Effects of After-School Programs on Math and Literacy for Fourth and Sixth Grade Students

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EFFECTS OF AFTER-SCHOOL PROGRAMS ON MATH AND LITERACY FOR
FOURTH AND SIXTH GRADE STUDENTS

by

June Elliott

Dissertation

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EFFECTS OF AFTER-SCHOOL PROGRAMS ON MATH AND LITERACY

FOR FOURTH AND SIXTH GRADE STUDENTS

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Dissertation

[Signatures and dates]
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I thank my wonderful mother for giving me my strong work ethic. She would be so proud that I have accomplished this goal.
DEDICATION

This dissertation is dedicated to my family. They are my life on this earth.
Title: Effects of After-School Programs on Math and Literacy for Fourth and Sixth Grade Students (Under the direction of Dr. Donny Lee)

The general purpose of this quantitative study was to determine if participating in after-school programs affected students’ math and literacy achievement in four elementary schools and two middle schools located in a school district in central Arkansas. The study investigated this phenomenon as it related to gender at two different grade levels. The independent variables were participation in after-school programs (participated versus no participation) and gender (male versus female). The dependent variables were math and literacy achievement measured by the state’s Augmented Benchmark Examinations. A review of the literature identified the various aspects after-school programs including the need for such program, characteristics of effective after-school programs, and the implications of after-school program.

The researcher used a 2 x 2 factorial ANOVA to test for interaction effects as well as the main effects of each hypothesis. To test the hypotheses, the researcher used a Bonferroni adjusted alpha level of .01. No significant interaction effects were noted between the variables of participation and gender. In addition, no significant main effects were noted for participation on the math and literacy scores for the two grade levels.
Although three of the gender main effects showed no significance, one main effect for gender was significant. Results indicated that only significant main effect for gender for 2009 Arkansas augmented Benchmark Examination Literacy Scale Scores for the sixth grade. The effect size for this significant result was large with females outscoring the males in the study.

Findings of the study were contrary to current research indicating quality after-school programs have a significant impact on students’ academic performance. However, these finding do confirm assertions that a more direct focus should be placed on the educational benefits of after-school programs is the goal is student achievement. Merely extending the school day with the same type of instruction and activities will not provide the opportunities to enhance learning.
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CHAPTER 1
INTRODUCTION

In the current climate of increased accountability under the mandates of the No Child Left Behind Act (2001), all students must reach proficiency in literacy and math by the 2013-2014 school year (Miller, Snow, & Lauer, 2004). Even with this increased focus, a study by Kirsch, Braun, Yamamoto, and Sum (2007) indicates that a wide disparity exists in literacy and math skills between fifteen-year-old students in the United States and that of other countries. The research reports that the United States ranks 25th out of 30 in math and 15th out of 29 in literacy among nations belonging to the Organization for Economic Co-operation and Development.

Research suggests that schools across the nation are searching for ways to increase student achievement in literacy and math to meet the 2013-2014 mandates. After-school programs are one approach that school administrators are utilizing to enhance student achievement. The research indicates that academic after-school programs reinforce the curriculum and provide additional opportunities for students to engage in the learning in order to increase achievement (Afterschool Alliance, 2002).

Statement of the Problem

This study examined the effects of after-school programs on math and literacy achievement for fourth and sixth grade students in four elementary and two middle schools in a school district located in central Arkansas. The statement of the problem for
this study is four-fold. First, the purpose of this study was to determine the effects by gender of participating in after-school programs versus no participation on the math achievement for fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations. Second, the purpose of this study was to determine the effects by gender of participating in after-school programs versus no participation on the literacy achievement for fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations. Third, the purpose of this study was to determine the effects by gender of participating in after-school programs versus no participation on the math achievement for sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations. Fourth, the purpose of this study was to determine the effects by gender of participating in after-school programs versus no participation on the literacy achievement for sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations.

Background

After-school programs are defined as activities taking place right after school or programs that provide care and academic enhancement immediately after school (Afterschool Alliance, 2007). According to a recent study on the effectiveness of out-of-school time, 6 million of the 54 million students grades K–8 in the United States
participate in after-school programs that are school-based or community-sponsored. The report indicates that the number of schools offering after-school programs has doubled since 1994 (Lauer, Wilkerson, Apthor, Snow, & Martin-Glenn, 2004).

After-school programs, which seem to mirror the concerns society has for students, have been evolving into their current design since the 1800s. During World War II, the U. S. government began funding after-school programs to help working women with childcare. In the 1950s, students were assigned to summer school programs because of discipline problems. These programs were also proven to help with academic achievement through remediation. In the 1970s and 1980s, programs took on the emphasis of after school care for latchkey children. Currently, the focus and design of after-school programs lean toward the need for academic accountability (Black, Somers, Doolittle, & Unterman, 2009).

**Need for After-School Programs**

According to Lauer et al. (2004), “Societal concerns have contributed to the recent growth in after-school programs: the lack of caregivers in the home after school, the belief that disadvantaged children can improve their learning given more time and opportunities, and the high incidence of teen crime after school” (p. 8). At one time, after-school programs were designed with a focus on recreation and arts and crafts. With the mounting pressure of meeting the demands of No Child Left Behind, schools across the nation are implementing after-school programs to help improve tests scores. The current focus is on increasing student achievement in reading and math with tutoring, academic enhancement, and homework help (Lauer, 2003). As the No Child Left Behind legislation dictates, schools must focus their time and resources on teaching the four core
subjects. Schools are increasingly finding that less time and fewer resources are available to provide for adequate exercise, arts, and interest-based activities. After-school can provide these activities and enhance academic achievement through interest-based, hands-on activities (Cain, 2004).

Vandell, Reisner, Brown, Dadisman, Pierce and Lee (2005) assert that regular participation of elementary and middle school students in high quality after-school programs is linked to significant gains in standardized test scores and improved work habits. This study also reveals that elementary students who attended high quality programs for two years made gains of up to 20 percentage points on standardized math test scores. According to their teachers, these students had positive improvements in their work habits. Middle school students who attended high quality programs for two years had similar gains with 12 percentile in standardized math scores and likewise had positive improvements in their work habits.

Additionally, research findings suggest that better attitudes toward school, better performance in school, improved school attendance, and better behavior are linked to participation in after-school programs. (Harvard Family Research Project, 2003). Similarly, Durlak, and Weissberg (2007) report that students who participate in after-school programs improve in three major areas: behavior, attitudes, and school performance.

In many areas of the United States, after-school programs may be the only avenue that students have for breaking out of poverty. In an article from the After School Alliance Organization (ASAO, 2007) entitled, After-School Programs: Helping Kids Succeed in Rural America, the following is noted:
Investing in after-school programs helps children of rural communities break out of the cycle of poverty and creates opportunities for at-risk youth. In areas where prospects and resources are limited, after-school programs are often the only source of supplemental enrichment in literacy, nutrition education, technology, and preparation for college entrance exams. After-school programs offer an effective and affordable way of overcoming obstacles confronting rural communities and helping children realize their full potential. (p. 1)

Many principals think their after-school programs are extremely important because the greatest outcome of these programs has been improving academic achievement and providing a safe place for students (Million, 2001). Another study denotes that numerous principals across America have accepted the responsibility of after-school programs because they realize there is a need (Ferrandino, 2007).

**Characteristics of Effective After-School Programs**

Robert C. Granger, President of the William T. Grant Foundation, one of the nation's most prestigious evaluators of after-school programs, reports that after-school programs centering on high interest and supportive relationships should be held daily (Mott Foundation, 2005). He goes on to stress that there is no one formula for success. Researchers at the Grant Foundation have found that effective programs combine academic, enrichment, cultural, and recreational activities to promote learning and interest. The following is a list that may be utilized to increase the potential of having a successful program (Granger, Durlak, Yohalem, & Reisner, 2007):

- Effective partnerships to promote learning and community engagement
- Strong program management including adequate compensation of qualified staff
• Qualified after-school staff and volunteers with regular opportunities for professional development and career advancement

• Enriching learning opportunities that complement school-day learning, utilize project-based learning, and explore new skills and knowledge

• Intentional linkages between school-day and after-school staff including coordinating and maximizing use of resources and facilities

• Appropriate attention to safety, health, and nutrition issues

• Strong family involvement in participants’ learning and development

• Adequate and sustainable funding

• Evaluation for continuous improvement and assessing program effectiveness

Similarly, Farbman, and Kaplan (2005) found that effective programs have similar characteristics. First, effective programs include strong partnerships with neighborhoods, schools, and community organizations. Second, programs having recreational, artistic, and enrichment activities create positive interpersonal relationships with students. Third, these age-appropriate programs engage students in enrichment activities. Fourth, teachers are provided focused professional development. Finally, these programs have low student-to-teacher ratios with strong collaboration between regular day school faculty, after-school faculty, and parents. The New Hampshire State After-school Task Force corroborated these findings in a report (Frankel, Streitburger, & Goldman, 2005). This study found that after-school programs improve student learning, students who attend regularly perform better; and highly qualified teachers make a difference.
Implications of After-School Programs

“Children don’t stop learning when the last bell rings. That’s why ongoing quality after-school programs are so important, and why school leaders need to consider how in-school and after-school learning are connected” (Ferrandino, 2003, p. 62). A survey of principals indicated that current after-school programs are developed to enhance academic success (Million, 2001). The results of the survey indicated that 96% of these programs offer homework help, 85% provide literacy and reading enrichment, and 85% provide math enrichment. Survey results showed that 69% offer science, 63% offer the arts, and 62% offer some type of technology. Principals also indicated that programs available after-school should be linked to the regular school day.

Research indicates that students who participate in after-school programs benefit in a number of areas: academic, social/emotional, and health and wellness. “After-school programs are impacting academic performance in a number of ways, including moving the needle on academic achievement test scores. Some after-school programs have demonstrated the capacity to do just that” (Harvard Family Research Project, 2008, p. 2). This research also denoted positive academic outcomes that include better attitudes toward school, higher school attendance rates, less tardiness, fewer disciplinary actions, lower dropout rates, better performance on achievement test scores and grades, greater on-time promotion, improved homework completion, and improved engagement in learning.

Researchers reported that after-school programs are very effective for low-income students (Harvard Family Research Project, 2003). Key findings indicated that after-
school program strategies could have positive effects on the achievement of low-achieving or at-risk students in reading and mathematics.

Hypotheses

A review of the literature suggests that quality after-school programs have strong positive effects on the academic performance of students. Due to the mandates of No Child Left Behind Act of 2001 on student achievement, the impact of after-school programs on academic achievement at a school district located in central Arkansas in grades four and six must be explored. In response, the researcher generated the following hypotheses:

1. No significant differences will exist by gender between fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate.

2. No significant differences will exist by gender between fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy achievement compared to those who do not participate.

3. No significant differences will exist by gender between sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate.
Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate.

4. No significant differences will exist by gender between sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy achievement compared to those who do not participate.

Description of Terms

Adequate Yearly Progress (AYP). AYP is the measure that is utilized to hold schools, districts, and states accountable for achievement under Title I and No Child Left Behind Act of 2001 (Education Week, 2004).

After-school programs. After-school programs are activities taking place after the school day ends or programs that provide care and academic enhancement immediately after school (Afterschool Alliance, 2007).

Arkansas Augmented Benchmark Examinations. The Arkansas Department of Education (2009b) characterizes the Arkansas Augmented Benchmark Examinations as a criterion-referenced test instrument customized around the Arkansas Curriculum Frameworks that focuses on establishing student performance levels in grades three through eight and contains items specifically designed to align with Arkansas state education standards.

Performance levels. Performance levels are the four levels of student achievement in both math and literacy on the Arkansas criterion-reference exams.
Arkansas Augmented Benchmark Examinations). The four levels are advanced, proficient, basic, and below basic (Arkansas Department of Education, 2008a).

**Scale scores.** Scale scores are converted raw scores on a test or different versions of a test in order to have a common scale that will allow for numerical comparison (Pearson, n.d.).

**Significance**

In 2006, Governor Mike Huckabee held a summit on after-school programs to roll out a three-year campaign to improve both after-school and summer programs. The Arkansas Governor’s Task Force (2008) on after-school and summer programs reported that the goals of improving student achievement, closing the achievement gaps for low-income and minority children, and developing an educated workforce that meets the demands of our global economy are intensifying the need for after-school and summer programs. The report stated, “Participation in after-school and summer program activities is predictive of academic success as measured through test scores, absenteeism, school dropout rates, homework completion, school grades and course enrollment” (p. 4).

According to a report by Arkansas Advocates for Children and Families (Kelly, 2006), after-school programs in Arkansas differ from school to school and from site to site. They are located at public school sites, churches, and community centers. However, Kelly noted that comprehensive surveys or studies have not been conducted to determine the number of students enrolled in after-school programs, the number of programs in existence, or the quality of the programs. A study by the Mott Foundation (2005) noted that regular participation in high quality after-school programs is linked to significant gains in standardized test scores and positive improvements in work habits. Protheroe
(2006) reported, “After-school programs have long been an option for principals seeking to give students some extra help” (p. 34). An Afterschool Alliance (2009) survey of Arkansas households indicated a four percent increase in participation in after-school programs over the past five years. The impact of such programs on academic achievement must be explored.

Over 150 students in a school district located in central Arkansas in grades four and six participated in the after-school programs in the 2008-2009 school year. This large number of students, which represents approximately 20% of the students in these grades, justifies a need for a study to reveal whether the after-school programs make a significant difference in student achievement in math and literacy. The findings from this study will provide useful information for educational policymakers to consider regarding the relative impact of after-school programs.

**Process to Accomplish**

**Design**

According to Johnson and Christensen (2008), “Non-experimental research is a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestation has already occurred or because they are inherently not manipulable” (p. 357). This quantitative research study employed a causal-comparative, non-experimental design utilizing fourth and sixth grade students in four elementary and two middle schools in a school district located in central Arkansas who participated in the after-school programs in the 2008-2009 school-year compared to those who did not participate.
The study utilized four 2 x 2 factorial designs. The independent variables for statements 1 through 4 included participation in the after-school program (participating v. not participating) and gender (male v. female). The dependent variable for statements 1 and 3 was math achievement, and the dependent variable for statements 2 and 4 was literacy achievement. Statements 1 and 2 included fourth grade students, and statements 3 and 4 included sixth graders.

Sample

The after-school programs were located in a school system in central Arkansas. The researcher used four elementary schools that were school-wide, Title I schools with at least 40% free and reduced lunch status. The elementary schools had students from kindergarten through fourth grade and were feeder schools for the two fifth and sixth grade middle schools. In addition, the researcher utilized the two middle schools, which both had a free and reduced lunch status in the upper 30%. The middle schools were not identified as Title I schools. All students who attended these after-school programs were identified as in need of improvement in either or both literacy and math.

Two criteria determined student selection into these existing programs. First, students who scored below proficient in at least one area, math or literacy, on the 2007-2008 Arkansas Benchmark Examinations were placed into these programs. Second, students who were identified by their classroom teachers as being below grade level in math or literacy were also placed into these programs. Their teachers identified this latter group of students after data from the first interim assessment were collected and analyzed.
Students who met the first criteria were identified for the after-school program in September 2008. They began attending the program in October 2008. After the results of the first interim assessment were analyzed, students who met the second criteria were identified. They began the program in November 2008. After the initial identification timeframe, students who met the second criteria could be added to the after-school program at anytime. After being identified, students attended these programs until data gathered by both their classroom and after-school teachers determined that proficiency was reached. Arkansas Augmented Benchmark Examinations were administered in early April 2009. Therefore, timelines include the following: Arkansas Augmented Benchmark Examinations administered in the spring of 2008, students identified for after-school program in fall of 2008, after-school programs in session from October 2008 until April 2009, and Arkansas Augmented Benchmark Examinations administered in April 2009.

**Instrumentation**

The literacy and math performance levels, determined by the 2008 Arkansas Augmented Benchmark Examinations, were utilized to identify students with similar academic abilities between students who participated in the after-school programs and students who did not participate. The literacy and mathematics performance level scale scores, as determined by the 2009 Arkansas Augmented Benchmark Examinations, of these students were utilized to determine the impact of after-school programs on student achievement.

The Arkansas Augmented Benchmark Examinations are criterion-referenced test administered to students in grades three through eight in literacy and mathematics. The
benchmark assessments are implemented as part of the Arkansas Comprehensive Testing, Assessment, and Accountability Program. According to the Arkansas Department of Education (2008a), the Arkansas Augmented Benchmark Examinations have been examined and found to be both reliable and valid. The Arkansas Department of Education reports that the Arkansas Augmented Benchmark Examinations have “technically sound levels of reliability, validity, and fairness, based on the extensive research that underlies both the CRT and NRT item sets” (Arkansas Department of Education, p. 6). The Arkansas Augmented Benchmark Examinations are developed around a common design from year to year. Although the test forms are built around a common design, post equating is utilized to control varying levels of difficulty from one version of the test to the next. These equating methods are empirical procedures for establishing uniformity between raw scores on different test forms (Arkansas Department of Education, 2009c).

Linking items are utilized to link one test version to another test version of the Arkansas Augmented Benchmark Examination. Evaluators utilize these linking items to place test items on the same scale as the previous year with a common-item, non-equivalent groups linking strategy. From this linking strategy, parameters are established to ensure consistency between different forms of the test. Accuracy rates were .89 or above for all grades in both literacy and mathematics (Arkansas Department of Education, 2009c).

A Stratified Alpha method is utilized to determine reliability. Each item is estimated separately for reliability and then combined with other test items to obtain a more precise estimate of the reliability. This method allows for item types to be weighted correctly (Arkansas Department of Education, 2009c).
The outcomes of these assessments are utilized to determine adequate yearly progress as mandated by No Child Left Behind. Students in grades three through eight are given approximately two and a half hours daily to complete the four-day test. The test items in both literacy and math include multiple choice and open response questions. The four levels of student achievement on these criterion-referenced exams include advanced, proficient, basic, and below basic. The Arkansas Department of Education (2009a) defines the student levels of achievement as follows:

- **Advanced**: Students demonstrate superior performance well beyond proficient grade-level performance. They can apply established reading, writing, and mathematics skills to solve complex problems and complete demanding tasks on their own. They can make insightful connections between abstract and concrete ideas and provide well-supported explanations and arguments.

- **Proficient**: Students demonstrate solid academic performance for the grade tested and are well prepared for the next level of schooling. They can use established reading, writing, and mathematics skills and knowledge to solve problems and complete tasks on their own. Students can tie ideas together and explain the ways their ideas are connected.

- **Basic**: Students show substantial skills in reading, writing, and mathematics; however, they only partially, demonstrate the abilities to apply these skills.

- **Below Basic**: Students fail to show sufficient mastering of skills in reading, writing, and mathematics to attain the basic level. (para. 15)

Each performance category has a range of specific scale scores by grade level in both mathematics and literacy that corresponds to a particular performance level. These
scale scores may be utilized to demonstrate academic growth when comparing scale scores from one year to the next (Arkansas Department of Education, 2008b).

**Data Analysis**

To address the four hypotheses, the following statistical analyses were utilized. Hypothesis 1 was analyzed by a 2 x 2 factorial analysis of variance (ANOVA) with participation in the after-school programs (participating versus not participating) and gender (male versus female) as the between subjects independent variables with the math achievement as the dependent variable. Hypothesis 2 was analyzed in the same manner as the first with the independent variables being the same. The dependent variable was literacy achievement. Hypothesis 3 utilized a 2 x 2 factorial ANOVA with participation in the after-school programs (participating versus not participating) and gender (male versus female) as the between subjects independent variables with math achievement as the dependent variable. Finally, hypothesis 4 was analyzed in the same manner as the third with the independent variables being the same. The dependent variable in this hypothesis was literacy achievement. Hypotheses 1 and 2 included fourth grade students, and hypotheses 3 and 4 included sixth graders. To test the null hypotheses, the researcher a two-tailed test with a .01 level of significance.
CHAPTER II

REVIEW OF THE RELATED LITERATURE

Quality after-school programs have a significant impact on a student’s academic performance (National Institute, 2004). Increased accountability with the mandates of the No Child Left Behind Act (NCLB) has placed schools across the nation under pressure to increase academic achievement. Therefore, additional learning opportunities such as after-school programs have become more important as the 2014 deadline of NCLB approaches (Gayl, 2004). The Organization for Economic Co-Operation and Development (2005) reported that students in the United States are receiving less instructional time during the school day than their counterparts are in other countries. This report stated that students in France spend almost 25 hours in class instruction and another 7 hours of homework each week. Australia is similar with almost 24 hours a week in class instruction and another 6 hours of homework. Likewise, Japanese students spend approximately 24 hours in class instruction with 4 hours of homework per week. By comparison, students in the United States spend approximately 22 hours per week on classroom instruction and less than 6 hours per week on homework. Accordingly, educators across the nation agree that the traditional school day and school year do not allow sufficient time to generate the academic achievement necessary to meet the current mandates of NCLB. Because of the approaching deadline and the need for continuous improvement, educators believe that the school day and the school year must be
expanding. After-school programs are one of the main approaches to expand the time for learning (Little, 2009). Furthermore, most districts and schools’ improvement plans mention after-school or tutoring programs as a means to improve student achievement. However, the quality and extent of implementation of these programs are in question (Stonehill et al., 2009).

The United States Conference of Mayors report on After-School Programs (2003) shows the multiplicity of after-school programming in America. A survey of 94 cities was conducted to determine the types of after-school programs that were being offered. Over half the programs (57%) offered some type of academic focus, while 53% offered arts and craft activities. Only 48% provided homework assistance, while music and games were provided in 46% of the programs surveyed. This particular survey did not poll to determine the effectiveness of programs.

Shumow (2001) reviewed a body of research spanning from 1999 to 2001 on the academic affects of after-school programs. The researcher concluded from this review that students who need after-school programs the most are the least likely to have access to the programs. Furthermore, a more direct focus should be placed on the educational benefits of after-school programs if the goal is student achievement. Research finding also indicated that merely expending the school day with same type of instruction and activities would not provide the opportunities needed to enhance learning.

Similarly, Miller (2003) stated that the goal of after-school programs is apparent: increased student achievement. She reported that several after-school programs are an extension of the regular school day, which does not meet best practice when trying to increase the achievement of disadvantaged students.
Additionally, Vadeboncoeur (2006) suggests that the increased attention to after-school programs and the funding required to implement these programs is encouraged by the concerns to improve student achievement, a commitment to student safety, and an increased interest in enrichment programs.

Over 30,000 schools in 3,000 districts in the United States did not meet adequate yearly progress in 2009 (Stonehill et al., 2009). Simultaneously, 6 million of the 54 million students in grades K-8 in the United States attend after-school programs (Laue et al., 2004). The National Association of Elementary School Principals (2001) reported that 67% of elementary school principals surveyed had after-school programs as an option to increase student achievement. The survey also revealed that 96% of the principals indicated that the after-school programs were designed to support academics including homework help, literacy and reading enrichment, and math enrichment.

The Arkansas Governor’s Task Force (2008) final report on best practices for after-school programs identified key elements for improving quality in after-school programs including safe and appropriate program environments and facilities; ongoing staff training and development; program monitoring and evaluation; positive youth development; parent involvement; community collaboration; attendance and participation; and a sustainability plan. The Task Force contended, “Growing interest in after-school and summer programs is fueled by concerns for improving educational outcomes and closing the educational achievement gaps between low-income and minority children and their peers” (p. 6).

This increased emphasis on after-school programs indicates a need to research the characteristics of effective after-school programs, implications of after-school programs,
and evaluation methods to determine after-school program effectiveness. The focus of this study was on the effects of after-school programs for elementary and middle school students on reading and math.

**Characteristics of Effective After-School Programs**

There is no one formula for successful after-school programs. Programs across the nation differ from programming to the amount of time they meet (Mott Foundation, 2005). Miller, Snow, and Lauer (2004) contended that programs should offer an additional 45 hours of learning time in order to improve academic achievement. Some successful programs have weekly schedules that include homework help, project-based activities, arts and crafts, performing arts, and recreation. Other programs offer specialized academic support such as individual tutoring or small-group instruction (Harvard Family Research Project, 2008). Redd et al. (2002) conducted both experimental evaluations and quasi-experimental studies on 12 programs around the nation including Boys and Girls Club of America Educational Enhancement Program, Children at Risk, Howard Street Tutoring Program, Quantum Opportunities Program, summer Training and Education Program, Upward Bound, Foundations, LA’s BEST, Sponsor-A-Scholar, Texas Parks and Recreation After-School Programs, Fifth Dimension and University Student Athletes Tutoring Program. Over 3 million elementary and secondary students who were considered at risk of failing a grade or dropping out of school were included in this study. The findings of this study suggested that academic achievement was one of several elements but not the focus of the programs. When academics are a component of after-school programs, the academic activities vary from program to program. Additionally, Birmingham, Pechman, Russell, and Mielke (2005)
examined high-performing after-school projects funded by The After-school Corporation (TASC) to determine successful shared program characteristics. The study identified high-performing TASC projects in New York City based on the changes in student achievement on New York’s statewide achievement tests in math and literacy. The sample study of 76 schools was narrowed to the top 10 performing schools in the project. All of the selected projects served students in elementary grades, and three of the projects served middle school students. Evaluators found that all programs shared similar characteristics. They provided multiple enrichment opportunities; academic enrichment in literacy and math; fostered positive relationships with staff; and employed highly trained staff. Therefore, effective programs must combine academic, enrichment, cultural, and recreational activities to promote learning and interest.

Effective programs have similar characteristics including partnerships with schools, community organizations, and neighborhoods. Farbman and Kaplan (2005) conducted a study of approximately 3,000 students in kindergarten through twelfth grade in seven schools in Massachusetts and one school in New York who had successful after-school programs. The free and reduced lunch status of these schools ranged from 68% to 98%. The study indicated that effective programs have similar characteristics including partnerships with neighborhoods, schools, and community organizations (Farbman & Kaplan, 2005). Similar results were found by the Southwest Educational Development Laboratory (2002) when compiling a synthesis of research published from 1995 to 2002 on 51 studies of after-school programs. The researchers concluded that when schools, families, and community groups work together to support learning, children usually do better in school. Likewise, the Mott Foundation (2005) developed a framework on ways
to improve and measure the quality and effectiveness of after-school programs. Researchers, evaluators, program and policy experts, and educators from across the United States developed this framework. It characterized improved community awareness and engagement as an element of effective after-school programs. In the same vein, Harvard Family Research Project (2008) stated that strong community partners are becoming what they term as nonnegotiable elements in quality after-school programs. Additionally, Arkansas Governor’s Task Force on After-School Programs (2008) after a three-year long study concluded that meaningful after-school enrichment programs must have strong community engagement and collaboration in order to leverage resources, evaluate, and monitor programs. Furthermore, the National Staff Development Council’s (2001) standards reflect that education is a partnership between home, school, and community.

A second characteristic of an effective after-school program is age-appropriate recreational, artistic, and enrichment activities. The Time, Learning, and Afterschool Task Force (2007) studied 13 different after-school programs around the nation. These programs ranged from nationally known programs located in 50 different schools throughout the country to locally designed after-school programs in specific school districts. The task force concluded that not only does content matter, it must be engaging, enriching, and should include relevant activities that are project-based in nature. Another research study suggested that “balancing academic support with engaging, fun, and structured extracurricular or co curricular activities, which promote youth development in a variety of real-world contexts, appear to support and improve academic performance” (Harvard Family Research Project, 2008, p. 1). This study was a compilation of findings
from five national programs, state programs, and individual school studies on after-school programs. The study included a two-year longitudinal review of the effects of participation in quality after-school programs among 3,000 elementary and middle school students located in eight states. The study involved a Massachusetts after-school study including 4000 students in 78 schools in the state; a pilot project located in Boston, Massachusetts; an evaluation of Citizen Schools; and an evaluation of 1,000 elementary school students who attended programs in Boston and New York.

Accordingly, Little (2009) seemed to concur. Little found that children are more successful in after-school programs when learning opportunities are presented in ways that do not replicate the regular school day. These approaches generally include hands-on activities with project-based learning as the focus. She also found that studies over the last decade pointed to common characteristics demonstrating academic impact of after-school programs. Little stated,

Extra time for academics by itself may be necessary but not sufficient to improve academic outcomes. However, balancing academic support with a variety of engaging, fun, and structured extracurricular or co curricular activities that promote youth development in a variety of real-world contexts appears to support and improve academic performance. (p. 10)

Furthermore, Farbman and Kaplan (2005) reported that attending after-school enrichment programs on a continuous basis could decrease the achievement gap especially among students from low socioeconomic backgrounds. Likewise, Rothstein (2004) writes that middle-class children gain an advantage over children from low economic backgrounds because of the experiences they gain from after-school and
summer programs that offer organized athletics, dance, drama, museum visits, recreational reading and other activities that develop creativity, self-discipline and organizational skills.

Birmingham et al. (2005) seemed to concur. These evaluators examined the top 10 performing TASC projects in New York and determined that enrichment activities such as dance, music, art and organized sports were found in each high performing program. They suggested, “Enrichment activities introduce participants to experiences that could spark interests and expand their goals for their own schooling, careers, and hobbies” (p. 5). Therefore, after-school programs especially for low socioeconomic students should include age-appropriate recreational, artistic, and enrichment activities.

The third characteristic of effective after-school programs is well-trained teachers. Researchers Farbman and Kaplan (2005) concluded that teachers in quality programs are provided focused professional development. This study included approximately 3,000 students in kindergarten through twelfth grade in seven schools in Massachusetts and one school in New York who had successful after-school programs. Teachers in these after-school programs were provided focused professional development relating to current research-based best practices on how to teach students in after-school programs. Additionally, after a two-year, in depth evaluation of 22 after-school programs in Boston, Miller and Midzik (2006) concluded that engaging after-school teachers in ongoing, onsite professional development is one of the most effective ways of ensuring high quality after-school programs. Similarly, Frankel, Streitburger, and Goldman (2005) found that highly qualified teachers make a difference in after-school programs. This study included data from after-school programs in 16 elementary and 13 middle schools.
in New Hampshire. The elementary programs served 2,886 students, ages 4 through 11, which is approximately 44% of the population in the 16 elementary school. The middle school programs served 1,256 students ages 12 through 15, which is approximately 25% of the population in the 13 middle schools. These highly effective programs employed staff that had at least a bachelor’s degree; most of the programs had staff with graduate degrees. Likewise, the Arkansas Governor’s Task Force (2008) on After-School Programs identified ongoing staff training and development as a key element in improving after-school programs. The best indicator of success is the relationship between staff and the student. Therefore, after-school staff professional development opportunities must include skills on child development, diverse cultural issues, and recreational and educational enrichment to promote quality after-school programs. In the same vein, after conducting an in-depth study of TASC programs in New York, Birmingham, et al. (2005) found that there was a connection between how students in after-school programs reacted to staff and student achievement. The evaluators found that positive relationships and greater student achievement were found in after-school programs where staff modeled positive behavior; held students to high expectations; listened to students; provided feedback and guidance; and, provided clear expectation. Additionally, Little (2009) suggested that the most critical component of high-quality programs is the staff quality. She indicated that students will benefit from positive relationships with staff and staff must be high trained in order to provide the type of quality interactions necessary for students to succeed. In the same vein, Bouffard (2004) purported that because staffing is key to after-school success, appropriate professional development must be conducted to enhance skills for all after-school personnel. She
reports that evaluation of professional development is vital because it distinguishes the difference between successful programs elements and unsuccessful elements. Bouffard provided four levels of evaluations to determine if professional development is worthwhile: “feedback from providers about satisfaction; providers’ knowledge of youth development and best program practice; the practices employed by program providers; and, positive development outcomes for youth and other stakeholders” (p. 2). All levels of evaluation should be employed in order to gain valuable feedback for improvement. Moreover, Granger, President of William T. Grant Foundation, touted a well-qualified, diverse staff as the key to successful after-school programs. He espoused, “Program quality is driven by what line and supervisory staff do” (Harvard Family Research Project, 2004, p. 18).

Finally, effective after-school programs have classes with low student-to-teacher ratios, and strong collaboration occurs between the regular day school faculty and the after-school faculty (Farbman & Kaplan, 2005). Little (2009) reported that sustained participation in quality after-school programs that are connected to regular school faculty and staff has the greatest gains for students. Similarly, the Mott Foundation’s (2005) framework guide for successful after-school programs indicated that intentional linkage between school day and after-school staff including coordinating and maximizing use of resources and facilities is a strong characteristic of effective after-school programs. Results from a national telephone survey of 800 principals concurred with the Mott Foundation research (Million, 2001). The outcome from the survey showed that current after-school programs are developed to enhance academic success and must be linked to the regular school day. The Massachusetts Afterschool Research Study determined that
after-school programs that connected to the regular school day teachers and administrators were more successful at affecting student achievement. This study focused on 78 after-school programs in 10 school districts in Massachusetts. The data collection methods utilized in this study included interviews, surveys and observations of students and staff. This research stated, “Positive relationships with schools can foster high-quality, engaging, and challenging activities, and also promote staff engagement” (Intercultural Center for Research in Education and National Institute on Out-of-School Time, 2005, p. 3).

Birmingham et al. (2005) found in their study of the top 10 TASC schools in New York that after-school program staff had a strong partnership with regular school staff. The most successful strategies include the following:

- Hiring a teacher from the day school to communicate with the after-school personnel to keep them abreast of the day school activities,
- Utilizing the same literacy and math materials as the day school,
- Observing in classrooms and collaborating with regular teachers,
- Pooling resources to hire arts and recreation specialist to work in both school day and after-school, and
- Sharing the school’s parent liaison to facilitate connections between the school and families. (p. 12)

Finally, the Mott Foundation formed a task force of leaders in education and after-school to create a new vision for after-school programs. This Time, Learning, and After-School Taskforce (2007) formulated the following list of characteristic that proven after-school programs exhibit:
• Academic instruction is designed to meet the needs, abilities and learning styles and provide them with a better chance to succeed;

• Engaging, relevant activities are often project-based, community-based or both, and designed to increase student motivation to learn;

• Linkages are made to the school day, but content is delivered in different ways by applying school day lessons to real world settings;

• Student choice is built into program design;

• Partnerships among schools and community-based organizations are essential because they bring new and diverse learning opportunities;

• Students have opportunities to work both independently and in groups, and to play leadership roles; and

• Communication between families and school-day staff is ongoing. (p.2)

Miller (2003) cautioned that positive student achievement outcomes depend on consistent participation in high quality after-school programs. She ascertained that such programs could increase skills necessary for student success. However, she found that many of the programs available were extensions of the regular school day, which is not conducive in showing achievement gains for low socioeconomic students.

Implications of After-School Programs

Chang-Rios (2007) suggests that a connection exists between participation in after-school programs and academic achievement. Quality after-school programs have a direct and positive influence on reading and math achievement of low performing students when students participate regularly. Similarly, Redd et al. (2002) contended that programs with a strong academic focus are more effective at improving academic
outcomes. This study of over 3 million students attending after-school programs found that students in academic after-school programs repeated grades less than students who did not attend academic after-school programs. In the same vein, Bartko and Eccles (2003) found that students in after-school programs focusing on homework help and reading perform higher than their peers who do not attend. These findings were from a longitudinal study of 1,004 students, ages 16 and 17, attending after-school programs in Washington D.C.

Granger (2008) seemed to concur. He reviewed several different studies on the effects of after-school programs. He concluded that after-school programs could have a positive impact on student achievement. One of the studies he reviewed was the meta-analysis by Lauer et al. (2006) who found significant effects on reading and math across 35 studies of after-school programs. A second study reviewed was by Zief and Lauver (2006) who found no effects on average for social, behavioral, or academic outcomes across five studies in met-analysis. The programs studied combined recreation and youth development with some academic services; however, mentoring and tutoring were excluded from this study. The third study reviewed was by Durlak and Weissber (2007) which showed a small, significant effect on social, behavioral, and academic outcomes across 73 studies in meta-analysis. This study excluded programs that focused on academics, including tutoring programs. After-school programs can influence learning and academic achievement. Students who participate in quality after-school programs have better behavior; are less likely to drop out of school; and have better grades and test scores (Little, 2009; Little, Wimer, & Weiss, 2008).
Current literature seems to suggest that after-school programs are very effective for low-income students. Britsch, Martin, Stuczninski, Tomala, and Tucci (2005) reviewed 20 studies on literacy in after-school programs from 1990-2004. They determined that after-school literacy enrichment programs positively affect the reading achievement of low-achieving students. Improved reading is seen more in early elementary students than in older students, and improved math scores are seen in older students. The study also showed that one-on-one tutoring has a positive effect on student achievement in reading. Although after-school programs approach literacy instruction differently and utilize a variety of instruments to measure achievement, the research provided enough positive outcomes to indicate that students benefit from literacy in after-school programs. The research supported the inclusion of research based literacy practices including reading aloud, dramatization, and book discussions. This body of research also indicated that the literacy skills obtained by these students transferred to other skills necessary for academic success.

Vandell, Reisner, and Pierce (2007) found that students in elementary schools who regularly attended quality after-school programs for two years had significant gains in standardized math scores when compared to elementary school students who did not attend after-school programs. This two-year study encompassed approximately 3,000 diverse, low-income elementary and middle school student in eight states in large and rural locations. The study indicated a gain of 20 percentiles in math achievement over a two-year period. The National Center Evaluation and Regional Assistance (2009) reported that math programs designed for after-school programs resulted in 49 more hours of math instruction during the school year for after-school participants than for
their counterparts. This study, which was conducted at 27 after-school centers located in 10 states in both rural and urban areas, determined that after-school math participants, grades two through five, scored 2.8 scaled points higher on their math achievement tests at the end of one year, which is an 8.5% difference in achievement growth than did their counterparts who did not participate. The number of participants involved in this particular study was not provided.

According to Harvard Family Research Project (2003), after-school program strategies can have positive effects on the achievement of low-achieving or at-risk students in reading and mathematics. In the same vein, Lauer et al. (2004) reported,

The synthesis resulted in statistically significant positive effects of OST [out of school programs] on student achievement in both reading and math. Overall effect sizes ranged from .06-.13 stand deviations for reading and .09-.17 standard deviations for math, depending on the method used for weighting sample sizes.

(p. 2)

The researchers indicated that one-on-one tutoring in reading had a larger positive effect than other strategies utilized. Therefore, the researchers ascertained that some program features could result in higher achievement for after-school participants. It is noteworthy to mention that the students who struggle the most to learn attained these gains.

Little (2009) indicated that participation in well-implemented after-school programs could help students from low-income families to overcome academic challenges. These programs can:
- Connect youth to quality learning opportunities and to learning itself and keep youth engaged in school;
- Help youth practice social and interpersonal skills and gain from positive youth development models;
- Give youth more access to environments that support academic achievement, particularly in the current higher stakes educational environment. (p. 7)

**Evaluation Methods to Determine After-School Effectiveness**

Granger, Durlak, Yohalem, and Reisner (2007) proposed that one of the main issues surrounding after-school programs is how to improve programs. Granger et al. noted that after-school programs have increased to the point that utilization of resources to improve programs is justified and practical. Program accountability has especially grown where public dollars are expended. These researchers assert that as the field of after-school has grown more emphasis has been placed on academic outcomes. Reisner et al. (2007) targeted 35 programs across eight states in urban, suburban and rural locations. The students served in these programs were low income, minority students attending elementary and middle schools. This two-year study revealed that some programs were successful in raising standardized achievement scores, and some were not. Yohelm, Pittman, and Wilson-Ahlstrom (2003) espouse that the quality of after-school programs is determined by the skill level of the individuals implementing the programs and the resources available.

After-school programs are complex in nature due to the effort it takes to link the regular school day to the after-school environment. Therefore, they are difficult to evaluate. After-school programs should be evaluated to show accountability, to make
programming decisions, and to build sustainability (Little, DuPree, & Deich, 2002). These researchers ascertained that evaluation of programs should be developed around the program design. These program evaluations include benchmark, data-collection, evaluation design, formative or process evaluation indicator, performance measurement, and summative or outcome evaluation. Similarly, Granger et al. (2007) asserted that the choice of evaluation tools is determined by the design of the program and the desired outcome. Geiger and Britsch (n.d.) agreed that evaluation should focus on specific outcomes that are at the heart of the program. If the program is designed around academics, the measurement should be appropriate to measure academic achievement. Additionally, if a program is comprehensive, then multiple data sources should be utilized. However, Geiger and Britsch asserted that evaluation of a program should be formative in nature to have continuous program improvement.

Weiss (2000) reported that program evaluation is important for large-scale initiatives and for local programs. Weiss noted, “The new landscape of accountability dictates that local programs need to ramp up supports to build capacity to identify and measure results in ways that are both manageable and cost effective” (p. 1). Likewise, the Arkansas Governor’s Task Force (2008) on After-School Programs reported, “All programs must be evaluated for the purpose of enhancing public accountability” (p. 2).

According to the Mott Foundation (2005), performance measures assess a program’s progress on the implementation of strategies and activities. There are generally two types of performance measures:

- Measures of effort help a program understand what activities and other services are being offered in the program. Examples include: types and
number of activities offered (e.g., tutoring three times a week, service learning in the community once a month), level and intensity of the activities (e.g., daily attendance, type of homework assistance provided and how often), and participant demographics.

- Measures of effect reflect changes in knowledge, skills, attitudes, or behavior of participants. Examples include: improved study habits, increased sense of responsibility to the community, and increased parent and/or participant satisfaction with programs. (p. 8)

Further details on data sources and data collection methods were provided including data collection from all stakeholder utilizing surveys, attendance records, or school records. Researchers at the Mott foundation noted that program evaluation should collect information on the program participants and compare their outcomes over time to those of a similar group of students who do not participate in the after-school program. In this era of accountability, after-school program evaluation is expected in order to ensure that defined outcomes are achieved and academic progress is demonstrated. Consequently, principals of effective after-school programs define short and long-term goals, use data to select at-risk students, encourage the utilization of data for program improvement, and utilize data and evaluation results to document program effectiveness (National Association of Elementary School Principals, 2006). Granger et al. (2007) concurred with the findings of the National Association of Elementary School Principals. The researchers stated, “Because programs can affect a range of important outcomes, program providers should choose a finite set of outcomes to work toward, align services
with those outcomes, and use improvement in outcomes as a basis for gauging program viability” (p. 10).

Clearly, evaluating after-school programs is complex due to the very nature of the after-school field. Because of program differences, clear goals and continuous self-evaluation is very important to after-school programs. “Depending on the focus of your program, you’ll be looking at different variables and numbers to determine your success” (Davis, n.d., p. 1).

**Conclusion**

This literature review provided information pertinent to after-school school programs, especially those that focus on academic outcomes. It presented research outlining the characteristics of effective after-school programs, implications of after-school programs, and evaluation methods to determine after-school program effectiveness. Within this framework, the effects of after-school programs on literacy and math in elementary and middle school were also explored. Specifically, this literature review presented evidence of success for after-school activities, and the review identified key components of high-quality programs and effective program practices. Further, this review also presented a perspective on how after-school programs could affect a student’s academic performance along with behavioral and social issues. Redd et al. (2002) suggested that after-school programs are able to improve educational outcomes. However, they concluded that, “Their impacts are scattered and programs vary in which outcomes they are able to improve. There is scant evidence regarding their implications for long-term educational attainment” (p. 18).
The literature is less conclusive on how to improve programs. Granger (2008) indicated that programs should be deliberate about what they want to achieve. If the program goal is improved academics, then academics should be the focus of the after-school program. In addition, if programs are to improve, professional development is necessary for continuous improvement to occur. Granger concluded by asking two questions: “What type of accountability and monitoring supports continuous improvement? How much of the ongoing staff development needs to be delivered on-site while staff are working with youth?” (p. 16).

Given the present body of literature, educational policy makers should consider putting procedures in place to ensure that after-school programs are effectively influencing student achievement. However, further investigation is needed due to the complexity of after-school programs and the importance of the after-school initiatives.
CHAPTER III

METHODOLOGY

The body of literature reviewed presented evidence that after-school programs that implement key components of high-quality programs and effective practices may have a positive impact on student achievement. The research indicated that effective academic after-school programs reinforce academic curriculum and provide additional opportunities for students to engage in learning. However, due to the complexity of after-school programs, clear measurable goals must be aligned to a set of predetermined outcomes to establish program effectiveness relating to student achievement.

The purpose of this study was to examine the effects of after-school programs on math and literacy achievement for fourth and sixth grade students in four elementary and to middle schools in a district located in central Arkansas. The researcher generated the following hypotheses:

1. No significant differences will exist by gender between fourth grade students in four elementary in schools located in a school district in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate.

2. No significant differences will exist by gender between fourth grade students in four elementary schools located in a school district in central Arkansas whose
performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy achievement compared to those who do not participate.

3. No significant differences will exist by gender between sixth grade students in two middle schools located in a school district in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate.

4. No significant differences will exist by gender between sixth grade students in two middle schools located in a school district in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy achievement compared to those who do not participate.

The five goals of this chapter are to (a) explain the research design of this study, (b) describe the subjects and explain the sample selection, (c) define the instrumentation and data collection, (d) provide an explanation of the analytical methods utilized, and (e) note any limitations of the study.

**Research Design**

Johnson and Christensen (2008) defines non-experimental research as a systematic empirical investigation in which one does not have direct control of independent variables because their appearance has already occurred or because they cannot be manipulated. For example, in non-experimental research, Variable Y is observed and Variable X is observed before, after, or simultaneously with the observation
of Y. The purpose is to establish the empirical validity of the conditional statements. Casual-comparative research is one type of non-experimental research in which the relationship between one or more categorical independent variables and one or more quantitative dependent variables are studied (Johnson & Christensen, 2008). This quantitative research study employed a causal-comparative, non-experimental design utilizing fourth and sixth grade students in four elementary and two middle schools in a school district located in central Arkansas who participated in the after-school programs in the 2008-2009 school-year compared to those who did not participate.

In non-experimental research, random assignment cannot be utilized because direct control of the variable is not possible. However, it is possible to draw participants from different populations at random in non-experimental research (those who participated in after-school programs and those who did not participate in after-school programs). Matching was also utilized to strengthen non-experimental study (Johnson & Christensen, 2008). Therefore, the 2008 Benchmark scores of students who participated in after-school programs were matched to those of students who did not participate. Groups constructed were gender (male versus female) and participation (participating versus not participating). This design was utilized for fourth grade students and again for sixth grade students. Groups were constructed so that they had similar scaled scores on the 2008 Arkansas Augmented Benchmark Examination in mathematics. The same process was utilized for the 2008 Arkansas Augmented Benchmark Examination in literacy. Two sets of 66 matched pairs (33 participants in each of the four cell groups) were randomly drawn after students had been matched on their 2008 Arkansas Augmented Benchmark Examination scaled scores in either math or literacy. This
process was completed for each group. A factorial analysis of variance (ANOVA) model was utilized to test that no significant differences would exist between the 2008 and 2009 test results based on the after-school treatment. The process was completed for the literacy scores and then math scores.

The study utilized four 2 x 2 factorial ANOVAs. The independent variables for hypotheses 1 through 4 included participation in the after-school program (participating versus not participating) and gender (male versus female). The dependent variable for hypotheses 1 and 3 was math achievement, and the dependent variable for hypotheses 2 and 4 was literacy achievement. Hypotheses 1 and 2 included fourth grade students, and hypotheses 3 and 4 included sixth graders.

Sample

This quantitative study was based on collecting data from students in grades four and six who attended after-school programs in four elementary schools located in a school district in central Arkansas. All four elementary schools are school-wide, Title I schools with at least 40% free and reduced lunch status. These elementary schools have students from kindergarten through fourth grade. Students at two of the elementary schools attend the middle school on the south side of the district in grades five through six, while students at the other two districts attend middle school on the north side of the district in grades five through six. The free and reduced lunch status of both middle schools is in the upper 30%. They are not identified as Title I schools. All students who attend these after-school programs are identified as in need of improvement in either or both literacy and math.
Two criteria determined student selection into these existing programs. First, students who scored below proficient in at least one area, math or literacy, on the 2007-2008 Arkansas Augmented Benchmark Examinations were placed into these programs. Second, students who were identified by their classroom teachers as being below grade level in math or literacy were also placed into these programs. Their teachers identified this latter group of students after data from the first interim assessment were collected and analyzed.

Students who met the first criteria were identified for the after-school program in September 2008 and began attending the program in October 2008. After the results of the first interim assessment were analyzed, students who met the second criteria were identified and began the program in November 2008. After the initial identification timeframe, students who met the second criteria could be added to the after-school program at anytime. Students who participated less than 30 days were excluded from this study. Jennifer and Jennifer (2007) contended that 30 days or more of participation in an after-school program meets the U. S. Department of Education’s definition of an after-school participant. After being identified, students attended these programs until data gathered by both their classroom and after-school teachers determined that proficiency was reached. Arkansas Augmented Benchmark Examinations were administered in early April 2009. Therefore, timelines include the following: Arkansas Augmented Benchmark Examinations administered in the spring of 2008, students identified for after-school program in fall of 2008, after-school programs in session from October 2008 until April 2009, and Arkansas Augmented Benchmark Examinations administered in April 2009.
This quantitative study was based on collecting data from a sample of students who participated in after-school programs and a sample of students who did not participate in after-school programs in four elementary schools and two middle schools located in a school district in central Arkansas during the 2008-2009 school year. Information from each group, gender (male versus female) and participation (participating versus not participating), were randomly drawn after students with similar academic abilities who had participated and those who had not participated were matched on their 2008 Arkansas Augmented Benchmark Examination scaled scores in either math or literacy. Eighty matched pairs existed for fourth grade and eighty matched pairs existed for sixth grade. After a list of the matched pairs by grade level was determined in July 2010, an Excel spreadsheet was created containing a unique number for each pair. The matched pairs were randomly drawn utilizing a random number generated from Excel. Krejcie and Morgan (1970) constructed a table to determine sample size for a given population utilizing the following formula: 

\[ s = X^2 NP \left( 1 - P \right) / d^2 \left( N - 1 \right) + X^2 P \left( 1 - P \right) \]

where 

- \( s = \) required sample size; 
- \( X^2 = \) the table value of chi-square for one degree of freedom at the desired confidence level; 
- \( N = \) the population size; 
- \( P = \) the population proportion (assumed to be .50 since this would provide the maximum sample size); and, 
- \( d = \) the degree of accuracy expressed as a proportion (.05). 

Over 150 students in the identified school district in central Arkansas grades four through six participated in the after-school programs in the 2008-2009 school year. According to this table for determining sample size for a given population, the appropriate sample size of 66 matched pairs would be required to generalize the data collected to the population of 150 students who
participated in the after-school programs. Therefore, 66 matched pairs for fourth grade and 66 matched pairs for sixth grade were utilized for the analysis.

**Instrumentation**

The literacy and math performance levels, determined by the 2008 Arkansas Augmented Benchmark Examinations, were utilized to identify students with similar academic abilities between students who participated in the after-school programs and students who did not participate. The literacy and mathematics performance level scaled scores, as determined by the 2009 Arkansas Augmented Benchmark Examinations, of these students were utilized to determine the impact of after-school programs on student achievement. Permission to utilize these data was granted by the district superintendent of the schools in this study.

The Arkansas Augmented Benchmark Examinations are criterion-referenced tests administered to students in grades three through eight in literacy and mathematics. The benchmark assessments are implemented as part of the Arkansas Comprehensive Testing, Assessment, and Accountability Program. The Arkansas Department of Education (2008a) deemed the Arkansas Augmented Benchmark Examinations both reliable and valid. The Arkansas Department of Education reports that the Arkansas Augmented Benchmark Examinations have “technically sound levels of reliability, validity, and fairness, based on the extensive research that underlies both the CRT and NRT item sets” (p. 6). The Arkansas Augmented Benchmark Examinations are developed around a common design from year to year (Arkansas Department of Education, 2009c). Although the test forms are built around a common design, post equating is utilized to control varying levels of difficulty from one version of the test to the next. They note that these
equating methods are empirical procedures for establishing uniformity between raw scores on different test forms.

Linking items are utilized to connect one test version to another test version of the Arkansas Augmented Benchmark Examination (Arkansas Department of Education, 2009c). Evaluators utilize the connection items to place test items on the same scale as the previous year with a common-item, non-equivalent groups linking strategy. From this linking strategy, parameters are established to ensure consistency between different forms of the test. Accuracy rates were .89 or above for all grades in both literacy and mathematics.

A Stratified Alpha method is utilized to determine reliability. Each item is estimated separately for reliability and then combined with other test items to obtain a more precise estimate of the reliability. This method allows for item types to be weighted correctly (Arkansas Department of Education, 2009c).

The outcomes of these assessments are utilized to determine adequate yearly progress as mandated by No Child Left Behind. Students in grades three through eight are given approximately two and a half hours daily to complete the four-day test. The test items in both literacy and math include multiple choice and open response questions. The four levels of student achievement on these criterion-referenced exams include advanced, proficient, basic, and below basic. The Arkansas Department of Education (2009a) defines the student levels of achievement as follows:

- Advanced: Students demonstrate superior performance well beyond proficient grade-level performance. They can apply established reading, writing, and mathematics skills to solve complex problems and complete demanding tasks on
their own. They can make insightful connections between abstract and concrete ideas and provide well-supported explanations and arguments.

- **Proficient**: Students demonstrate solid academic performance for the grade tested and are well prepared for the next level of schooling. They can use established reading, writing, and mathematics skills and knowledge to solve problems and complete tasks on their own. Students can tie ideas together and explain the ways their ideas are connected.

- **Basic**: Students show substantial skills in reading, writing, and mathematics; however, they only partially, demonstrate the abilities to apply these skills.

- **Below Basic**: Students fail to show sufficient mastering of skills in reading, writing, and mathematics to attain the basic level. (para. 15)

Each performance category has a range of specific scale scores by grade level in both mathematics and literacy that corresponds to a particular performance level. These scale scores may be utilized to demonstrate academic growth when comparing scale scores from one year to the next (Arkansas Department of Education, 2008b).

**Data Collection**

After IRB approval, the researcher physically obtained existing data from the school district of the schools in this study. These data included names, gender, grade levels, and attendance dates of fourth and sixth grade students who had participated in after-school programs during the 2008-2009 school-year, the 2008 Arkansas Augmented Benchmark Examination scaled scores of all fourth and sixth grade students who attended the four elementary schools and two middle schools, and the 2009 Arkansas Augmented Benchmark scaled scores of all fourth and sixth grade students who attended the four
elementary schools and two middle schools. Names were replaced with unique numbers in order to maintain confidentiality. The 2008 Arkansas Augmented Benchmark Examination and the 2009 Arkansas Augmented Benchmark Examination data for all fourth and sixth grade students in the four elementary schools and the two middle schools were provided on two data discs. These data were provided to the school district by Arkansas Department of Education. The after-school participant data (names, grade levels, gender, and dates attended) were provided on a thumb drive by school district personnel. Permission to utilize these data was granted by the superintendent of this central Arkansas school district.

Students with similar academic abilities who had participated and those who had not participated were matched on their 2008 Arkansas Augmented Benchmark Examination scaled scores in literacy and math. Students who had attended less than 30 days were eliminated from the study. Information from each group, gender (male versus female) and participation (participating versus not participating), were randomly drawn. Eighty matched pairs existed for fourth grade and eighty matched pairs existed for sixth grade. After a list of the matched pairs by grade level was determined, an Excel spreadsheet was created containing a unique number for each pair. The matched pairs were randomly drawn utilizing a random number generated from Excel. A sample of 66 matched pairs was utilized to generalize the data collected to its population given a population of 250.

**Analytical Methods**

First, data were coded and entered into SAS (Statistical Analysis Systems) software. The following codes were used to identify data: gender (1 = male, 2 = female),
participation (1 = participated, 2 = not participated). Fourth and sixth grade coding schemes were utilized for different data sets.

Next, a pre-analysis of the data was limited to verifying the number of participants by gender and participation to ensure the correct sampling. A second analysis was conducted to check for outliers based on the matching criteria. Additionally, homogeneity of variances was checked using the Levene’s statistic.

Finally, the four hypotheses were addressed utilizing the following statistical analyses. Hypothesis 1 was analyzed by a 2 x 2 factorial ANOVA with participation in the after-school programs (participating versus not participating) and gender (male versus female) as the between subjects independent variables with the math achievement as the dependent variable. Hypothesis 2 was analyzed in the same manner as the first with the independent variables being the same. The dependent variable was literacy achievement. Hypothesis 3 utilized a 2 x 2 factorial ANOVA with participation in the after-school programs and gender as the between subjects independent variables with math achievement as the dependent variable. Finally, hypothesis 4 was analyzed in the same manner as the third with the independent variables being the same. The dependent variable in this hypothesis was literacy achievement. Hypotheses 1 and 2 included fourth grade students, and hypotheses 3 and 4 included sixth graders. To test the null hypotheses, the researcher used a two-tailed test with a 0.01 level of significance.

**Limitations**

This quantitative study was conducted with a limited number of participants who were enrolled in the after-school programs in a school district in central Arkansas during the 2008-2009 school year. The research was confined to fourth and sixth grade students.
who attended the after-school programs in four elementary schools and two middle schools. The quantitative procedures cannot provide generalizations to be applied to the entire population of all schools and programs.

According to the Arkansas Department of Education (2008a), the Augmented Arkansas Benchmark has been examined and found to be both reliable and valid. A possible threat to internal validity is ambiguous temporal precedence since other variables might influence achievement.

Testing is also likely to be another threat to internal validity because all of these students have previously taken the Arkansas Augmented Benchmark Examinations. In addition, students have been given practice tests that have a similar format to that of the Arkansas Augmented Benchmark Examination.

The non-experimental design of this research is a limitation within itself. Researchers in non-experimental studies cannot manipulate the independent variables or randomly assign participants. Therefore, evidence is less conclusive.
CHAPTER IV

RESULTS

The general purpose of this quantitative study was to determine if participating in after-school programs affected students’ math and literacy achievement. The study investigated this phenomenon as it related to gender at two different grade levels. The independent variables were participation in after-school programs (participated versus no participation) and gender (male versus female). The dependent variables were math and literacy achievement measured by the state’s Augmented Benchmark Examinations. Factorial Analyses of Variance (ANOVAs) were run to look at each of the four null hypotheses. Due to multiple statistical tests being run, a Bonferonni adjustment was used to modify the alpha level from .05 to .025 to correct for alpha inflation because each of the samples was tested twice. The stricter alpha level helped control for Type 1 errors (Huck, 2008). This chapter provides a summary of the key findings.

Demographic Information

Demographic information was collected on these after-school programs located at four elementary schools and two middle schools in a school district located in central Arkansas. All four elementary schools are school-wide, Title I schools with at least 40% free and reduced lunch status and have students from kindergarten through fourth grade. Students in two of the elementary schools attend the middle school on the south side of town in grades five through six. Students in the other two elementary schools attend
middle school on the north side of town in grades five through six. The free and reduced lunch status of both middle schools is in the upper 30%, which does not qualify for the Title I classification. The specific free and reduced lunch status of the students in this study could not be obtained due to restrictive guidelines. All students who attend these after-school programs were identified as in need of improvement in either or both literacy and math. Students in this study scored basic or below basic on the 2008 Arkansas Augmented Benchmark Examination or were identified by their classroom teacher as performing below grade level. The ethnicity of these schools consisted of 95% Caucasian, 2% Hispanic, 1% African American, and 3% other.

The gender composition of the fourth grade after-school program participants consisted of 25 females and 40 males. The gender composition of the sixth grade after-school program participants consisted of 43 females and 43 males. The age of students in the fourth grade ranged from 9 to 10 and 11 to 12 years of age for students in the sixth grade who participated in after school programs. The non-participant gender composition and age groups were matched to that of the participant gender composition and age groups.

**Statistical Assumptions**

All analyses in this study were conducted using SPSS (PASW Statistical 18). The statistical assumptions of normality and homogeneity of variances were checked prior to running the statistical analysis. A visual inspection of the box and whisker plots (see Appendix C) for scores on each of the areas revealed approximate normal distributions with only a few outliers on each of the ends of the plots. Appropriate steps were taken to address the outliers.
Hypothesis 1

Hypothesis 1 stated that no significant differences will exist by gender between fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate. Table 1 presents the means and standard deviations of each of the independent variables grouped together (gender and participation) for the fourth grade 2009 Arkansas Augmented Math Benchmark Scale Scores.

Table 1

*Descriptive Statistics for 2009 Arkansas Augmented Benchmark Examination Math Scale Scores Fourth Grade*

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Non-Participant</td>
<td>573.33</td>
<td>104.263</td>
</tr>
<tr>
<td>Male Participant</td>
<td>583.33</td>
<td>58.532</td>
</tr>
<tr>
<td>Female Non-Participant</td>
<td>583.95</td>
<td>83.147</td>
</tr>
<tr>
<td>Female Participant</td>
<td>571.81</td>
<td>67.137</td>
</tr>
</tbody>
</table>

Prior to running the actual analysis, the researcher also checked for normality using the Kolmogorov-Smirnov test of normality. When the Kolmogorov-Smirnov test of normality with the Lilliefors significance correction was conducted, the null hypothesis for non-normal distribution was not rejected for male participants and male non-participants in math at the fourth grade level ($p > .05$) and female participants and female non-participants in math at the fourth grade level ($p > .05$) on all scores.
To test for homogeneity of variances prior to the data analysis, the Levene’s test of equality of variances was conducted within ANOVA. As presented in Table 2, the $F$ value resulted in no violations of the assumption with the exception of fourth grade math. Mertler and Vannatta (2005) advise, “….analysis of variance is robust to violations of the normality assumptions….and should not be a cause for substantial concern” (p. 74). The ANOVA was continued.

Table 2

*Results of Levene’s Test of Equality of Variances*

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>df1</th>
<th>df2</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourth Grade Math</td>
<td>3.531</td>
<td>3</td>
<td>80</td>
<td>.018</td>
</tr>
<tr>
<td>Fourth Grade Literacy</td>
<td>2.506</td>
<td>3</td>
<td>84</td>
<td>.065</td>
</tr>
<tr>
<td>Sixth Grade Math</td>
<td>1.925</td>
<td>3</td>
<td>128</td>
<td>.129</td>
</tr>
<tr>
<td>Sixth Grade Literacy</td>
<td>.591</td>
<td>3</td>
<td>92</td>
<td>.622</td>
</tr>
</tbody>
</table>

To test this hypothesis, a 2 x 2 factorial ANOVA was conducted using student participation (participant versus non-participant) by gender as the independent variables and the 2009 Arkansas Augmented Benchmark Examination Math Scale Scores for fourth grade as the dependent variable. There was insufficient evidence based on the interaction of the variables to reject the first null hypothesis, $F (1,80) = .400, p = .529, ES = .005$), as reported in Table 3. Given that there was no significant interaction between the variables of gender and participation, the main effect of each variable was examined separately.
Table 3

Factorial ANOVA for 2009 Arkansas Augmented Benchmark Examination Math Scale Scores Fourth Grade

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>4.298</td>
<td>1</td>
<td>4.298</td>
<td>.001</td>
<td>.979</td>
<td>.000</td>
</tr>
<tr>
<td>Participation</td>
<td>24.107</td>
<td>1</td>
<td>24.107</td>
<td>.004</td>
<td>.951</td>
<td>.000</td>
</tr>
<tr>
<td>Gender*Participation</td>
<td>2574.107</td>
<td>1</td>
<td>2574.107</td>
<td>.400</td>
<td>.529</td>
<td>.005</td>
</tr>
<tr>
<td>Error</td>
<td>514349.524</td>
<td>80</td>
<td>6429.369</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2.86E7</td>
<td>84</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The main effect for gender was not significant, $F(1, 80) = .001, p = .979, ES = .000$. The main effect for participation was also not significant, $F(1, 80) = .004, p = .979, ES = .000$.

**Hypothesis 2**

Hypothesis 2 stated that no significant differences will exist by gender between fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy achievement compared to those who do not participate. Table 4 presents the means and standard deviations of each of the independent variables grouped together (gender and participation) for the fourth grade 2009 Arkansas Augmented Literacy Benchmark Scale Scores.
Table 4

*Descriptive Statistics for 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores Fourth Grade*

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Non-Participant</td>
<td>575.18</td>
<td>153.515</td>
</tr>
<tr>
<td>Male Participant</td>
<td>570.95</td>
<td>82.780</td>
</tr>
<tr>
<td>Female Non-Participant</td>
<td>629.45</td>
<td>121.791</td>
</tr>
<tr>
<td>Female Participant</td>
<td>572.18</td>
<td>96.024</td>
</tr>
</tbody>
</table>

Prior to running the actual analysis, the researcher also checked for normality using the Kolmogorov-Smirnov test of normality. When the Kolmogorov-Smirnov test of normality with the Lilliefors significance correction was conducted, the null hypothesis for non-normal distribution was not rejected for male participants and male non-participants in literacy at the fourth grade level \((p > .05)\) and female participants and female non-participants in literacy at the fourth grade level \((p > .05)\) on all scores.

To test for homogeneity of variances prior to the data analysis, the Levene’s test of equality of variances was conducted within ANOVA. The \(F\) value resulted in no violations of the assumption for fourth grade literacy. The ANOVA was continued.

To test this hypothesis, a 2 x 2 factorial ANOVA was conducted using student participation (participant versus non-participant) by gender as the independent variables and the 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores for fourth grade as the dependent variable. There was insufficient evidence based on the interaction of the variables to reject the null hypothesis, \(F (1, 84) = 1.136, p = .289, ES = .013\), as reported in Table 5. Given that there was no significant interaction between the
variables of gender and participation, the main effect of each variable was examined separately.

Table 5

*Factorial ANOVA for 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores Fourth Grade*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>16941.375</td>
<td>1</td>
<td>16941.375</td>
<td>1.244</td>
<td>.268</td>
<td>.015</td>
</tr>
<tr>
<td>Participation</td>
<td>20802.375</td>
<td>1</td>
<td>20802.375</td>
<td>1.528</td>
<td>.220</td>
<td>.018</td>
</tr>
<tr>
<td>Gender*Participation</td>
<td>15476.011</td>
<td>1</td>
<td>15476.011</td>
<td>1.136</td>
<td>.289</td>
<td>.013</td>
</tr>
<tr>
<td>Error</td>
<td>1143928.955</td>
<td>84</td>
<td>13618.202</td>
<td>.000</td>
<td>.964</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.15E7</td>
<td>88</td>
<td></td>
<td>.268</td>
<td></td>
<td>.015</td>
</tr>
</tbody>
</table>

The main effect for gender was not significant, *F*(1, 84) = 1.244, *p* = .268, *ES* = .015. The main effect for participation was also not significant, *F*(1, 84) = 1.528, *p* = .220, *ES* = .018.

**Hypothesis 3**

Hypothesis 3 stated that no significant differences will exist by gender between sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate. Table 6 presents the means and standard deviations of each of the independent variables grouped together (gender and participation) for the sixth grade 2009 Arkansas Augmented Math Benchmark Scale Scores.
Table 6

Descriptive Statistics for 2009 Arkansas Augmented Benchmark Examination Math Scale Scores Sixth Grade

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Non-Participant</td>
<td>650.45</td>
<td>67.800</td>
</tr>
<tr>
<td>Male Participant</td>
<td>639.94</td>
<td>52.191</td>
</tr>
<tr>
<td>Female Non-Participant</td>
<td>658.94</td>
<td>66.129</td>
</tr>
<tr>
<td>Female Participant</td>
<td>665.36</td>
<td>48.960</td>
</tr>
</tbody>
</table>

Prior to running the actual analysis, the researcher also checked for normality using the Kolmogorov-Smirnov test of normality. When the Kolmogorov-Smirnov test of normality with the Lilliefors significance correction was conducted, the null hypothesis for non-normal distribution was not rejected for male participants and male non-participants in math at the sixth grade level (p > .05) and female non-participants in math at the sixth grade level (p > .05) on all scores. The null hypothesis was rejected for the female participants in math at the sixth grade level (p < .05) indicating a non-normal distribution KS = .023. Although the null hypothesis was rejected, this researcher obtained numerical values for skewness (.010) and kurtosis (.287) and found them to be in normal range, which indicates normality. Mertler and Vannatta (2005) states, “Typically, skewness and kurtosis values should lie between +1 and -1” (p. 43).

To test for homogeneity of variances prior to the data analysis, the Levene’s test of equality of variances was conducted within ANOVA. The F value resulted in no violations of the assumption for sixth grade math. The ANOVA was continued.
To test this hypothesis, a 2 x 2 factorial ANOVA was conducted using student participation (participant versus non-participant) by gender as the independent variables and the 2009 Arkansas Augmented Benchmark Examination Math Scale Scores for sixth grade as the dependent variable. There was insufficient evidence based on the interaction of the variables to reject the null hypothesis, $F (1, 128) = .672, p = .414, ES = .005$, as reported in Table 7. Given that there was no significant interaction between the variables of gender and participation, the main effect of each variable was examined separately.

Table 7

*Factorial ANOVA for 2009 Arkansas Augmented Benchmark Examination Math Scale Scores Sixth Grade*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>$F$</th>
<th>Sig.</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>9486.068</td>
<td>1</td>
<td>9486.068</td>
<td>2.693</td>
<td>.103</td>
<td>.021</td>
</tr>
<tr>
<td>Participation</td>
<td>138.068</td>
<td>1</td>
<td>138.068</td>
<td>.039</td>
<td>.843</td>
<td>.000</td>
</tr>
<tr>
<td>Gender*Participation</td>
<td>2367.280</td>
<td>1</td>
<td>2367.280</td>
<td>.672</td>
<td>.414</td>
<td>.005</td>
</tr>
<tr>
<td>Error</td>
<td>450905.576</td>
<td>128</td>
<td>3522.700</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5.69E7</td>
<td>132</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The main effect for gender was not significant, $F (1, 128) = 2.693, p = .103, ES = .021$. The main effect for participation was also not significant, $F (1,128) = .039, p = .843, ES = .000$.

**Hypothesis 4**

Hypothesis 4 stated that no significant differences will exist by gender between sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark.
Examinations who participate in after-school programs on literacy achievement compared to those who do not participate. Table 8 presents the means and standard deviations of each of the independent variables grouped together (gender and participation) for the sixth grade 2009 Arkansas Augmented Literacy Benchmark Scale Scores.

Table 8

Descriptive Statistics for 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores Sixth Grade

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Non-Participant</td>
<td>545.29</td>
<td>88.140</td>
</tr>
<tr>
<td>Male Participant</td>
<td>586.04</td>
<td>84.983</td>
</tr>
<tr>
<td>Female Non-Participant</td>
<td>659.71</td>
<td>102.684</td>
</tr>
<tr>
<td>Female Participant</td>
<td>674.58</td>
<td>119.572</td>
</tr>
</tbody>
</table>

Prior to running the actual analysis, the researcher also checked for normality using the Kolmogorov-Smirnov test of normality. When the Kolmogorov-Smirnov test of normality with the Lilliefors significance correction was conducted, the null hypothesis for normal distribution was not rejected for male participants and male non-participants in literacy at the sixth grade level ($p > .05$) and female participants and non-participants in literacy at the sixth grade level ($p > .05$) on all scores.

To test for homogeneity of variances prior to the data analysis, the Levene’s test of equality of variances was conducted within ANOVA. The $F$ value resulted in no violations of the assumption for sixth grade literacy. The ANOVA was continued.
To test this hypothesis, a 2 x 2 factorial ANOVA was conducted using student participation (participant versus non-participant) by gender as the independent variables and the 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores for sixth grade as the dependent variable. There was insufficient evidence based on the interaction of the variables to reject the null hypothesis, \( F (1, 92) = .403, p = .527, ES = .004 \), as reported in Table 9. Given that there was no significant interaction between the variables of gender and participation, the main effect of each variable was examined separately.

Table 9

**Factorial ANOVA for 2009 Arkansas Augmented Benchmark Examination Math Scale Scores Sixth Grade**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>( F )</th>
<th>Sig.</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>247152.510</td>
<td>1</td>
<td>247152.510</td>
<td>24.819</td>
<td>.000</td>
<td>.212</td>
</tr>
<tr>
<td>Participation</td>
<td>18564.844</td>
<td>1</td>
<td>18564.844</td>
<td>1.864</td>
<td>.175</td>
<td>.020</td>
</tr>
<tr>
<td>Gender* Participation</td>
<td>4017.094</td>
<td>1</td>
<td>4017.094</td>
<td>.403</td>
<td>.527</td>
<td>.004</td>
</tr>
<tr>
<td>Error</td>
<td>916146.708</td>
<td>92</td>
<td>9958.116</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.77E7</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The main effect for gender was significant, \( F (1, 92) = 24.819, p = .000, ES = .212 \). The effect size (\( ES = .212 \)), according to Huck (2008), is large (\( \eta^2 = .14 \)). The main effect for participation was not significant, \( F (1, 92) = 1.864, p = .175, ES = .020 \).
CHAPTER V

DISCUSSION

In the current climate of increased accountability, schools across the nation are searching for ways to increase student achievement in literacy and math. After-school programs are one approach that school administrators are utilizing to increase student achievement. Schools in Arkansas are no different. Arkansas Governor’s Task Force (2008) indicates the need for after-school programs is intensifying. Although the results of a survey of Arkansas households show a 4% increase in participation in after-school programs over the past five years, a comprehensive study has not been conducted in Arkansas to determine the number of programs, number of students participating, or the quality of the programs. Moreover, there has not been a comprehensive study conducted in Arkansas to determine the effects of after-school programs on student achievement in math and literacy.

The focus of this study was to examine the effects of after-school programs on math and literacy achievement for fourth and sixth grade students in four elementary and two middle schools in a school district located in central Arkansas. The study investigated this phenomenon as it related to gender at two different grade levels. The independent variables were participation in after-school programs (participated versus no participation) and gender (male versus female). The dependent variables were math and literacy achievement measured by the state’s Augmented Benchmark Exams.
This quantitative study examined the achievement data of over 300 students utilizing the 2009 Arkansas Augmented Benchmark Assessment for math and literacy for both fourth and six grades. In Chapter IV, these data were analyzed by examining students who participated in after-school programs and students who did not participate in after-school programs and testing the existing hypotheses. First, this chapter includes a reflection and conclusion on the data collected and analyzed in this study. Second, recommendations based on the conclusions found in the data analysis are included. Finally, the implications and significance of this study are discussed.

**Conclusions**

To address the four hypotheses, the following statistical analyses were utilized. Hypothesis 1 was analyzed by a 2 x 2 factorial analysis of variance (ANOVA) with participation in the after-school programs (participating versus not participating) and gender (male versus female) as the between subjects independent variables with the math achievement as the dependent variable. Hypothesis 2 was analyzed in the same manner as the first with the independent variables being the same. The dependent variable was literacy achievement. Hypothesis 3 utilized a 2 x 2 factorial ANOVA with participation in the after-school programs (participating versus not participating) and gender (male versus female) as the between subjects independent variables with math achievement as the dependent variable. Finally, hypothesis 4 was analyzed in the same manner as the third with the independent variables being the same. The dependent variable in this hypothesis was literacy achievement. Hypotheses 1 and 2 included fourth grade students, and hypotheses 3 and 4 included sixth graders. To test the null hypotheses, the researcher used a two-tailed test with a .01 level of significance. Main effects and interaction effects
in each of the hypotheses were examined. The following hypotheses were tested and conclusions were determined.

**Hypothesis 1**

Hypothesis 1 stated that no significant differences will exist by gender between fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate. There was no significant interaction between the independent variables of gender and participation and the dependent variable of the 2009 Arkansas Augmented Benchmark Examination Math Scale Scores for fourth grade. Together, gender and participation did not affect how individuals scored on the 2009 Arkansas Augmented Benchmark Examination in math. Based on these results, the null hypothesis could not be rejected. Although there was no significant difference, the male participants had a higher mean score than that of their non-participant counterparts. Conversely, the female non-participants’ mean score was higher than their participant counterparts were. The male participates’ mean score was higher than that of the female participates. The main effect for gender was not significant nor was the main effect for participation significant.

**Hypothesis 2**

Hypothesis 2 stated that no significant differences will exist by gender between fourth grade students in four elementary schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy
achievement compared to those who do not participate. There was no significant interaction between the independent variables of gender and participation and the dependent variable of the 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores for fourth grade. Together, gender and participation did not affect how individuals scored on the 2009 Arkansas Augmented Benchmark Examination in literacy. Although there was no significant difference, the male non-participants had a higher mean score than that of their participant counterparts. Similarly, the female non-participants’ mean score was higher than their participant counterparts were. The female non-participants’ mean score was higher than that of the male non-participants’ mean score. Likewise, the female participates’ mean score was higher than that of the male participates. This indicates that overall female mean scores were higher than that of their male counterparts. The main effect for gender was not significant nor was the main effect for participation significant.

**Hypothesis 3**

Hypothesis 3 stated that no significant differences will exist by gender between sixth grade students in school two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on math achievement compared to those who do not participate. There was no significant interaction between the independent variables of gender and participation and the dependent variable of the 2009 Arkansas Augmented Benchmark Examination Math Scale Scores for sixth grade. Together, gender and participation did not affect how individuals scored on the 2009 Arkansas Augmented Benchmark Examination in math. Although there was no
significant difference, the male non-participants had a higher mean score than that of their participant counterparts. Conversely, the female participants’ mean score was higher than their non-participant counterparts were. The female non-participants’ mean score was higher than that of the male non-participants’ mean score. Likewise, the female participates’ mean score was higher than that of the male participates. This indicates overall, female mean scores are higher than that of their male counterpart. The main effect for gender was not significant nor was the main effect for participation significant.

**Hypothesis 4**

Hypothesis 4 stated that no significant differences will exist by gender between sixth grade students in two middle schools in a school district located in central Arkansas whose performance level is basic or below basic on the Arkansas Augmented Benchmark Examinations who participate in after-school programs on literacy achievement compared to those who do not participate. There was no significant interaction between the independent variables of gender and participation and the dependent variable of the 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores for sixth grade. Together, gender and participation did not affect how individuals scored on the 2009 Arkansas Augmented Benchmark Examination in literacy. Although there was no significant difference, the male participants had a higher mean score than that of their non-participant counterparts. Likewise, the female participants’ mean score was higher than their non-participant counterparts were. The female non-participants’ mean score was higher than that of the male non-participants’ mean score. Likewise, the female participates’ mean score was higher than that of the male participates. This indicates overall, female mean scores are higher than that of their male counterparts. The main
effect for gender was significant. Generalizing to the population of all sixth grade students in this district located in central Arkansas, sixth grade females’ scored significantly higher on the 2009 Arkansas Augmented Benchmark Examination in literacy than their male counterparts. The main effect for participation was not significant.

The results of this study indicated that no significant difference existed in the 2009 Arkansas Augmented Benchmark Examination scale scores in either literacy or math between those fourth grade students who participated in after-school programs and those who did not participate. The findings were the same for sixth grade students. However, the findings did indicate one area of statistical significance, gender. Overall, sixth grade females scored significantly higher on the 2009 Arkansas Augmented Benchmark Examination in literacy than their male counterparts. Because this research centered on participation in after-school programs versus non-participation, there was no statistical significance that participation in after school programs played a role in these finding.

**Recommendations**

These findings are contrary to current research indicating quality after-school programs have a significant impact on students’ academic performance (National Institute, 2004). However, these findings do confirm Shumow’s (2001) assertion that a more direct focus should be placed on the educational benefits of after-school programs if the goal is student achievement. Merely extending the school day with the same type of instruction and activities will not provide the opportunities to enhance learning. Therefore, the first recommendation is that after-school teachers receive extensive
professional development relating to current research-based best practices on how to teach students in after-school programs.

In this study, consideration was given to students who had attended the program for at least 30 days. Miller (2003) espouses that positive student achievement outcomes depend on consistent participation in high quality after-school programs. A second recommendation is that future studies focus on the impact of student attendance along with the duration of the program as it relates to achievement in after-school programs. This study focused on a program that lasted for one and a half hours, five days per week beginning in October and ending in April. Does extended time and consistent attendance have an effect on student achievement?

Along those same lines, the Time, Learning, and After-school Task force (2007) formulated the following list of characteristics that proven after-school programs exhibit:

- Academic instruction is designed to meet the needs, abilities and learning styles and provide them with a better chance to succeed;
- Engaging, relevant activities are often project-based, community-based or both, and designed to increase student motivation to learn;
- Linkages are made to the school day, but content is delivered in different ways by applying school day lessons to real world settings;
- Student choice is built into program design;
- Partnerships among schools and community-based organizations are essential because they bring new and diverse learning opportunities;
• Students have opportunities to work both independently and in groups, and to play leadership roles; and

• Communication between families and school-day staff is ongoing. (p. 2)

These characteristics of effective after-school programs were not considered in this study. A third recommendation is to conduct further research to explore how these characteristics of after-school programs might affect student achievement. Research should be conducted to determine the impact of each characteristic individually to determine which characteristic makes a significant impact on student achievement.

This study consisted of after-school programs located in one school district. Therefore, a fourth recommendation is to conduct a study utilizing a larger sampling of after-school programs in the state to provide a more sweeping conclusion as to the effectiveness of after-school programs on academic achievement. Granger (2008) indicates that programs should be deliberate about what they want to achieve. If the goal is to improve academics, then academics should be the focus of after-school programs. Indeed, Redd et al. (2002) concluded that after-school program impacts are scattered and varied with scant evidence of positive long-term outcomes.

Additional research is needed comparing student achievement in schools utilizing the money expended on after-school programs in the regular school day. Further, this researcher recommends a study of this type to answer the question if and how after-school programs affect student achievement.
Implications

Significance and Expansion of Knowledge Base

This research focusing on gender and participation has provided insight into after-school programs for a one-year period. Continued research on after-school programs to determine the impact on student achievement should be considered. A longer study over several years assessing programming, staff qualification, and student attendance would provide a more comprehensive look at the impact of after-school programs on student achievement.

After-school programs are implemented by many school districts nation-wide in their quest to improve student achievement. This study suggests that after-school programs are not effective at significantly increasing student achievement in math and literacy. Therefore, the statistical outcome of this study challenges current funding priorities for after-school programs. Could these funds be better used for funding programs during the school day rather than after-school if the purpose is to increase student achievement on standardized tests?

Future Research Considerations

Future researchers might build on this study by including all schools in Arkansas who implement academic focused after-school programs. Researchers could focus on what constitutes quality instruction, the length of time necessary to influence student achievement, and what type of curriculum is effective. Mott Foundation (2005) noted that program evaluation should collect information on program participants and compare their outcomes over time to those of a similar group of student who do not participate in after-school programs. The results of that information would help educators determine if after-
school programs influence student achievement or if it has no significance as it relates to student achievement.

**Potential Policy Change**

Transforming schools to meet the demands of the 21st century is complex. Schools seem to have inherited the challenge of meeting the academic needs of students along with meeting a broader social need of child-care for working parents. In this context, the benefits of after-school programs become convoluted. As indicated by Granger et al. (2007), program accountability has grown where public dollars are expended. However, the question should be asked, what is the actual purpose of after-school programs? Because after-school programs seem to mirror the concerns society has for students, this researcher poses the question, is the purpose increased academic achievement or extended childcare? Whether federal and state governments and districts continue to fund such efforts after knowing the potential statistical effect, they can at least do so in an informed manner whether it is to satisfy social and cultural needs, to satisfy academic needs, or to satisfy both. Policy makers should determine the fundable purpose of after-school programs and the criteria that constitutes quality after-school programs. Only after this determination is made can after-school programs be held accountable for student achievement.
REFERENCES


Davis, J. (n.d.). *How will we evaluate whether or not the program is meeting the needs of children & the community?* Retrieved from http://www.thirteen.org/edonline/concept2class/afterschool/exploration_sub4.html


Retrieved from http://www.mcrel.org/PDF/noteworthy


Retrieved from the Mott Foundation Web site: http://www.publcengagement.com


APPENDICES
APPENDIX A

Boxplot 2009 Arkansas Augmented Benchmark Examination Math Scale

Scores 4th Grade for Participation by Gender
APPENDIX B

Boxplot 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores

4th Grade for Participation by Gender
APPENDIX C

Boxplot 2009 Arkansas Augmented Benchmark Examination Math Scale Scores

6th Grade for Participation by Gender
APPENDIX D

Boxplot 2009 Arkansas Augmented Benchmark Examination Literacy Scale Scores

6th Grade for Participation By Gender
# APPENDIX E

## IRB Approval

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**Status of Request for Exemption from IRB Review**

*(For Board Use Only)*

<table>
<thead>
<tr>
<th>Date:</th>
<th>July 12, 2010</th>
</tr>
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<tbody>
<tr>
<td>Proposal Number:</td>
<td>2010-61</td>
</tr>
<tr>
<td>Title of Project:</td>
<td>Effects of After-School Programs on Math and Literacy for 4th and 6th Grade Students</td>
</tr>
<tr>
<td>Principal Investigator(s) and Co-Investigator(s):</td>
<td>June Elliott</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Research exempted from IRB review.</th>
<th>Research requires IRB review.</th>
<th>More information is needed before a determination can be made. (See attachment.)</th>
</tr>
</thead>
</table>

I have reviewed the proposal referenced above and have rendered the decision noted above. This study has been found to fall under the following exemption(s):

- 1
- 2
- 3
- 4
- 5
- 6

In the event that, after this exemption is granted, this research proposal is changed, it may require a review by the full IRB. In such case, a *Request for Amendment to Approved Research* form must be completed and submitted.

This exemption is granted for one year from the date of this letter. Renewals will need to be reviewed and granted before expiration.

The IRB reserves the right to observe, review and evaluate this study and its procedures during the course of the study.

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Chair, Harding University Institutional Review Board

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