study utilized an alternate treatment posttest-only nonequivalent groups design. The study sought to determine if there was a statistically significant difference among the Texas mandated annual assessment, TAKS test scores, in reading and math, of all third- through eighth-grade students who participated in a fine arts program and the reading and math TAKS scores of all third- through eighth-grade students who did not participate in a fine arts program in a small, rural south Texas school district. The data gathered were analyzed across the district's levels of fine arts implementation during the 2007, 2008, 2009, and 2010 school years. Additionally, this study examined the difference in reading and math achievement, as measured by the TAKS test, across these levels by ethnic subgroups (Hispanic and White) and by socioeconomic subgroup (economically disadvantaged and non-economically disadvantaged). The levels of fine arts implementation in this study represented: (a) student scores void of any fine arts opportunities (2007), (b) scores of students who received 1 year of fine arts instruction (2008), (c) scores of students who received 2 years of fine arts instruction (2009), and (d) the scores of students who received 3 years of fine arts instruction (2010). As suggested by Creswell (2003), nonprobability sampling, or convenience sampling, was utilized because it was necessary the researcher use scores obtained from naturally formed groups (e.g., Grades 3-8).

SETTING AND SAMPLE

The study took place at a public school district located in Nueces County in south Texas. District A is in a small, rural community of predominately low socioeconomic students of Hispanic origin. The district is comprised of two campuses: an elementary school serving students in grades Pre-Kindergarten through Grade 5, and a middle school campus educating sixth-, seventh-, and eighth-grade students. District A does not have a high school within its district boundaries; instead, the District buses resident students of high school age nearly 30 miles south, twice a day, to a neighboring school district for secondary instruction.

District A serves approximately 270 students representing limited ethnic diversity. According to the District's 2009 Academic Excellence Indicator System (AEIS) report, 86% of the students enrolled are of Hispanic origin while the remaining 14% are classified as White. Of the total enrolled population, 80% are considered economically disadvantaged, 12% labeled limited English proficient or (LEP), and nearly 10% learning disabled. Likewise, nearly half of all students enrolled in District A are considered at risk of dropping out of school as determined by Title I, Part A of NCLB (AEIS, 2009).

The sampling method utilized for this study was convenience sampling. According to Creswell (2003), "Convenience sampling is necessary when random sampling cannot be used due to the nature of the formed groups (e.g., a classroom, organization, or family unit; p. 164). In this study, the reading and math TAKS scores of students within each sample group represent the dependent variable for analysis. Those scores were aggregated by grade level for state comparison and campus and district level reporting. Therefore, the sample groups remained intact groups by grade. TAKS scores in reading and math for all third- through eighth-grade students who made up the levels of fine arts implementation–one level representing no participation in a fine arts program and the remaining levels representing various degrees of fine arts implementation–were acquired, accumulated, and analyzed.

All of the students whose scores were used in this study were enrolled in Grades 3-8 and attend District A's elementary or middle school campuses or promoted to the district's feeder high school campus during the duration of the study. The fine arts attendees received 1, 2, or 3 years of fine arts instruction. Data from each level of fine arts course implementation 2008, 2009, and 2010 were compared to the data from the group of students who did not participate in fine arts courses during the 2007 school year. Each level was comprised of the same grade levels at the same campuses. The average size of each grade level within District A was approximately 25 students. Thus, the sample size for this study was approximately 150 students per level for a total sample population of 600. The sample size of 235 was the recommended size determined by using a sample size calculator for a 5% error and a 95% confidence level (Raosoft, 2010). However, for this study all the students' scores in each level made up the data that were analyzed.

The reading and math TAKS scores included in this study were obtained from all students enrolled in grades 3-8 during the 2007, 2008, 2009 and 2010 levels of fine arts implementation. As previously described, these scores reflect whether the student received 1 year of fine arts instruction in 2008, 2 years fine arts instruction in 2009, or 3 years of fine arts instruction in 2010. Scores obtained from the 2007 reading and math TAKS test reflect the academic achievement of students who did not receive a curriculum which included any component of fine arts instruction during that school year and served as a baseline for comparison in this study.

As suggested by Creswell (2002), several analyses of variance were utilized to statistically analyze the scores of each level of fine arts implementation through the identified subgroups of ethnicity (Hispanic and White) and socioeconomic status (economically disadvantaged and non-economically disadvantaged). This demographic information was obtained by the researcher from District A's elementary and middle school campus level TAKS reports provided by NCS Pearson, the assessment scoring contractor for the Texas Education Agency. Student demographic information including ethnicity and socioeconomic status are reported by all Texas public school districts through the Public Education Information Management System (PEIMS). "This system encompasses all data requested and received by the TEA about public education, including student demographic and academic performance, personnel, financial, and organizational information" (TEA, 2006c., para. 1).

RESULTS

An analysis of variance (ANOVA) was administered in order to determine if a statistically significant difference existed between the identified variables in each of the three research questions. Use of the ANOVA allowed the researcher to combine and analyze several mean differences in one single test; however, it alone did not reveal exactly which means where significantly different when the outcome indicated a difference was present (Gravetter & Wallnau, 2008). As such, additional post hoc tests to pinpoint the exact location of the significant mean differences for each research question which ANOVA signified a difference was evident. Tukey's Honestly Significant Difference (HSD) test and the Scheffe test were utilized as post hoc tests for this study.

Results for Research Question 1

Question 1 examined the reading and math TAKS scores (dependent variable) across four levels of fine arts implementation 2007, 2008, 2009, and 2010 (independent variables). Results of this question are presented first by the reading results followed by an analysis of the math results.

Reading results

The researcher conducted an analysis of variance (ANOVA) which compared the mean reading TAKS score of the all third- through eighth-grade students in 2007 (Level 1 which represented no fine arts instruction within the curriculum) to the mean reading TAKS score of all third- through eighth-grade student in 2008 (Level 2 which indicated 1 year of fine arts instruction included in the curriculum); to the mean reading TAKS score of all third- through eighth-grade students in 2009 (Level 3 which represented 2 years of fine arts instruction included in the curriculum); to the mean reading TAKS score of all third- through eighth-grade students in 2010 (Level 4 which indicated 3 years of fine arts instruction included in the curriculum). The results of the analysis ($N = 633$) revealed a statistically significant difference in these scores, $F(3, 629) = 3.19$, $p = .023$, leading to rejection of the null hypothesis. A summary of the one-way ANOVA is presented in Table 1 (Appendix)

As discussed earlier, Tukey's Honestly Significant Difference (HSD) test and the Scheffe' test were conducted as post hoc tests to determine exactly which mean differences were

significant and which were not. Those post hoc tests indicated a significant difference, (p = .014) and (p = .028) respectively, between the third- through eighth-grade reading TAKS scores of students who did not receive a curriculum which included fine arts in 2007 (Level 1) and the third- through eighth-grade reading TAKS of students who had received 2 years (or Level 3) of fine arts instruction. Table 2 and Table 3 (Appendix) represent the Tukey's HSD and Scheffe's post hoc comparisons by level of fine arts implementation.

The results depicted in Table 1 demonstrate significant differences exist among the mean reading TAKS scores for all students, Hispanic students, and for students considered economically disadvantaged. Tables 2 and 3 (Appendix) present the overall post hoc analyses conducted in reading and demonstrated the location of the difference existed between Levels 1 and 3, or students with no fine arts instruction and those who received 2 years of instruction in the arts.

Math results

Following the analysis of reading scores, an analysis of variance (ANOVA)was conducted comparing the mean math TAKS score of the same sample population as described in the reading analyses across the same levels of fine arts implementation. The sample population included all 3rd through 8th grade student scores (N = 636) across the four levels of fine arts implementation enrolled at the study site, a small, rural school district located in south Texas. The results of the one-way ANOVA did not demonstrate a statistically significant difference among the mean scores $F(3, 632) = 2.163$, p = .050 and thus failed to reject the null hypothesis. The outcome required no additional post hoc tests. Table 4 presents a summary of the one-way ANOVA results of the analysis.

Results for Research Question 2

Research Question 2 examined whether or not a statistically significant difference existed between the reading and math achievement of Hispanic and White students, as measured by the TAKS test, across the levels of fine arts implementation (2007, 2008, 2009, 2010). Those results are presented first by the ethnic subgroup Hispanic reading and math results followed by the ethnic subgroup White reading and math results.

Hispanic students' reading results

The analysis of variance (ANOVA) conducted by the researcher yielded a significant difference among groups compared, $F(3, 554) = 3.244$, p = .023, thus rejecting the null hypothesis that there is no significant difference in reading achievement as measured by the TAKS test across the 2007, 2008, 2009, and 2010 levels of fine arts implementation for Hispanic students (N = 558) in third- through eighth-grade enrolled in a small, rural south Texas school district (see Table 1). Post hoc test results confirmed that the difference existed between Levels 1 and 3 suggesting the reading achievement of Hispanic students was improved after two years of instruction in fine arts. Post hoc comparisons by ethnic subgroup Hispanic are presented in Table 5 and Table 6.

Hispanic students' math results

Likewise, the results of the ANOVA comparing the mean math TAKS scores of Hispanic students, (N = 561), across the four levels of fine arts implementation produced an outcome which led to rejection of the null hypothesis. Those results indicated a statistically significant difference existed, $F(3, 557) = 3.001$, $p = .030$, among the math TAKS scores of Hispanic students who received 1 or more years of fine arts instruction (see Table 4). Tukey's HSD post hoc test detailed in Table 7, pinpointed the difference between Level 1 (no fine arts in the curriculum) and Level 3 (2 years of instruction in the arts) as well as Levels 1 and Level 4 (3 years of fine arts instruction). Table 8 presents the Scheffe post hoc test results which did not yield the same results as Tukey's HSD for the Hispanic math analysis.

White students' reading and math results

Research Question 2 also examined whether a significant difference existed between the reading and math TAKS scores of White students across the levels of fine arts implementation. According to the results, a significant difference did not exist between the achievement of White students, (N = 75), in reading, $F(3, 71) = .691$, $p = .605$, or in mathematics, $F(3, 71) = .510$, $p = .677$, in relation to their participation or lack of participation in a fine arts program. Based on those results, the analyses failed to reject the null hypothesis for the White ethnic subgroup (see Table 1).

Results for Research Question 3

The final research question addressed by this study examined the difference in third through eighth grade students' reading and math achievement as measured by the TAKS test, across the 2007, 2008, 2009, and 2010 levels of fine arts implementation for socioeconomic subgroups economically disadvantaged and non-economically disadvantaged. The results of those analyses are presented first by economically disadvantaged reading results followed by the math results for this socioeconomic subgroup and conclude with the results of the non-economically disadvantaged reading and math results.

Economically disadvantaged students' reading results

A one-way analysis of variance (ANOVA) was conducted to determine if participation in a fine arts program over specified levels of fine arts implementation significantly improved the reading achievement as measured by the TAKS test for economically disadvantaged students, (N = 529), enrolled in a small rural school district. The results of the analysis confirmed the alternate hypothesis, $F(3, 525) = 3.670$, $p = .012$. Therefore, the null hypothesis was rejected. Table 1 presents the summary of the one-way ANOVA.

According to the analyses, both Tukey's HSD test and Scheffe's post hoc test confirmed a significant difference between the scores of students who had no instruction in the arts, (Level 1), and the scores of students who had received 2 years of fine arts instruction (Level 3). Results from the analyses are presented in Tables 9 and 10.

Economically disadvantaged students' math results

Preceded by the reading analysis for the economically disadvantaged subgroup, an analysis of variance (ANOVA) was conducted to determine if a statistically significant difference existed in the math achievement for this same group population across the same four levels of fine arts implementation. The results indicated that a significant difference existed, $F(3, 528) = 2.926$, $p = .033$ (see Table 4). When post hoc tests were conducted, both post hoc tests yielded borderline p values which contributed to the overall p value of .033. The results of Tukey's HSD test indicated a borderline difference ($p = .052$) among the pair which represented students who did not receive instruction in the arts and those who participated in 3 years of the district's fine arts program. Though the results of Scheffe's post hoc test did not yield a significant difference ($p = .088$), these results did parallel Tukey's results and indicated the largest difference between the means tested existed between Levels 1 and 4. Table 11 and Table 12 detail the results of the post hoc math analyses for the economically disadvantaged socioeconomic subgroup.

Non-economically disadvantaged students' reading results

A one-way analysis of variance (ANOVA) was conducted to determine if a significant difference existed in the reading performance of non-economically disadvantaged students in the sample population across the levels of fine arts implementation. According to the analysis, a significant difference did not exist, $F(3, 100) = .544$, $p = .653$, among the variables compared which failed to reject the null hypothesis. Table 1 presented the results from this analysis.

Non-economically disadvantaged students' math results.

The final test conducted was a one-way analysis of variance (ANOVA) to examine whether or not a significant difference existed between the math achievement of non-economically disadvantaged students across the 2007, 2008, 2009, and 2010 levels of fine arts implementation. There was not a significant difference between the levels of fine arts implementation and the math TAKS scores of non-economically disadvantaged students, $F(3, 100) = .269$, $p = .847$, thus failing to reject the null hypothesis (see Table 4).

CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to explore and test the hypothesis that participation in a fine arts program in a small, rural south Texas school district would demonstrate a statistically significant difference in the achievement of all third- through eighth-grade students as measured by the reading and math Texas Assessment of Knowledge and Skills test across the 2007, 2008, 2009, and 2010 levels of fine arts implementation.

The conclusions drawn from the study potentially have significant implications for positive social change in education. The results of the study demonstrate that the arts, a field of education often thought of as "nice, but not necessary" (Eisner, 2002, p. xi), can produce a statistically significant difference in the reading and math achievement of a population of students most educators struggle to support; the economically disadvantaged and the Hispanic minority.

Educational leaders and legislators must understand the consequences of both organizational practices and federal and state policies. The NCLB (2002) challenges educators to meet the needs of all students especially those most easily brushed aside and typically underserved; however, it does so in a way that forces good educators to make bad decisions in the name of accountability.

As demonstrated by the study, this is the state of fine arts in small, rural schools. The results of the study conclude that the deficiencies in the students or the communities they come from do not pose a challenge to meeting accountability requirements and mandates when opportunities for fine arts instruction remain in the student curriculum. With the high number of students living in small, rural communities in the state of Texas who are also considered minorities and economically disadvantaged, strategies to close the achievement gap between this population and their peers are widely sought after. The results from this study could equip decision makers at local and state levels with the data necessary to justify, defend, and advocate for fine arts programs across the state bringing equity and creative learning opportunities to all students regardless of the geographical location of their school, their ethnicity or their socioeconomic status.

REFERENCES

Arts Education in Maryland Schools Alliance. (2006). *Arts education research: Making connections between arts education and current research critical evidence*. Kennedy Center Alliance for Arts Education Network. Baltimore, MD: Retrieved from http://web.me.com/mjosephfischer/River_Hill_Music/MUSIC_BOOSTERS_files/Arts%20Education%20Research.pdf

Arts Education Partnership. (2004). *The arts and Education: New opportunities for research.* Washington, DC: Retrieved from http://www.aep-arts.org.

Arts Education Partnership. (2005a.). *Making the Case for the Arts*. Washington, DC: Retrieved from http://www.aep-arts.org.

Arts Education Partnership (2005b.). *No Subject Left Behind: A Guide to Arts Education Opportunities in the 2001 NCLB Act*. Washington, DC: Retrieved from http://www.aep-arts.org.

Center for Educator Development in Fine Arts. *Arts Curriculum Framework*. (2008). Retrieved From http://www.cedfa.org/teaching/curriculum/artframework.pdf.

Center for Educator Development in Fine Arts. *Senate Bill 815 Requires the Fine Arts TEKS* (2009). Retrieved from http://www.cedfa.org/news.php.

Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, NJ: Merrill/Pearson.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage.

Eisner, E. W. (2002). *The arts and the creation of the mind*. Harrisonburg, VA: R. R. Donnelley & Sons.

Johnson, J. & Strange, M. (2007, October). *Why rural matters 2007: The realities of rural education growth*. Arlington, VA: Rural School and Community Trust.

Kruez, T. (2005). *The status of teacher quality in rural high schools: A descriptive analysis.* (Doctoral dissertation). Retrieved from http://ritter.tea.state.tx.us/p16/council_mtg_attach/presentations/nov05_stat_teach_qual_%20ruralhs.pdf

McClure, C., Redfield, D. & Hammer, P. (2003). *Recruiting and retaining high-quality teachers in rural areas*. Charleston, WV: Appalachia Educational Laboratory.

National Education Association. (2009). *Recommendations for rural schools*. Retrieved from http://www.nea.org/home/17475.htm

No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, §115, stat. 1425 (2002).

Roasoft, Inc. Sample Size Calculator. Retrieved from www.raosoft.com/samplesize.html.

Ruppert, S. (2006). *Critical evidence: How the arts benefit student achievement*. National Assembly of State Arts Agencies.

Stevenson, L. & Deasy R. J. (2005). *Third space; when learning matters*. Washington D.C.: Arts Education Partnership.

Texas Center for Educational Research. (2008, December). *The Texas rural technology (R-TECH) pilot program: Interim evaluation report.* Retrieved from http://www.tcer.org.

Texas Education Agency. (2006a.), *Academic Excellence Indicator System (AEIS), 2005-06 District Performance of Driscoll ISD: 178-905*. Retrieved from http://www.tea.state.tx.us/cgi/sas/broker.

Texas Education Agency. (2006b.). Glossary of Terms, Division of Accountability Research. Retrieved from http://ritter.tea.state.us/acctres/gloss0506.html.

Texas Education Agency. (2006c., Updated November 30,). *About PEIMS – Public Education Information Management System.* Retrieved from http://ritter.tea.state.tx.us/peims/about.html.

APPENDIX

Table 1
Summary of One-Way ANOVAs for Reading

Variable	Sum of Squares	*df*	Mean Square	*F*	*p*
	Between subjects				
Reading	254211.832	3	84737.277	3.193	.023*
Hispanic	2393207.749	3	79735.916	3.244	.022*
White	73812.291	3	24604.097	.619	.605
Economically Disadvantaged	274968.055	3	91656.018	3.670	.012*
Noneconomically Disadvantaged	49056.307	3	16352.102	.544	.653

Note. * $p < 0.05$

Table 2
Tukey's Honestly Significant Difference (HSD) Test for Reading

Comparisons (I)		Comparisons (J)		Mean Difference (I - J)	Std. error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Level	1	Level	2	-38.25589	18.76788	.175	-86.6003	10.0885
			3	-55.83633*	18.47434	.014	-103.4246	-8.2480
			4	-39.24769	18.65707	.153	-87.3067	8.8113
Level	2	Level	1	38.25589	18.76788	.175	-10.0885	86.6003
			3	-17.58044	18.02700	.764	-64.0164	28.8555
			4	-.99180	18.21421	1.000	-47.9100	45.9264
Level	3	Level	1	55.83633*	18.47434	.014	8.2480	103.4246
			2	17.58044	18.02700	.764	-28.8555	64.0164
			4	16.58865	17.91161	.791	-29.5501	62.7274
Level	4	Level	1	39.24769	18.65707	.153	-8.8113	87.3067
			2	.99180	18.21421	1.000	-45.9264	47.9100
			3	-16.58865	17.91161	.791	-62.7274	29.5501

Note. *p < 0.05

Table 3
Scheffe's Post Hoc Test for Reading

Comparisons (I)		Comparisons (J)		Mean Difference (I - J)	Std. error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Level	1	Level	2	-38.25589	18.76788	.246	-90.8636	14.3518
			3	-55.83633*	18.47434	.028	-107.6212	-4.0515
			4	-39.24769	18.65707	.220	-91.5448	13.0494
Level	2	Level	1	38.25589	18.76788	.246	-14.3518	90.8636
			3	-17.58044	18.02700	.813	-68.1114	32.9505
			4	-.99180	18.21421	1.000	-52.0475	50.0639
Level	3	Level	1	55.83633*	18.47434	.028	4.0515	107.6212
			2	17.58044	18.02700	.813	-32.9505	68.1114
			4	16.58865	17.91161	.836	-33.6188	66.7961
Level	4	Level	1	39.24769	18.65707	.220	-13.0494	91.5448
			2	.99180	18.21421	1.000	-50.0639	52.0475
			3	-16.58865	17.91161	.836	-66.7961	33.6188

Note. *p < 0.05

Table 4
Summary of One-Way ANOVAs for Math

Variable	Sum of Squares	*df*	Mean Square	*F*	*p*
	Between subjects				
Math	255642.153	3	85214.051	2.613	.050
Hispanic	285215.315	3	95071.772	3.001	.030*
White	59023.568	3	19675.523	.510	.677
Economically Disadvantaged	262493.956	3	87497.985	2.926	.033*
Noneconomically Disadvantaged	34912.417	3	11637.472	.269	.847

*Note. * p < 0.05*

Table 5
Tukey's Honestly Significant Difference (HSD) Test for Ethnic Subgroup Hispanic Reading

Comparisons				Mean Difference			95% Confidence Interval	
(I)		(J)		(I - J)	Std. error	Sig.	Lower Bound	Upper Bound
Level	1	Level	2	-34.00806	19.46662	.300	-84.1705	16.1544
			3	-59.06104*	18.99990	.011	-108.0208	-10.1013
			4	-36.64752	19.11610	.222	-85.9068	12.6117
Level	2	Level	1	34.00806	19.46662	.300	-16.1544	84.1705
			3	-25.05298	18.53392	.530	-72.8120	22.7061
			4	-2.63946	18.65303	.999	-50.7054	45.4265
Level	3	Level	1	59.06104*	18.99990	.011	10.1013	108.0208
			2	25.05298	18.53392	.530	-22.7061	72.8120
			4	22.41352	18.16541	.606	-24.3959	69.2230
Level	4	Level	1	36.64752	19.11610	.222	-12.6117	85.9068
			2	2.63946	18.65303	.999	-45.4265	50.7054
			3	-22.41352	18.16541	.606	-69.2230	24.3959

*Note. *p < 0.05*

Table 6
Scheffe's Post Hoc Test for Ethnic Subgroup Hispanic Reading Achievement

Comparisons				Mean Difference			95% Confidence Interval	
(I)		(J)		(I - J)	Std. error	Sig.	Lower Bound	Upper Bound
Level	1	Level	2	-34.00806	19.46662	.385	-88.5944	20.5783
			3	-59.06104*	18.99990	.022	-112.3386	-5.7835
			4	-36.64752	19.11610	.300	-90.2510	16.9559
Level	2	Level	1	34.00806	19.46662	.385	-20.5783	88.5944
			3	-25.05298	18.53392	.609	-77.0239	26.9180
			4	-2.63946	18.65303	.999	-54.9444	49.6655
Level	3	Level	1	59.06104*	18.99990	.022	5.7835	112.3386
			2	25.05298	18.53392	.609	-26.9180	77.0239
			4	22.41352	18.16541	.677	-28.5241	73.3511
Level	4	Level	1	36.64752	19.11610	.300	-16.9559	90.2510
			2	2.63946	18.65303	.999	-49.6655	54.9444
			3	-22.41352	18.16541	.677	-73.3511	28.5241

*Note. *p < 0.05*

Table 7
Tukey's Honestly Significant Difference (HSD) Test for Ethnic Subgroup Hispanic Math Achievement

Comparisons				Mean Difference			95% Confidence Interval	
(I)		(J)		(I - J)	Std. error	Sig.	Lower Bound	Upper Bound
Level	1	Level	2	-42.59489	21.88558	.210	-98.9897	13.8000
			3	-56.43751*	21.49494	.044	-111.8257	-1.0493
			4	-56.67711*	21.56211	.044	-112.2384	-1.1158
Level	2	Level	1	42.59489	21.88558	.210	-13.8000	98.9897
			3	-13.84262	21.02737	.913	-68.0260	40.3408
			4	-14.08222	21.09603	.909	-68.4426	40.2781
Level	3	Level	1	56.43751*	21.49494	.044	1.0493	111.8257
			2	13.84262	21.02737	.913	-40.3408	68.0260
			4	-.23960	20.69048	1.000	-53.5549	53.0757
Level	4	Level	1	56.67711*	21.56211	.044	1.1158	112.2384
			2	14.08222	21.09603	.909	-40.2781	68.4426
			3	.23960	20.69048	1.000	-53.0757	53.5549

*Note. *p < 0.05*

Table 8
Scheffe's Post Hoc Test for Ethnic Subgroup Hispanic Math Achievement

Comparisons				Mean Difference			95% Confidence Interval	
(I)		(J)		(I - J)	Std. error	Sig.	Lower Bound	Upper Bound
Level	1	Level	2	-42.59489	21.88558	.286	-103.9632	18.7734
			3	-56.43751	21.49494	.077	-116.7104	3.8354
			4	-56.67711	21.56211	.076	-117.1384	3.7842
Level	2	Level	1	42.59489	21.88558	.286	-18.7734	103.9632
			3	-13.84262	21.02737	.933	-72.8045	45.1192
			4	-14.08222	21.09603	.931	-73.2366	45.0722
Level	3	Level	1	56.43751	21.49494	.077	-3.8354	116.7104
			2	13.84262	21.02737	.933	-45.1192	72.8045
			4	-.23960	20.69048	1.000	-58.2568	57.7776
Level	4	Level	1	56.67711	21.56211	.076	-3.7842	117.1384
			2	14.08222	21.09603	.931	-45.0722	73.2366
			3	.23960	20.69048	1.000	-57.7776	58.2568

*Note. *p < 0.05*

Table 9
Tukey's Honestly Significant Difference (HSD) Test for Socio Economic Subgroup Economically Disadvantaged Reading Achievement

Comparisons				Mean Difference			95% Confidence Interval	
(I)		(J)		(I - J)	Std. error	Sig.	Lower Bound	Upper Bound
Level	1	Level	2	-43.18868	19.96163	.135	-94.6353	8.2580
			3	-64.09085*	19.55080	.006	-114.4787	-13.7030
			4	-36.03099	19.74822	.263	-86.9276	14.8656
Level	2	Level	1	43.18868	19.96163	.135	-8.2580	94.6353
			3	-20.90217	19.18192	.696	-70.3393	28.5350
			4	7.15769	19.38309	.983	-42.7979	57.1133
Level	3	Level	1	64.09085*	19.55080	.006	13.7030	114.4787
			2	20.90217	19.18192	.696	-28.5350	70.3393
			4	28.05986	18.95973	.450	-20.8046	76.9244
Level	4	Level	1	36.03099	19.74822	.263	-14.8656	86.9276
			2	-7.15769	19.38309	.983	-57.1133	42.7979
			3	-28.05986	18.95973	.450	-76.9244	20.8046

*Note. *p < 0.05*

Table 10
Scheffe's Post Hoc Test for Socioeconomic Subgroup Economically Disadvantaged Reading Achievement

Comparisons (I)		(J)		Mean Difference (I - J)	Std. error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Level	1	Level	2	-43.18868	19.96163	.198	-99.1726	12.7952
			3	-64.09085*	19.55080	.014	-118.9225	-9.2592
			4	-36.03099	19.74822	.345	-91.4164	19.3544
Level	2	Level	1	43.18868	19.96163	.198	-12.7952	99.1726
			3	-20.90217	19.18192	.756	-74.6993	32.8950
			4	7.15769	19.38309	.987	-47.2037	61.5191
Level	3	Level	1	64.09085*	19.55080	.014	9.2592	118.9225
			2	20.90217	19.18192	.756	-32.8950	74.6993
			4	28.05986	18.95973	.534	-25.1142	81.2339
Level	4	Level	1	36.03099	19.74822	.345	-19.3544	91.4164
			2	-7.15769	19.38309	.987	-61.5191	47.2037
			3	-28.05986	18.95973	.534	-81.2339	25.1142

*Note. *p < 0.05*

Table 11
Tukey's Honestly Significant Difference (HSD) Test for Socio Economic Subgroup Economically Disadvantaged Math Achievement

Comparisons (I)		(J)		Mean Difference (I - J)	Std. error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Level	1	Level	2	-48.88525	21.67265	.110	-104.7407	6.9702
			3	-53.06885	21.33641	.063	-108.0577	1.9200
			4	-55.15531	21.51837	.052	-110.6131	.3025
Level	2	Level	1	48.88525	21.67265	.110	-6.9702	104.7407
			3	-4.18359	20.94432	.997	-58.1620	49.7948
			4	-6.27005	21.12966	.991	-60.7261	48.1860
Level	3	Level	1	53.06885	21.33641	.063	-1.9200	108.0577
			2	4.18359	20.94432	.997	-49.7948	58.1620
			4	-2.08646	20.78463	1.000	-55.6533	51.4803
Level	4	Level	1	55.15531	21.51837	.052	-.3025	110.6131
			2	6.27005	21.12966	.991	-48.1860	60.7261
			3	2.08646	20.78463	1.000	-51.4803	55.6533

*Note. *p < 0.05*

Table 12
Scheffe's Post Hoc Test for Socioeconomic Subgroup Economically Disadvantaged Math Achievement

Comparisons				Mean Difference			95% Confidence Interval	
(I)		(J)		(I - J)	Std. error	Sig.	Lower Bound	Upper Bound
Level	1	Level	2	-48.88525	21.67265	.167	-109.6667	11.8962
			3	-53.06885	21.33641	.104	-112.9073	6.7696
			4	-55.15531	21.51837	.088	-115.5041	5.1935
Level	2	Level	1	48.88525	21.67265	.167	-11.8962	109.6667
			3	-4.18359	20.94432	.998	-62.9225	54.5553
			4	-6.27005	21.12966	.993	-65.5287	52.9886
Level	3	Level	1	53.06885	21.33641	.104	-6.7696	112.9073
			2	4.18359	20.94432	.998	-54.5553	62.9225
			4	-2.08646	20.78463	1.000	-60.3775	56.2046
Level	4	Level	1	55.15531	21.51837	.088	-5.1935	115.5041
			2	6.27005	21.12966	.993	-52.9886	65.5287
			3	2.08646	20.78463	1.000	-56.2046	60.3775

*Note. *p < 0.05*