Is There a Relationship Between Physical Fitness and Student Academic Achievement?

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IS THERE A RELATIONSHIP BETWEEN PHYSICAL
FITNESS AND STUDENT ACADEMIC
ACHIEVEMENT?

by

William Rushton Parker

Abstract of a Dissertation
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ABSTRACT

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The study utilized a quantitative approach to identify the relationship between students’ levels of fitness to students’ academic achievement as well as addressing the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers towards physical fitness and academic achievement. Instruments used in the study were the Mississippi Curriculum Test, 2nd Edition (MCT2) and the FITNESSGRAM®. The data from the FITNESSGRAM® and MCT2 were archival, coming from the 2013-2014 academic school year. The MCT2 provided scores from the areas of language arts, mathematics, and science, and the FITNESSGRAM® provided the fitness scores of those students. From these two instruments, the students’ fitness scores were compared to their performance scores in language arts, mathematics, and science. As well as using the MCT2 and the FITNESSGRAM®, data were collected through the use of survey methodology with a questionnaire compiled of attitudes from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers.

The results from this study revealed a statistically significant difference in the attitudes in regards to physical fitness and student academic achievement from
elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. More specifically, there was a statistically significant difference in the attitudes pertaining to physical fitness and academic achievement between elementary administrators and fifth grade regular education teachers and fifth grade regular education teachers and elementary physical education teachers.

Furthermore, there was no statistically significant difference between elementary administrators and elementary physical education teachers. There was a statistically significant difference from the questionnaire on Items 1, 3, 8, 9, 10, and 11; however, there was no statistically significant difference on Items 4, 5, 6, and 7 in the attitudes towards physical fitness and student achievement from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers.

In addition to these results, the study revealed there was no statistically significant relationship between scores from the mathematics, language arts, and science sections of the MCT2 and the FITNESSGRAM® fitness level scores from muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity.
IS THERE A RELATIONSHIP BETWEEN PHYSICAL FITNESS AND STUDENT ACADEMIC ACHIEVEMENT?

by

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DEDICATION

This dissertation is dedicated to several people who have shown me love, encouragement, and patience during these last five years of my life. Without these people I would not have been able to accomplish this feat.

To my beautiful wife, Robin, thank you for sharing with me my dream of earning my doctorate. Your encouragement and love throughout this process means more to me than you will ever know. I love you!

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TABLE OF CONTENTS

ABSTRACT .............................................................................................................................................. ii

DEDICATION ............................................................................................................................................... iv

ACKNOWLEDGMENTS .............................................................................................................................. v

LIST OF TABLES .......................................................................................................................................... viii

CHAPTER

I. INTRODUCTION ................................................................................................................................. 1

Statement of the Problem
Purpose of the Study
Research Questions
Research Hypotheses
Definition of Terms
Delimitations
Assumptions
Justification

II. REVIEW OF LITERATURE .................................................................................................................... 15

Theoretical Framework
History of Physical Education
Defining Physical Education in Schools
Education of the Whole Child
Importance of Physical Education
Lifestyle Developments
Physical Benefits of Physical Fitness
Psychological Benefits of Physical Fitness
Academic Benefits of Physical Fitness
Links between Obesity and Student Achievement
Accountability and the Mississippi Curriculum Test
FITNESSGRAM®
Summary
III. METHODOLOGY ................................................................................................................. 59
   Overview
   Research Design
   Participants
   Instrumentation
   Procedures
   Data Analysis

IV. ANALYSIS OF DATA.......................................................................................................... 74
   Introduction
   Descriptive
   Instrumentation
   Statistics

V. DISCUSSION ......................................................................................................................... 93
   Summary
   Overview
   Conclusions and Discussions
   Limitations
   Recommendations for Policy and Practice
   Recommendations for Future Research

APPENDIXES ....................................................................................................................... 106

REFERENCES ........................................................................................................................ 120
LIST OF TABLES

Table

1. Frequencies and Percentages of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers .................................................76


3. Means and Standard Deviations of Muscular Strength, Muscular Endurance, Body Composition, Flexibility, and Aerobic Capacity Scores ..................................................................................................................78

4. Means and Standard Deviations in Descending Order of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers’ Attitudes Towards Physical Fitness and Student Achievement ........................................81

5. Summary of Attitudes of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers ................................................................................83

6. Frequencies and Percentages of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers Towards Adequate Time Active and Type of Physical Activity .........................................90
CHAPTER I

INTRODUCTION

Statement of the Problem

School districts and educators are constantly stressed over acquiring a better educational framework for increasing academic performance (Fernandez, 2011). As educational development takes place, the answer has been to eliminate those areas that are not assessed by standardized exams (Bailey, 2006; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Jensen, 2008; Langford & Carter, 2003; Sallis et al., 1999; Sherman, Tran, & Alves, 2010). Langford and Carter (2003) added that these areas are sometimes referred to as an add-on class to education. As government leaders, school leaders, teachers, and parents deliberate over which areas of education are more important, student improvement in the tested areas is the main focus (Sirotta, 2013).

Langford and Carter (2003) stated that the objective of educational quality is definitely clear, yet, if tomorrow's students die too soon from a sedentary lifestyle, their best contributions to the world will never occur. Bailey (2006), Coe et al. (2006), Jensen (2008), Langford and Carter, Sallis et al. (1999), Sherman et al. (2010), and Trost and van de Mars (2010) indicated that leaders in educational systems want to go as far as to eliminate physical education in the hope of improving students’ academic achievement in the language arts, mathematics, science, and social studies. Trost and van de Mars further stated the following:

According to a national study conducted by the Center on Education Policy in 2007, since the passing of NCLB in 2002, 62 percent of elementary schools and 20 percent of middle schools have significantly increased the instructional time
they allocate to reading/language arts and math. To accommodate such increases, 44 percent of school districts reported cutting time in such areas as social studies, art, music, physical education, and recess. On average, schools reduced the time allotted to these subjects by more than 30 minutes per day. (p. 60) Langford and Carter stated that it is probable that a decline in all parts of the educational model, such as deleting physical education classes, could cause an unbalanced approach to improving the student as a whole. In fact, there is more to educating a child than teaching language arts, science, social studies, and mathematics.

As the idea of eliminating physical education lingers, Gabbard (as cited in Langford & Carter, 2003) emphasized that “many administrators express the view that, while acknowledging that physical education is important to child development and school activities, they consider it to be an enrichment or frill unworthy of high priority, especially if a school’s goal is improving poor academic performance” (p. 1). Also, Stevens-Smith, Fisk, Williams, and Barton (2006) added that principals want to make the areas of language arts, mathematics, science, and social studies a priority because those are the areas that are tested. Therefore, school districts are now discussing the idea to remove physical education class from school curriculums and no longer be a state requirement (Trost & van de Mars, 2010).

According to Stevens-Smith et al. (2006), educational systems place a great amount of accountability on teachers and administrators. For example, in Mississippi, the Mississippi Statewide Teacher Appraisal Rubric (M-STAR) and the Mississippi Principal Evaluation System (MPES), which came into effect in Mississippi for the 2013–2014 school year, are two new evaluation systems that will evaluate both teachers
and administrators. Both, the M-STAR and MPES are largely based on the areas of student academic achievement (Mississippi Department of Education, n.d.a; Mississippi Department of Education, n.d.b). Humphries, Binder, and Edwards (2011) and Trost and van de Mars (2010) stated that with this accountability placed on the school districts, one can see how school leaders and administrators would want to take classes, such as physical education, music, and art, out of the curriculum or pull students from these classes in order to give the teachers sufficient time to prepare the students for the curriculum tests. Furthermore, this is becoming a common discussion among school leaders because there is no type of assessment placed on physical education that is associated with school ratings. Without physical education class in schools, how are students going to become physically active and maintain an optimal level of fitness?

Purpose of the Study

As educators, it is the teacher’s job to ensure the success of the students they teach, and educators can do this by exploring every avenue that is available. One particular avenue is physical education and the physical activity associated with the class. Research has shown that there are several benefits associated with physical activity, especially in the elementary years. For example, studies conducted by Castelli, Hillman, Buck, and Erwin (2007), Sallis et al. (1999), and Taras (2005) all found that there may be a connection between children that are physically active and fit and student academic achievement. Jensen (2008) and Sallis et al. further added that physical education class should not be taken away because of the social, physical, and psychological benefits associated with the physical activity provided by the class.
Based on these benefits, Bailey (2006) stated that physical activity during physical education class plays an essential role in the makeup of a young child during the elementary years. Physical activity has the potential to provide several benefits to the development of students. Bailey, Hastie and Martin (2006), the National Association for Sport and Physical Education (2004), and Overdorf and Coker (2013), emphasized that one benefit is realized through the student learning movement skills and physical capabilities. For example, Goodway and Robinson (2006) indicated that by children learning these motor skills it gives them the capabilities to succeed in the classroom. These capabilities can be as simple as sitting upright in a chair and using their fingers and hands correctly when learning to write. Also, when presented appropriately, physical activity can help develop social skills and behaviors; and in certain cases, it can help with academic and cognitive development (Bailey, 2006; Sallis et al. 1999; Tomporowski, Davis, Miller, & Naglieri, 2008).

In addition to providing increased physical capabilities and motor skills benefits to students, another possible benefit of physical activity through physical education class is learning a lifestyle trait that will hopefully continue with students after they graduate from high school (Bailey, 2006; Lumpkin, 1986; Overdorf & Coker, 2013). This is important because, according to the Mississippi Department of Education (n.d.c), the percentage of children in Mississippi that are overweight is 6.9% higher than the second place state and childhood obesity has tripled since 1980. As a result of sedentary lifestyles, childhood obesity is a significant epidemic taking place in the United States (Beaulieu, Butterfield, Mason, & Loovis, 2012; Krishnamoorthy, Hart, & Jelalian, 2006). Physical education teachers need to make sure these facts are made known and instill in
their students a desire to practice a healthy lifestyle as they get older so this development of obesity will fade away (Guimarães & Ciolac, 2014; Senne, 2013). Students who develop good exercise habits during the elementary school years will hopefully keep those habits as they get older. By developing these habits, the overweight and obesity rates could be decreased as well as those diseases such as diabetes, cancer, and cardiovascular problems that are associated with people who live a sedentary lifestyle (Ross, 1994).

Along with helping with the obesity rate and decreasing the risk for certain diseases, Bailey (2006), Taras (2005), and Taras and Potts-Datema (2005) stated that physical activities can provide psychological benefits as well. One of the psychological issues physical activity can help is self-esteem. With increased self-esteem, students have reduced stress, anxiety, and depression levels (Bailey, 2006; Taras, 2005; Taras & Potts-Datema, 2005). By reducing stress, and causing less anxiety and depression, students will want to attend school and will perform better academically as well (Taras, 2005). Along with reducing stress and decreasing the risk for certain diseases, Mouratido, Goutza, and Chatzopoulos (2007) asserted that physical activity can teach students the importance of sportsmanship through working together as a team while being fair to one another.

Furthermore, there has been a long tradition claiming that a healthy body leads to a healthy mind (Bailey, 2006) and that being physically active and fit can support intellectual development in students. Bailey (2006) and Jensen (2008) stated that physical activity can improve academic performance by increasing blood flow to the brain and producing more dopamine. As more blood reaches the brain, Bronson, Merki,
Cleary, Middleton, and Zike (2007) and Jensen (2008) stated that more nutrients are getting to the neurons as well as other parts of the brain. Increased blood flow can enhance an individual’s mood by raising mental consciousness, recall ability, and again improving their confidence (Bailey, 2006; Jensen, 2008).

With all the academic, psychological, and social benefits associated with physical activity and in efforts to address Mississippi’s high obesity rate and the student’s sedentary lifestyle (Mississippi Department of Education, n.d.c), the state legislature passed the Mississippi Healthy Schools Act of 2007 that required all students in grades K–8 to participate in 150 minutes of physical activity per week (Mississippi Department of Education, 2013). According to the National Association for Sport and Physical Education (2011) and the Mississippi Department of Education (2013), the State Board of Education further requires that the 150 minutes of physical activity must be based on instruction which excludes recess. With the required 150 minutes of physical activity per week, the State Board of Education requires students in grade 5 to participate in fitness testing, using the FITNESSGRAM®, ACTIVITYGRAM® or the President’s Challenge to Fitness (Mississippi Department of Education, 2013). In addition to administering these assessments, the results must be kept on record.

The FITNESSGRAM® assesses five areas of health-related fitness: muscular strength, muscular endurance, flexibility, aerobic capacity, and body composition (Meredith & Welk, 2009). Students’ scores are evaluated against criterion-referenced standards for gender and age that have been established to show levels of fitness parallel to their health. Parents, teachers, and students benefit from the FITNESSGRAM®
because it can be used to map personal fitness goals, identify student needs, and direct physical education programs (Meredith & Welk, 2009).

In addition to the required use of the FITNESSGRAM® in grade 5 to measure students’ physical abilities, Mississippi uses another curriculum test for grades K–8 that rates its schools based on how the students perform academically. This test is called the Mississippi Curriculum Test, 2nd Edition (MCT2). The MCT2 test consists of three tested parts: mathematics, language arts, and a science portion. This test is given to students in grades 3, 5, and 8. This test rates students as minimal, basic, proficient, and advanced (Mississippi Department of Education, 2012).

Based on the cognitive, physical, and social benefits associated with physical fitness, this study compared students’ scores on the FITNESSGRAM® with students’ scores from the MCT2 test to determine if there was a correlation between physical fitness and student achievement. Through conducting this study, administrators and teachers could possibly be informed on whether or not physical education is needed in today’s schools.

Another reason for conducting this study was to promote healthy lifestyles for the children of tomorrow. Obesity, diabetes, and heart disease are major concerns to children in today’s society (Bailey, 2006; Castelli et al., 2007; Taras, 2005; Taras & Potts-Datema, 2005). With obesity, diabetes, and heart disease posing a threat to children in elementary school, the emphasis needs to be on physical education as an essential function of the educational process, just as we do with other academic areas. By focusing on physical education, educators can help children make lifestyle changes as well as increasing the academic excellence of students. Hopefully, the results of this study will show the
importance of physical education and determine if there was a relationship between physical fitness and student achievement.

Research Questions

The following research questions addressed the purpose of this study:

Research Question 1: What are the differences in the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on how physical fitness affects student achievement?

Research Question 2: What is the relationship between the FITNESSGRAM® fitness scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the mathematics section of the MCT2 in fifth grade students?

Research Question 3: What is the relationship between the FITNESSGRAM® fitness scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the language arts section on the MCT2 in fifth grade students?

Research Question 4: What is the relationship between the FITNESSGRAM® fitness scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the science section on the MCT2 in fifth grade students?

Definition of Terms

*Academic achievement* - for the purpose of this study, the scores students receive from the Mississippi Curriculum Test, 2nd Edition in the areas of mathematics, language
arts, and science. Students can receive raw scores that are placed in categories as advanced, proficient, basic, and minimal.

**ACTIVITYGRAM®** - an assessment given by physical education teachers to determine the level of physical activity of their students (Meredith & Welk, 2009).

**Aerobic capacity** - a component of the FITNESSGRAM® which measures the maximal intake of oxygen (Meredith & Welk, 2009).

**Body composition** - a component of the FITNESSGRAM® that measures the ratio of lean body tissue to the amount of fatty tissue in an individual’s body (Bronson et al., 2007).

**Body Mass Index (BMI)** - a measure of an individual’s weight based on their height. It is computed by dividing the weight in kilograms by the square of the height in meters (Must & Anderson, 2006).

**Exercise science** - a part of physical education class that explains the scientific analysis of the human body in motion (Lumpkin, 2005).

**Fitness Levels** - determined once students have completed the FITNESSGRAM® assessment. The results place the students in one of two categories, Healthy Fitness Zone or Needs Improvement Zone (Bass, Brown, Laurson, & Coleman, 2013; Meredith & Welk, 2009).

**FITNESSGRAM®** - an assessment given to students based on criterion-referenced questions that score their health-related fitness (Meredith & Welk, 2009). The FITNESSGRAM® includes components that measure muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity.
Flexibility - a component of the FITNESSGRAM® that measures the complete range of motion for a muscle or joint (Bronson et al., 2007).

Health-Related Fitness - consists of teaching good health and how to prevent certain diseases. This should be a component of a good physical education curriculum (Bailey, 2006; Hastie & Martin, 2006).

Mississippi Curriculum Test, 2nd Edition (MCT2) - an assessment that is given in grades 3 through 8 in mathematics and language arts, which consists of a reading and writing section. Along with those two areas, a science portion is given in grade 5 and 8 (Mississippi Department of Education, 2012).

Mississippi Statewide Teacher Appraisal Rubric (M-STAR) - a teacher evaluation system that is based on students’ academic achievement and teacher actions. It is designed to help improve the performance of educators (Mississippi Department of Education, n.d.b).

Mississippi Principal Evaluation System (MPES) - a principal evaluation system that is based largely on student performance goals by encouraging school and community environments that value high academic achievement (Mississippi Department of Education, n.d.a).

Motor Skills - skills that require muscle movement such as agility, balance, and hand eye coordination (Bronson et al., 2007).

Muscular Endurance - a component of the FITNESSGRAM® that measures the amount of time a muscle can perform a task without becoming fatigued (Bronson et al., 2007).
Muscular Strength - a component of the FITNESSGRAM® that measures the amount of force a muscle can exert (Bronson et al., 2007).

No Child Left Behind Act of 2001 - a federal mandate that required states to employ an assessment that measures student achievement in the areas of mathematics, language arts, history, and science (Mississippi Department of Education, 2010).

Obese - a Body Mass Index of 30 or higher (Centers for Disease Control and Prevention, 2012).

Overweight - a Body Mass Index between 25 and 29.9 (Centers for Disease Control and Prevention, 2012).

Physical Activity - any movement that makes your body use energy (World Health Organization, 2014).

Physical Education - for the purpose of this study, a part of Mississippi’s schools curriculum that teaches to the whole child and provides fitness assessments to the children to show their current fitness levels and provide ways to improve those levels and the process by which an individual gains optimal skills through some type of activity (Lumpkin, 2005).

President’s Challenge to Fitness - an assessment designed to increase and improve physical fitness in people of all ages (The President’s Council on Fitness, Sports, & Nutrition, n.d.). This assessment measures body composition, flexibility, muscular strength, muscular endurance, and cardiovascular endurance

President’s Council on Youth Fitness - a council set up by Presidents Dwight D. Eisenhower and John F. Kennedy that was used to inform the American people about the importance of their children being physically fit (Stein, 1985; Sturgeon & Meer, n.d.).
**Sedentary Lifestyle** - a lifestyle where an individual is not active.

**Skill Related Fitness** - fitness that promotes the performance of motor skills (Bailey, 2006; Hastie & Martin, 2006).

**Sports** – for the purpose of this study, a part of physical education class which involves physical activities with specific rules that involve competition against an opponent or one’s self for reward or fun (Lumpkin, 2005).

**Whole Child** - developing the mental well-being, physical well-being, and social well-being of a child through physical education class (Madigan, 2009; Pica, 2006; Tremarche, Robinson, & Graham, 2007)

**Delimitations**

1. This study was delimited to one school district in the southeastern region of Mississippi.

2. The student population chosen for this study was delimited to elementary school students in grade 5.

3. This study was delimited to using the FITNESSGRAM® to measure the fitness levels of the students and the MCT2 to measure student academic achievement.

4. This study was delimited to elementary administrators, regular education teachers in grade 5, and elementary physical education teachers’ attitudes about physical fitness and student academic achievement.

5. This study was delimited to FITNESSGRAM® scores and academic achievement scores from the MCT2 during the 2013-2014 school year.
6. Only students that took the MCT2 without accommodations were used for the study.

Assumptions

1. It was assumed that all administrators, fifth grade regular education teachers, and physical education teachers who participated in the study answered the questionnaire honestly.

2. It was assumed that the FITNESSGRAM® and the Mississippi Curriculum Test, 2nd Edition were given to the students consistently.

Justification

The purpose of this study was to discover the relationship between physical fitness and students’ academic achievement. Some research supports that physical education is an important part of the educational process and needs to remain part of the curriculum (Wilkins et al., 2003). For example, Wilkins et al. (2003) asserted that with the cognitive benefits associated with a quality physical education program, it would be at a great disadvantage for the students not to receive any physical activity through physical education class. However, Stevens-Smith et al. (2006) stated that some educators believe that physical education takes time away from the core classes and has no benefit to students’ academic achievement. Regardless of how school districts, administrators, and teachers feel, there needs to be time set aside for these students to participate in physical education class (Langford & Carter, 2003).

Another issue facing students today is a sedentary lifestyle (Hastie & Martin, 2006). This type of inactive lifestyle needs to change and one way this can be reversed is through good habits developed during physical education class. Students in today’s
society tend to steer away from physical activity (Chen, Kim, & Gao, 2014; Hastie & Martin, 2006). Our current society supports children staying inside and playing video games or watching television (Chen et al., 2014). This can lead to children becoming overweight or even worse, obese, and developing certain diseases associated with that lifestyle.

Results of this study may help find that physical education can improve the overall academic performance of students. With numerous studies conducted on physical activity and student achievement, the research regarding the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers was lacking. The goal of this research was to expand on the relationship between physical fitness and academic achievement through interpreting the attitudes of the elementary administrators and elementary teachers. School leaders, administrators, teachers, and parents need to understand why physical education must be kept in the curriculum, and students need to be allowed to participate and not made to stay in class to prepare for the curriculum tests.
CHAPTER II
REVIEW OF LITERATURE
Theoretical Framework

In Howard Gardner’s (1999) theory of multiple intelligences, there is one intelligence, bodily-kinesthetic, that can be used as a foundation for administrators and teachers to utilize physical education to improve student achievement. Along with the bodily-kinesthetic intelligence, there are six other intelligences discussed in Gardner’s theory of multiple intelligences. The other six multiple intelligences are verbal-linguistic, logical-mathematical, musical-rhythmic, visual-spatial, interpersonal, and intrapersonal (Gardner, 1999). As regular education teachers are held accountable by school districts to perform, physical educators now are facing situations where they have less time for physical education class, hindering the bodily-kinesthetic intelligence (Humphries et al., 2011). Humphries et al. (2011) emphasized that classroom teachers and physical education teachers need to collaborate to ensure students receive the needed time for physical education class.

Bodily-kinesthetic intelligence, which is primarily used during physical education, is considered by Pica (2006) to be the least valuable intelligence; however, Kagan (2000) concluded that teachers need to understand all of Gardner’s (1999) multiple intelligences because this will better prepare students to be successful. According to Gardner, the bodily-kinesthetic intelligence involves the potential of applying movement of body parts and the movement of the body to help students learn. Humphries et al. (2011) added that physical education class is important to students with a high bodily-kinesthetic intelligence because of the enhancement it provides to these
students. The kinetic movement of the body has many physical benefits and cognitive
benefits when applied to students during physical education class. Pica argued that from
birth to around the age of eight, every person uses the bodily-kinesthetic intelligence to
solve problems they might be experiencing. In addition, Hannaford (2007) emphasized
students tend to process information kinesthetically by using their senses.

Ozdemir, Guneysu, and Tekkaya (2006) stated students have several different
abilities, thus allowing them to learn by different techniques. Douglas, Burton, and
Reese-Durham (2008) suggested that students have several types of abilities that could
enhance their capacity to learn and cause them to respond successfully to the
environment around them. Gardner’s (1999) theory of multiple intelligences takes this
into account. The theory of multiple intelligences has become “a viable approach for
exploring teaching styles, individualizing teaching and learning, developing curriculum,
and improving teachers’ assessment literacy” (Ozdemir et al., 2006, p. 74). McMahon,
Rose, and Parks (2004) added that educators are constantly looking for ways to improve
their teaching strategies and finding different ways for students to learn. Gardner’s
multiple intelligence theory’s greatest strength lies within its framework (Ozdemir et al.,
2006). The framework allows teachers to examine and explore different teaching
techniques and helps teachers find ways to structure teaching and learning experiences
for all students (Ozdemir et al., 2006).

McMahon et al. (2004) and Ozdemir et al. (2006) emphasized that Gardner’s
theory of multiple intelligences gives understanding to the cognitive abilities of students.
Ozdemir et al. further stated that Gardner’s theory can be used to meet three objectives:
(a) match teaching styles to students’ learning abilities, (b) help students to extend their
learning capabilities by developing all their possible intelligences, and (c) observe the diversity of all students.

By applying these objectives and using the bodily-kinesthetic intelligence through physical activity, students can enhance their learning capabilities (Gardner, 1999). Physical education class is an important part in students becoming more physically active during the school day. For example, when students become interactive during physical education class, the blood flow throughout the body is increased and more oxygenated blood reaches the brain. Berg (2010) stated that through moderate exercise a neurotrophic factor in the brain is increased and causes more neurons, which transmits information to be produced. Administrators and teachers all understand that student achievement is the main goal in education. By tapping into these different intelligences, students will be helped in reaching success in academic achievement.

History of Physical Education

Physical education ranks to historically the oldest elements of education. If we wanted to present the whole chronology of the development of physical culture, we would have to start with the beginnings of the development of man, when motion was a social phenomenon conditioned by material conditions, vital for the preparation of man for fight and motional fitness was an evolutional selective impulse. (Jurkechova, Vlcek, & Bartik, 2011, p.17)

Physical activity has been around a very long time and the Greek culture took that physical activity to another level by incorporating it into games known as the Olympics. The Greeks described the Olympics as events where athletes trained to show off their physical fitness by participating in sporting activities competing against one another
Since the Olympics revolved around sporting activities and the physical fitness of athletes, they are considered to be the backbone of physical education in today’s school systems (Lumpkin, 1986). Spears and Swanson (1983) and Christesen (2012) stated the Olympics were held every four years to honor the Greek god, Zeus. These Olympic events began as early as 776 B.C. (Christesen, 2012), and the first Olympics consisted of five days of activities that included races, disc and javelin throws, wrestling, and other festive practices (Lumpkin, 1986). Since that time, civilizations and cultures throughout Europe have constantly contributed to the development of physical education. Lumpkin (1986) stated “the European legacy of athletics, gymnastics, and sports laid the foundation for physical education programs in the United States” (p. 181). Jurkechova et al. (2011) added that because of the popularity of the gymnastics from Europe, people in the United States began to become more concerned about their health.

As the United States entered the 1800s, Jurkechova et al. (2011) noted that education was no longer strongly influenced by the church; instead, the state began to take more power over public education. Jurkechova et al. labeled this time period as the “architecture of American education,” (p. 23) and public education began to take form. As provisions were made in public education to educate more and more children, schools placed emphasis on reading, writing, and arithmetic, and showed little interest in physical education. However, in 1853, Boston became the first city to mandate daily physical exercise for children in schools (Lumpkin, 1986). Then, physical education began to become a topic of discussion in public education (Bishop, 2005). It was not long after Boston mandated physical education that California became the first state to mandate a physical education curriculum in their schools (Bishop, 2005). Bishop (2005) and
Lumpkin (1986) emphasized that after California made this mandate, physical education became a part of the curriculum for many secondary schools, as well as several colleges. As a result of this taking place, “Early physical education in the United States underwent a transition from recreational sports and games to organized school and college programs that emphasized one system of gymnastics or a combination of exercises” (Lumpkin, 1986, pp. 206-207) that promoted wellness.

With this transition taking place, Bishop (2005) and Sturgeon and Meer (n.d.) stated that during the 1900s, presidents, such as Dwight D. Eisenhower and John F. Kennedy, endorsed physical education in schools and established the first President’s Council on Youth Fitness. The function of the President’s Council on Youth Fitness was to inform the American people about the importance of their children being physically fit (Stein, 1985; Sturgeon & Meer, n.d.). Stein (1985) added that the President’s Council on Youth Fitness was vital to “(a) determining current status of youth fitness programs, (b) identifying problems and needs, (c) obtaining input for improving programs, and (d) enhancing opportunities in these areas for all children and youth” (p. 2). Along with the development of the President’s Council on Youth Fitness, President Eisenhower also developed a fitness test, the Presidential Fitness Test, to measure the fitness levels of not only the youth, but all individuals in the United States (Sturgeon & Meer, n.d.).

According to the John F. Kennedy Presidential Library and Museum (JFKPLM) (n.d.) and Sturgeon and Meer, this fitness test was created because President Dwight D. Eisenhower, being a military man, was concerned with the fitness of the soldiers as they were preparing for war. Military officers were not pleased with the physical fitness level of the men who were being drafted during World War II and the Korean War (JFKPLM,
n.d.). In addition to soldiers’ levels of fitness being poor, there was another factor that led to the concern of physical fitness in the United States. This was the drastic change to the economy in the 1900s. Machines were now being used in place of workers. While these machines did much of the work, the people operating the machines were often left physically inactive (JFKPLM, n.d.).

With the new economy and worries about soldiers’ fitness levels, more concern arose when research from Europe found children in the United States to be less fit than children in other countries (JFKPLM, n.d.; Sturgeon & Meer, n.d.). When John F. Kennedy took over as President, he continued to emphasize what Dwight D. Eisenhower had started with regard to becoming a more physically fit nation. Therefore, physical education programs became popular in school curricula, and with this popularity, children were eager to participate (JFKPLM, n.d.). With this new acceptance, many state educational systems now understood the importance of physical education and the need for the students to be physically fit and stay fit during their lives (Bishop, 2005; Palmer & Bycura, 2014).

Defining Physical Education in Schools

Lumpkin (2005) defined physical education as the process through which an individual gains optimal physical, mental, social, and fitness skills through some type of activity. According to Lumpkin, two elements provide the foundation for physical education:

1. Exercise science, which is the scientific study of the human body while in motion.

2. Sports, which are physical activities with specific guidelines that involve competition against an opponent or oneself for reward or fun.
Throughout the years, physical education, which is based on exercise science and sport, has focused on developing the whole person as well as seeking to improve the quality of life and well-being of whoever is involved (Lumpkin, 2005; Madigan, 2009; Pate, O’Neill, & McIver, 2011; Pica, 2006; Young, 1996).

Lumpkin (2005) stated that during the 1930s, educators began to focus physical education on the objectives from Bloom’s domains of learning. Bloom’s domains of learning consist of cognitive, affective, and psychomotor objectives (Fraser & Robinson, 2012). According to Fraser and Robinson (2012) the cognitive domain deals with “reasoning, judging, and problem solving” (p. 115). Lumpkin stated that an individual who has increased cognitive development tends to have a better execution of skills in reading, math, and language, and that performance in these areas could be increased from physical education programs. Also, Lumpkin noted that content from reading, math, and language should be incorporated in physical education curriculum. Another domain of Bloom’s learning is the affective domain. Fraser and Robinson described this domain as the “socio-emotional component” (p. 115). The affective domain relates to the formation of attitudes and values, along with social and emotional feelings of children (Lumpkin, 2005). The last of Bloom’s domains is psychomotor development. According to Fraser and Robinson and Lumpkin, the psychomotor domain highlights fundamental movements, motor skills, and sports skills. Lumpkin stated that educational objectives will come through the cognitive, affective, and psychomotor domains. Lumpkin emphasized that the main purpose and challenge facing physical educational professionals is to make sure they get students involved in regular physical activity so the children can enjoy the health benefits for years to come.
In order to get students involved in physical activity, Hastie and Martin (2006) and Overdorf and Coker (2013) suggested physical education class should consist of health-related fitness and skill-related fitness. Health-related fitness consists of promoting good health and the prevention of certain diseases (Bailey, 2006; Hastie & Martin, 2006). The other component is skill-related fitness which promotes the performance of motor skills, such as agility and balance. Hastie and Martin stated that a major concern today is determining how much physical activity a child should have. With the invention of new technology, children are not as active as they used to be (Chen, Kim, & Gao, 2014), and Hastie and Martin, and Lynn (2007) stated that elementary aged children should participate in 30-60 minutes of physical activity per day making sure that 10-15 minutes are very vigorous. Physical educators should make sure the students remain active by incorporating instant activities (Hastie & Martin, 2006). For example, physical education teachers should be providing activities while students wait their turn for an activity, and also use pedometers to promote awareness of their activity levels (Hastie & Martin, 2006). Also, physical educators need to promote positive messages about physical activity and wellness, while presenting the lessons with enthusiasm and praise (Hastie & Martin, 2006).

When first started, physical education class was not considered to be a part of the regular curriculum; instead, it was considered as a co-curricula class (Young, 1996). Young (1996) stated that physical education class was separated from regular education classes, such as language arts, mathematics, and science, and viewed as a “special” (p. 3) area of education. Originally, educators thought physical education class had little or no relationship with other academic areas (Young, 1996). Instead, activities during physical
education class were to promote fun (Garn & Cothran, 2006) and provided a type of physical release that helped children to get their minds away from content area learning tasks (Young, 1996). Sallis and McKenzie (1991) and Young described how elementary classroom teachers prepared games on the playground for children to take part in, while secondary school physical education class focused on stretching and sport skills that prepared the children to participate in sporting events. As more research was being done on physical activity, people began to think differently about the concept of physical education class. This research begins to show how physical education class helped develop the whole child through providing cognitive, social, and physical benefits (Madigan, 2009; Pica, 2006; Tremarche, Robinson, & Graham, 2007; Young, 1996).

Young (1996) stated that as the 19th century was ending, physical education class was viewed as an important portion of the mind and overall health maintenance. As a result, “it was believed that physical education class could contribute to the emotional, social, mental, and physical development of children so that they might become more well rounded adults and contributing citizens” (Young, 1996, p.3). Young and Mood, Jackson, and Morrow (2007) concluded that physical education class today is recognized for its effectiveness in helping to provide activities through physical activity that can yield preventive health benefits throughout a person’s lifetime.

Beaulieu, Butterfield, Mason, and Loovis (2012) discussed that with the United States now taking strides to boost children’s physical activity, it was more likely that physical education curricula would develop accordingly. This is evident in the past few years with many states now mandating that children participate in physical education class. The state of Mississippi is a prime example of how this process took place. In
2007, according to the National Association for Sport and Physical Education (2011) and the Mississippi Department of Education (2013), the Mississippi state legislature passed a mandate that required 150 minutes of activity-based lessons per week for students in grades K-8, with at least 50 of those minutes coming from physical education class. This mandate was titled the Mississippi Healthy Students Act of 2007. By mandating students to participate in 150 minutes of physical activity per week, this legislation reinforced physical education and showed that the state wanted students to be physically active. The Mississippi Department of Education hoped this mandate would allow students to start participating in physical education class at an early age and learn the skills they need to be healthier.

The Mississippi Healthy Students Act of 2007 took place because Mississippi ranks among the highest in childhood and adult obesity in the nation (Mississippi Department of Education, n.d.c). According the Mississippi Department of Education (n.d.c), the percentage of children in Mississippi that are overweight is 6.9% higher than the second place state. Since childhood obesity has tripled since 1980 (Mississippi Department of Education, n.d.c), there is worry that children’s life expectancies will become shorter. This is because there are several health issues associated with obesity which include cardiovascular disease, Type II diabetes, and stroke (Bailey, 2006; Castelli, Hillman, Buck, & Erwin, 2007; Taras, 2005; Taras & Potts-Datema, 2005). Also, children that are overweight show signs of depression, miss more school, and have lower academic performance in school (Mississippi Department of Education, n.d.c).

With this mandate in place, the Mississippi Department of Education (2013) aimed for students to (a) take part in regular physical activity, (b) understand the health
benefits from participation in physical activities, (c) understand the significance of physical activity and how it contributes to a healthy lifestyle, (d) become physically fit, and (e) be taught skills and obtain knowledge of how to perform numerous physical activities. Also, with the required 150 minutes of physical activity per week, the National Association of State Boards of Education (2009) now mandates that students in grade five participate in one of three types of fitness testing programs, using the FITNESSGRAM®, ACTIVITYGRAM® or the President’s Challenge to Fitness. These three fitness assessments are all used in physical education class. The FITNESSGRAM® is used to inform administrators, teachers, parents, and even students of the fitness levels of students at school (Meredith & Welk, 2009). The FITNESSGRAM® consists of assessments to measure body composition, flexibility, muscular strength, muscular endurance, and cardiovascular endurance (Meredith & Welk, 2009). The President’s Challenge to Fitness is very similar to the FITNESSGRAM® in that it measures body composition, flexibility, muscular strength, muscular endurance, and cardiovascular (The President’s Council on Fitness, Sports, & Nutrition, n.d.). The only difference is that the President’s Challenge to Fitness is designed to increase and improve physical fitness in people of all ages (The President’s Council on Fitness, Sports, & Nutrition, n.d.). The FITNESSGRAM®, ACTIVITYGRAM® or the President’s Challenge to Fitness assessment must be performed in grade five and the results kept in the child’s records to verify to the State Department of Education that the fitness test has been administered (National Association of State Boards of Education, 2009).
Education of the Whole Child

Physical education class is no longer seen as something separate from other academic disciplines such as language arts, mathematics, and science, as in many states it is now mandated by the state department of education. Physical education is now regarded as a vital part of the school curriculum and an important part of developing the whole child, which consists of their physical, mental, and social well-being (Madigan, 2009; Pica, 2006; Tremarche et al., 2007; Young, 1996). The National Association for Sport and Physical Education (2011) stated that physical education is vital when it comes to educating the whole child. According to the National Association for Sport and Physical Education, developing the whole child is done by:

1. Children are learning and practicing a healthy lifestyle.
2. Children are put in an intellectually demanding environment that is psychologically safe and physically safe.
3. Children are linked to the school and children are linked community while being vigorously occupied with learning.
4. Children are supported by compassionate adults and qualified adults, through modified learning.
5. The curriculum is balanced, and when children are finished with high school, they are prepared for college, prepared for additional study, or prepared for employment.

Madigan (2009) stated that emotions, cognitive learning, interaction between one another, and physical movement all rely upon each other. If a student’s emotional,
cognitive, social, and physical ability are developed properly, it will lead to the child’s capacity to learn (Madigan, 2009).

**Importance of Physical Education**

Not only does physical education help develop the whole child, it also helps with cognitive function. The physical education curriculum plays a major role in providing numerous benefits to both the body and mind. Physical education class allows for the student to become physically active which can lead to them having a healthy body. Having a healthy body can effect cognitive development; therefore, a healthy body leads to a healthy mind (Bailey, 2006). Pica (2006) described children’s favorite way to learn is through movement. Pica stated that current research has shown that the brain and body are not two separate units, and certain actions of the body contribute to the cognitive ability of the mind. Ratey (2008) argued that the brain has the capacity to improve by performing exercises and being physically active. According to Madigan (2009), the framework for learning is built on movement. Weinstein and Erickson (2011) stated that with regular participation in physical activity during the early years and mid-years of life, there is less of a decline in brain function and brain decay.

Along with physical education providing a healthy body and healthy mind, there are goals physical educators are aiming to accomplish. Lumpkin (1986) stated that one goal of a physical education curriculum should be to provide the student with activities that can impact their lives. Lumpkin also added that physical education class could contribute to making the student a successful member of society. Ultimately, physical education should increase one’s quality of life through physical, mental, and social benefits (Lumpkin, 1986; Young, 1996).
Another goal of physical education is to help in the development of skillful motor movements (Hastie & Martin, 2006; Overdorf & Coker, 2013). According the National Association for Sport and Physical Education (2004), having the confidence to perform a skill with proficiency leads to a lifetime of physical activity. Overdorf and Coker (2013) added that these are the skills that should be taught to children while in physical education class. Based on that information, with improvement and a general understanding of a specific motor skill, children can take that skill with them into adulthood and sustain a physically active lifestyle (Overdorf & Coker, 2013; Young, 1996).

Often when trying to understand the ultimate goal of physical education, two things may stand out: (a) finding ways for children to participate in physical activities throughout their lives and (b) children making changes to their current health practices (Lumpkin, 1986; Overdorf & Coker, 2013). Tammelin, Nayha, Hills, and Jarvelin (2003) stated that children will stay active as they enter adulthood as long as they have a type of activity they feel comfortable performing. As an individual becomes more comfortable with a skill or activity, they are considered to be physically literate (Higgs et al., 2008). Physical literacy has been defined as “the development of fundamental movement and skills and fundamental sport skills that permit a child to move confidently and with control, in a wide range of physical activity, rhythmic (dance) and sport situations” (Higgs et al. 2008, p. 5). Children who feel confident in their abilities are more likely to take part in more physical activity, while children who do not feel confident in their skills are not as likely to be involved. Overdorf and Coker (2013) added that efficient physical
movement should begin early in children’s lives; therefore, it will move on with them later in life.

By preparing our students to become physically active, it may greatly benefit not only their present lifestyles, but also their future lifestyles. Loundsbery, McKenzie, Morrow Jr., Monnat, and Holt (2013) and Guimarães and Ciolac (2014) stated that physical activity is a necessity for our children’s present and future health, and school is the prominent environment for providing any type of physical activity to children. If physical activity is not taught to children in physical education class, there is a chance of children becoming inactive which can lead to unhealthy weight gain. Childhood obesity is a significant epidemic in the United States (Beaulieu et al., 2012; Krishnamoorthy, Hart, & Jelalian, 2006). According to a Central Intelligence Agency (2013) report, the United States was the sixth most obese country with an obesity rate of 33.90%. Only Saudi Arabia (35.60%), Kiribati (50.60%), Tonga (56.00%), Tokelau (63.40%), and American Samoa (74.60%) have a higher obesity than the United States (Central Intelligence Agency, 2013). Countries such as Vietnam (0.50%), Madagascar (2.10%), Japan (3.10%), South Korea (3.20%), and the Philippines (4.30%) are all in the lowest rates of being obese (Central Intelligence Agency, 2013). According to The World Health Organization (2013), 40 million children under the age of five were overweight, and that a reported 2.8 million people died as a result of being obese. This pattern of obesity has to change in not only the United States, but throughout the world. If a pattern of obesity is created in childhood, it is likely to carry over into adulthood (Guimarães & Ciolac, 2014). This can be harmful because of health risks and health costs associated with the being obese. Obesity can cause problems such as Type II diabetes and
cardiovascular problems (Bailey, 2006; Castelli et al., 2007; Taras, 2005; Taras & Potts-Datema, 2005). Our students cannot live full, productive lives if there is nothing done to correct the current situation of childhood obesity rates.

Krishnamoorthy et al. (2006) added that with this public health disorder taking place, physical educators, politicians, and school leaders have collaborated to try to find an answer for the problem. It seems that children are not getting enough physical activity in their daily walks of life, and now the leaders of our nation and school systems are looking for ways to increase physical activity for the students (Beaulieu et al., 2012). Beaulieu et al. (2012) stated and the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) (2013) emphasized that recently it has added provisions to its current Comprehensive School Physical Activity Program (CSPAP). The new model of the CSPAP now consists of making schools have physical activity programs before, during, and after school (AAHPERD, 2013; Beaulieu et al., 2012). Beaulieu et al. and AAHPERD added that these new programs would be in addition to the physical education classes offered during the school day. Importantly, AAHPERD is now encouraging school employees to get involved with the physical activity programs along with the families of students and members of the community (Beaulieu et al., 2012). With AAHPERD and CSPAP making these strides to offer several opportunities to children, employees, and family members, the number of obese children will hopefully decrease.

Being physically active can provide individuals with healthy bodies, active lifestyles, and ways to change their current health practices for the better. Physical activity has also demonstrated a positive effect on a neurotrophic factor in the brain
(Huang, Larsen, Ried-Larson, Moller, & Anderson, 2013). This factor is the brain-derived neurotrophic factor (BDNF). According to Manabe (2002), memorization and learning take place in the synapses between brain neurons. BDNF serves as a type of nerve growth factor that helps with the survival of neurons (Manabe, 2002). Manabe added that BDNF is vital for synaptic transmission because it speeds up the process of sending information between the synapses in the brain. Huang et al. (2013) reported that BDNF levels were improved after individuals performed a moderate amount of endurance training, and after six months, the cognitive function of the individuals improved as well. Berg (2010) stated that by participating in running activities, production of BDNF is increased. This increase in BDNF affects the hippocampus part of the brain which is involved in the learning process (Berg, 2010). Not only does exercise increase the levels of BDNF, exercising also increases the synaptic connections between neurons (Berg, 2010). Ferris, Williams, and Shen (2007) stated that a small amount of aerobic exercise showed improved performance in cognitive skills that were connected to higher levels of BDNF. Huang et al. concluded that most of the studies conducted supported the idea that BDNF levels will be elevated when taking part in both short-term and long-term physical activity.

Lifestyle Developments

Physical education can be linked to numerous events throughout the years. From the first Olympics in 776 B.C. to the 1900s, when presidents Dwight D. Eisenhower and John F. Kennedy made big gains in promoting individuals to become physically fit. By urging individuals to become physical fit, Presidents Eisenhower and Kennedy both endorsed physical education in schools (Bishop, 2005). Through this endorsement,
children were now able to gauge their fitness level by taking the Presidential Fitness test (Bishop, 2005). As physical education became more popular, educators could see how participating during class could help develop the whole child (Madigan, 2009; Pica, 2006; Tremarche et al., 2007; Young, 1996). By helping develop the cognitive, physical, and social facets of children, physical education class suddenly became an important part of the curriculum. Physical education was important because not only did it help develop the whole child, but it helped create curricula to assist students in developing motor skills and becoming physically fit (Loundsbery et al., 2013). These goals could be accomplished through physical education class. These physical activities, learned during physical education class, could influence students to be active during their leisure time and throughout their lives (Lumpkin, 1986; Overdorf & Coker, 2013).

By teaching children to participate in physical activities during their leisure time and throughout their lives, hopefully children will be encouraged to practice a healthy lifestyle. Beaulieu et al. (2012) and Krishnamoorthy et al. (2006) noted that childhood obesity is at an all time high and that children need to understand this is not an ideal lifestyle. According to the Centers for Disease Control and Prevention (2011), 48% of students did not take part in any physical education class during the week, and 69% of students did not attend physical education classes on a daily basis. The U. S. Department of Health and Human Services (USDHHS) (2013) reported that 31.7% of children in the United States are considered to be overweight and 16.9% are considered to be obese. The worst part about these statistics is that this epidemic is taking place in children who are very young (USDHHS, 2013). According to the USDHHS, 21% of the children in the United States between the ages of two and five are overweight, and 10.4% are
considered to be obese. Sedentary lifestyles, poor eating habits, and lack of physical activity have led to the children of the United States becoming obese (Sherman, Tran, & Alves, 2010; USDHHS, 2013). The disorder of obesity adds to children’s chances of developing additional short and long term physical and mental problems (Dietz, 2004; Reilly et al., 2003). Sherman et al. (2010) stated these physical and mental problems include different types of cancer, problems sleeping, cardiovascular disease, high blood pressure, and Type II diabetes. Along with the physical problems of being obese, obesity can lead to psychological problems. For example, being obese can cause people to be isolated from their friends, to experience low self-confidence, and to be rejected by their peers (Pearce, Boergers, & Prinstein, 2002; Strauss & Pollack, 2003). These statistics of obese children and problems associated with being obese are very alarming and must change in order for children to become healthy, productive citizens. Changing sedentary lifestyles can increase the amount of calories being burned and help with the obesity epidemic in the United States (Staiano & Calvert, 2011). Changing sedentary lifestyles can begin with physical education class. Physical education class can provide the necessary skills to teach children to became active and give them benefits to become healthy adults. Physical education class provides to the whole development of the child as well as providing numerous cognitive, social, and physical benefits that children can use throughout their lives. Physical educators and other supporters of physical education have been made aware of the benefits associated with participation in physical education (Bailey, 2006). Talbot (as cited in Bailey, 2006) suggested:

Physical education helps children to develop respect for the body – their own and others’, contributes toward the integrated development of mind and body,
develops an understanding of the role of aerobic and anaerobic physical activity in health, positively enhances self-confidence and self-esteem, and enhances social and cognitive development and academic development. (p.1)

Physical Benefits of Physical Fitness

Getting individuals to participate in regular physical activity is the main goal of numerous organizations that promote healthy lifestyles (Pesce, Faigenbaum, Crova, Marchetti, & Belluci, 2013). One strategy these organizations could try is to go to their state departments of education and show how physical education class is important for the success of school districts and for the overall achievement of the child. Pesce et al. (2013) added that when children receive regular physical activity during their childhood, it helps to develop their motor skills. When children develop good motor skills at an early age, it gives them the ability to carry these skills into adulthood (Pesce et al., 2013). Bailey (2006) and Staiano and Calvert (2011) suggested that children learn a majority of their motor skills and how to be physically active during their time spent in physical education class. For many children, the only physical activity they may participate in is during physical education class. Bailey suggested that physical education class taught by skilled physical education teachers gives the needed skills for children to develop habits for an active lifestyle. Bailey (2006) and Taras (2005) noted that by choosing a lifestyle with physical activity incorporated into it, children can expect a longer and better quality of life. Bailey stated that physical activity gives children a better quality of life because it reduces certain risks of developing various diseases and can guard against death at an early age. For example, being physically active can also help prevent the onset of diabetes, lower blood pressure, promote bone growth, and decrease unhealthful weight
Along with helping the child’s physical well being, participating in physical education class provides the skills children need to lay the groundwork for most sporting activities (Bailey, 2006; Overdorf & Coker, 2013; Sallis et al., 1999). According to Bailey (2006) and Overdorf and Coker (2013), if a strong foundation is made with the basic movement skills through sports, children are more likely to be active as a child and on into the adult years allowing them to live a long and healthy life.

Psychological Benefits of Physical Fitness

Along with providing many physical benefits, such as decreasing unhealthy weight gain, fighting against diabetes, helping bones to grow, and lowering blood pressure, Bailey (2006) stated that being physically active on a regular basis can also contribute to the betterment of a child’s psychological health. The main psychological factor is in relation to a child’s self-esteem. Self-esteem is very important for the success of children (Mitrovic, Todorovic, & Markovic, 2012). Mitrovic et al. (2012) defined self-esteem “as an evaluative dimension of the self-concept which is of great importance to the individual” (p. 133). As well as providing an increase in a child’s self-esteem, being physically active can help to reduce stress, anxiety, and even depression (Bailey, 2006; Taras, 2005; Taras & Potts-Datema, 2005). Bailey (2006) and Taras (2005) suggested that physical education class can even help with school attendance and often reinforces children’s attitudes toward school. Children that are otherwise not interested in school, suddenly find themselves wanting to go to school so they can participate in physical education class (Bailey, 2006). As children continue to participate in physical education class, other psychological benefits can positively emerge. The development of these skills is shown in moral reasoning, sportsmanship, and responsibility (Bailey, 2006;
Mouratido, Goutza, & Chatzopoulos, 2007). These traits are developed because when children encounter situations that result from competition, physical education teachers and coaches can guide the students through the situation and teach them how to handle it appropriately (Bailey, 2006). Bailey (2006) and Mouratido et al. (2007) suggested that students can learn sportsmanship, reasoning, and responsibility better from school based programs because physical education teachers can demonstrate how students should act in those competitive situations. Physical education class also has the power to bring individuals together that would normally not mix. Bailey stated individuals from various backgrounds come together to form a team and give a feeling of togetherness.

Academic Benefits of Physical Fitness

It has been suggested that there is a link between physical activity and cognitive function (Sallis et al., 1999; Tomporowski et al., 2008). Tomporowski et al. (2008) noted that research on this subject matter had not been thoroughly conducted until the 1950s. According to Bailey (2006), the original research that determined the connection between physical activity and academic achievement was performed in France in the 1950s. The method of the research was to take children out of their core academic class for a certain amount of time and replace that time with physical education class (Bailey, 2006). The results from the study showed that the children’s achievement did not worsen. In fact, attentiveness was improved, and discipline problems declined throughout the school day (Bailey, 2006).

Since then, researchers have taken notice of the benefits associated with physical activity, especially dealing with cognitive function (Tomporowski et al., 2008). With more and more benefits becoming known, educators needed to take notice of the
importance of physical education class. However, with all the new advances in technology, more and more children are becoming less active (Greer & Gilbert, 2006; Tremarche et al., 2007). For some children, the only form of physical activity they may get is during physical education class while at school. When children participate in a physical education class, it gives them the opportunity to be physically active. Physical activity can provide physical benefits such as better health and increased levels of energy. Additionally, physical activity provides psychological benefits such as better self-esteem and lower stress levels; also, physical activities help children show sportsmanship with one another. Along with these benefits, research is showing a link between physical activity and academic achievement. Research suggests that being physically active can help with cognitive development and student achievement in children (Bailey, 2006; Castelli et al., 2007; Coe et al., 2006; Pica, 2006; Sallis et al., 1999; Sherman et al., 2010; Staiano & Calvert, 2011; Taras, 2005; Tomporowski et al., 2008).

To help illustrate the effects of physical activity on student achievement, a study was conducted by Castelli et al. (2007) which shows a correlation between students participating in some form of physical activity and scores on assessments measuring cognitive ability. Castelli et al. discussed how being physically active during physical education class can improve academic achievement. Castelli et al. studied research conducted by the California Department of Education that used academic scores from the Stanford Achievement Test with fitness scores from the FITNESSGRAM®. The results found a positive correlation between being physically fit and scores from the Stanford Achievement Test, more specifically, the higher the fitness score from the FITNESSGRAM®, the higher the scores on the achievement test (Castelli et al., 2007).
After reviewing the research conducted by the California Department of Education, Castelli et al. (2007) conducted more research with third and fifth grade students in Illinois. These third and fifth graders participated in different types of fitness tests to determine their level of fitness. Along with taking these fitness tests, students took the Illinois Standardized Achievement Test to measure their academic status in reading and mathematics. Castelli et al. concluded the key findings from this study were physical fitness was related to academic performance, confirming the idea that children who are more physically fit are more likely to perform better on standardized tests. Castelli et al. added that when the study was broken down further it revealed that children who performed better on math and reading had better aerobic fitness as well as a better body mass index.

Along with Castelli et al. (2007), Taras (2005) used research conducted by Caterino and Polak to show correlation between physical fitness and student achievement. Taras examined a study conducted by Caterino and Polak and stated that Caterino and Polak took children, grades second through fourth, and divided them into two groups. One of the groups participated in physical activity and the other group did not participate in any physical activity (Taras, 2005). The physical activity included students participating in 15 minutes of calisthenics and walking; afterwards, both groups were tested by using the Woodcock-Johnson Test of Concentration to measure their cognitive ability (Taras, 2005). The results showed fourth grade students who were physically active scored better than the students who did not participate in any physical activity (Taras, 2005). However, second and third grade students showed no differences
if they participated in physical activity or not and when taking the concentration assessment (Taras, 2005).

Other examples of physical activity effecting student achievement include research conducted with elementary students, kindergarten through grade five. According to Sallis et al. (1999), these students were to participate in physical education classes and then be tested using the Metropolitan Achievement Tests. Students were put into two groups, a control group and an experimental group. The control group participated in regular physical education classes, while the other group used the Sports, Play, and Active Recreation for Kids (SPARK) program which consists of high levels of vigorous physical activity. After two years of research, Sallis et al. found that spending more time in physical education classes did not have harmful effects on the standardized test results. In fact, Sallis et al. found some evidence that suggested the physical education program had many favorable results on academic achievement. Sallis et al. concluded that none of the research showed that increasing physical education classes harmed academic performance.

The research examined by Taras (2005) and Castelli et al. (2007) show there may be a relationship between physical fitness and student achievement. Also, research conducted by Castelli et al. and Sallis et al. (1999) suggested that there may be a connection between physical activity and student achievement. According to Jensen (2008) and Sallis et al. physical education should not be taken away because it provides great physical and mental health benefits for the students.

Along with the research showing a relationship between physical activity and student achievement, Jensen (2008) stated that movement has many benefits for the brain.
Movement causes blood flow throughout the body to increase and with the increased blood flow, there is more oxygenated blood carrying nutrients to neurons and other parts of the brain (Bronson, Merki, Cleary, Middleton, & Zike, 2007; Jensen, 2008). Physical activity can also increase the production of dopamine, allow for nerves to grow, and increase the production of new brain cells (Jensen, 2008). These new brain cells can improve learning, memory, and a student’s mood, alertness, and self-esteem (Bronson et al., 2007; Jensen, 2008; Taras, 2005; Taras & Potts-Datema, 2005). Even though physical education is mandatory in many schools, Jensen concluded that only around 36% of children in school participate in physical education due to teachers and administrators pulling students in order for them to prepare for more curriculum tests. Physical education has many benefits for brain development and learning, and according to Jensen, must be kept in the school’s curriculum.

Even with the research showing the advantages of establishing a physical education curriculum, several school districts across the nation are trying to take this curriculum out of schools making room for other academic areas (Bailey, 2006; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Jensen, 2008; Langford & Carter, 2003; Sallis et al., 1999; Sherman et al., 2010) such as language arts, mathematics, and science. These are the areas that teachers are held accountable for from the No Child Left Behind Act. Thomas D. Parker, Superintendent of a local school district, stated:

In today’s educational system, there is much emphasis placed on the accountability of teachers and administrators. Currently, No Child Left Behind is still in place but two new evaluation systems, Mississippi Statewide Teacher Appraisal Rubric (M-STAR) and Mississippi Principal Evaluation System
(MPES), are coming into effect in Mississippi for the 2013-2014 school year.

(personal communication, March 9, 2014)

Both of these evaluation systems, M-STAR and MPES, are heavily weighted in the areas of student achievement (Mississippi Department of Education, n.d.a & Mississippi Department of Education, n.d.b). With this accountability placed on school districts, Humphries et al. (2011) and Trost and van de Mars (2010) emphasized that they could understand how school leaders and administrators would want to take physical education out of the curriculum or pull students from physical education class in order to give the teachers more time to prepare the students for the curriculum tests.

Similarly, Langford and Carter (2003) stated that administrators understood the importance of physical education and the benefits associated with it; however, they do not consider it to be a top priority, especially if academic performance is the main goal. Parker further noted that this is a common theme among schools because there is no type of assessment placed on physical education that is associated with school ratings (personal communication, March 9, 2014). Along with school leaders and teachers, parents are also concerned that time spent in physical education class takes away from student achievement (Bailey, 2006). As the accountability system becomes more prevalent, Coe et al. (2006) stated that “the percentage of schools requiring physical education in each grade decreases from approximately 50% in grades 1-5, to 25% in grade 8, to only 5% in grade 12” (p. 1515). As school districts are taking time away from physical education class, no apparent data has shown that eliminating physical education will increase academic achievement (Coe et al., 2006). With the research showing these
results, it seems clear that the physical education curriculum needs to be a mainstay in education.

Links Between Obesity and Student Achievement

Educational systems in the United States have the ability to impact the health of children (Cavallini, Wendt, & Rice, 2007). Through the physical education curriculum in schools, children can learn ways to become healthy. When children are healthy and physically active, it can help them in several areas of their development, from learning motor skills to reducing stress levels to countering unhealthful weight gain. However, if children still continue to live sedentary lifestyles, they will gain unhealthful weight. This gain in weight can cause children to be overweight, and even over time, become obese.

For a long time, obesity has played a multifaceted role in a child’s development (Crosnoe & Muller, 2004). Ross (1994) stated that being obese causes several health risks increase, such diabetes, cancer, and cardiovascular disease. Along with the increased health risks, obesity can also affect cognitive functioning (Ross, 1994).

For example, Yaussi (2005) stated that obesity can lead to children having lowered stamina, having difficulty breathing, and having an overall lack of motivation. MacCann and Roberts (2013) stated another factor that might affect student achievement is the psychological health of children that are obese. Children that are overweight or obese are more likely to have lower confidence levels and encounter a broad degree of downbeat feelings (MacCann & Roberts, 2013; Taras & Potts-Datema, 2005). Other factors that can affect student achievement in obese students are the ways teachers view these students (MacCann & Roberts, 2013). MacCann and Roberts suggested this can be done “directly or indirectly” (p. 45). Directly, teachers may give lower marks to
overweight students because on their attitudes toward the students. Neumark-Sztainer, Story, and Harris (1999) noted that teachers have a negative view towards students that are obese. MacCann and Roberts added that obese students tend to get less help from teachers, peers, and family because they feel like they are not wanted. This is known as deficit thinking. Deficit thinking “allows teachers to blame the students and parents for failures and lessens the teachers’ and the schools’ accountability for these students” (Bruton & Robles-Pina, 2009, p. 42). All of these factors can lead to a reduced level of well being, thus allowing children’s concentration levels to become lowered and making it more difficult to learn (MacCann & Roberts, 2013; Yaussi, 2005).

To help illustrate the effects of obesity on student achievement, MacCann and Roberts (2013), Datar and Sturm (2006), and London and Castrechini (2011) conducted research to determine if there is a correlation between obesity and low academic performance. The research conducted by MacCann and Roberts was with 383 eighth grade students and 1,036 college age students from five large cities across the United States. The students measured their body mass index to determine if they were considered to be in an overweight, obese, or healthy weight range. MacCann and Roberts added that students measured their cognitive ability by completing grade appropriate assessments in mathematics and vocabulary. In addition to these tests, the eighth grade students had to describe their satisfaction of life, and give individual and parent reports of the how they felt about their grades from the prior semester (MacCann & Roberts, 2013). MacCann and Roberts indicated that the results showed that eighth grade and college-age obese students scored significantly lower than students in a healthy weight range.
MacCann and Roberts concluded that normal weight students had higher grades than obese students.

Datar and Sturm (2006) carried their research out over a four-year period from when students entered kindergarten until they finished the third grade. Student academic achievement was measured from math and reading standardized test scores while students’ weight measurements came from their body mass index. Datar and Sturm concluded that girls, not boys, who started kindergarten at a normal weight and then became overweight by the end of the third grade year were linked to lower test scores. Datar and Sturm suggested that when girls’ weight changed significantly during the first four years of school, it had negative effects on school outcomes. Taras and Potts-Datem (2005) stated that although little research has been conducted in the area between obesity and student achievement, “there are notable strengths to this small body of research and consistent finding of detriment to school performance among children who are overweight and obese” (p. 292).

Another example of how obesity affects student achievement included research conducted by London and Castrechini (2011). The research conducted by London and Castrechini included measuring student fitness levels through the FITNESSGRAM® along with measuring student achievement through the California standardized test. London and Castrechini used two groups of students for their research. One group was in grades four through seven and the other group was from grades six to nine. London and Castrechini concluded that students who are fit as compared to those students who are unfit showed differences in both math and language arts test scores. London and Castrechini stated the differences in academics begin before students enter the fifth grade.
London and Castrechini suggested, however, that overall fitness is a better indicator of academic achievement than obesity.

Accountability and the Mississippi Curriculum Test

Today, school systems have accountability placed on them from the federal, state, and local levels of education. Stevens-Smith et al. (2006) stated that educators believe the teaching world is driven by accountability. This accountability was placed on school districts from the No Child Left Behind (NCLB) Act of 2001 (Education Week, 2004; Mississippi Department of Education, 2010). NCLB, which was passed by the federal government in 2002, required states to implement an assessment that measures student achievement in the areas of mathematics, language arts, history, and science; this assessment began in the 2003-2004 school year (Mississippi Department of Education, 2010). NCLB was intended to help make increases in student achievement by placing accountability on states and individual schools (Education Week, 2004). As this pressure is continually placed on teachers to meet achievement, growth, and adequate yearly progress, some teachers believe less time is needed for areas outside of the academic areas, or tested subjects, of mathematics, language arts, history, and science. Along with teachers, principals also see the need to place priority on the core academic tested areas. Stevens-Smith et al. (2006) added that:

Principals must continually prioritize the needs of the school in terms of curriculum, time, resources, and ultimate outcomes. The major academic focus for every school is always going to be in the areas of language arts, math, science, and social studies; therefore, the principal must prioritize to achieve the goals imposed by testing in these areas. (p.7)
As a result of the accountability placed on educators from NCLB, they feel like they need extra time with their students in order to get maximum academic performance on the language arts, mathematics, history, and science tests. For example, Mississippi rates the academic performance from its students on a yearly basis (Mississippi Department of Education, 2012). This is done by students in elementary school and middle school taking the Mississippi Curriculum Test, 2nd Edition (MCT 2). This test is given in grades three through eight in mathematics and language arts, which consists of reading and writing (Mississippi Department of Education, 2012). Along with these areas, there is a science portion that is administered in grades five and eight (Mississippi Department of Education, 2012). According to the Mississippi Department of Education (2012), the language arts and mathematics portions of the MCT2 are made up of criterion-referenced questions that are aligned with the 2006 Mississippi Language Arts Framework-Revised and the 2007 Mississippi Mathematics Framework-Revised. Also, the science portion of the MCT2 is made up of criterion-referenced questions that are aligned with the 2010 Mississippi Science Framework. All three of these assessments meet the requirements mandated by No Child Left Behind (Mississippi Department of Education, 2012). Once the scores for these assessments are determined, they are used in the Mississippi Statewide Accountability System, exclusively in the areas of achievement, growth, and adequate yearly progress.

In order to set clear expectations for the knowledge, skills, and abilities that students are expected to maintain, Mississippi has developed curriculum frameworks to guide instruction. There is a separate curriculum framework for each content area, and the frameworks contain specific grade-level content to be
mastered. Each curriculum framework undergoes periodic review to ensure that the frameworks include challenging content that is aligned to national expectations and based on the most current research about student learning. (Mississippi Department of Education, 2008, p. 2)

As a result of NCLB, school districts throughout the United States are now trying to decide on ways to increase student achievement and reach adequate yearly progress. Wilkins et al. (2003) suggested that time in classes such as music, the arts, and physical education may be condensed, therefore increasing time in the core academic areas. Physical education teachers fear what kind of consequences these standardized tests will have on physical education programs (Stevens-Smith et al., 2006). Stevens-Smith et al. (2006) stated principals often fail to notice the positive benefits of providing a physical education program in their schools.

Even though teachers, administrators, and school districts want extra time to spend with their students in hopes of better preparing them for these state standardized tests, this can take away from the overall development of the child (Stevens-Smith et al., 2006). Many researchers agree that educators need to understand that every child is different and every child learns through different techniques (Douglas, Burton, & Reese-Durham, 2008; Gardner, 1999; McMahon, Rose, & Parks, 2004; Ozdemir, Guneysu, & Tekkaya, 2006). One of the ways students can learn is through movement (Gardner, 1999). According to Gardner (1999), there are seven intelligences that children can use to help them learn. They are verbal-linguistic, logical-mathematical, musical-rhythmic, visual-spatial, interpersonal, and intrapersonal (Gardner, 1999). Bodily-kinesthetic intelligence is the intelligence associated with applying movement of the body parts and
the movement of the body to help gain an understanding for problem (Gardner, 1999). Using kinetic movement during physical education class can provide many physical benefits and cognitive benefits. Tremarche et al. (2007) suggested that children who participated in regular physical activity at an early age developed more neurons, and with the production of more neurons, it enhanced the ability of children to learn. Learning through movement allows children to tap into parts of their brain that were once not accessible (Tremarche et al., 2007). Many scholars agree that physical education class should be viewed the same as other academic areas because by participating in regular physical activity, children can increase cognitive function (Bailey, 2006; Castelli, Hillman, Buck, & Erwin, 2007; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Pica, 2006; Sallis, et al., 1999; Sherman, Tran, & Alves, 2010; Staiano & Calvert, 2011; Taras, 2005; Tomporowski, Davis, Miller, & Naglieri, 2008).

To help illustrate why more time should be given to physical education programs, Wilkins et al. (2003) conducted a study to understand the perceptions of principals with regard to time spent in subjects such as art, physical education, and music. Wilkins et al. suggested that based on the cognitive benefits provided by a physical education program, it would seem risky for principals to take physical education out of school curricula. Wilkins et al. conducted research by surveying elementary school principals in Virginia. The survey asked principals to specify the amount of time children spent during the week in classes such as music, art, and physical education. Once the time was determined, it was compared to passing rates on the Virginia Standards of Learning tests. Wilkins et al. concluded that mandating less time in music, art, and physical education did not lead to higher scores on the Virginia Standards of Learning test. Alternatively, Wilkins et al.
suggested from their research that students at schools that have classes such as music, art, and physical education, may actually score higher on state standardized tests.

According to Stevens-Smith et al. (2006) and Grissom (2005), principals who do see the value in physical education classes are sometimes influenced by school board members and other external pressures to concentrate more on the academic areas. Even if enough time is given for physical education, finding funding for physical education can make it difficult to incorporate. Stevens-Smith et al. and Grissom stated that without the proper funding it is hard to implement quality programs into the curriculum, and as a result, these programs are sometimes removed. As principals are faced with decisions about having physical education programs, they need to understand that physical education standards have been developed to direct and facilitate physical educators to create a physical education program that provides quality instruction to the students and meets the needs of the school (National Association for Sport and Physical Education, 2004). According to Stevens-Smith et al., when implementing physical education programs, principals need to hire well-qualified physical education teachers and make sure the teachers they hire take part in professional development frequently.

Not only principals, but teachers also need to voice their concern regarding time allowed for physical education. To help illustrate how teachers view physical education programs, Morgan and Hansen (2008) conducted research in Australia to determine teachers’ perceptions on the role and benefits of physical education. Also, the teachers discussed problems of why physical education is difficult to implement in the school curriculum.
Along with principals’ perceptions of physical education, teachers also express their feelings on whether physical education should be part of school curricula. Research conducted by Morgan and Hansen (2008) in Australia indicated that classroom teachers there had to teach not only the core areas such as mathematics, language arts, and science, but physical education as well. Teachers in Australia viewed physical education class as a hindrance because they felt as if they were not trained properly to teach physical education classes. The teachers felt more comfortable teaching subjects such as mathematics and language arts instead of physical education (Morgan & Hansen, 2008). Morgan and Hansen added that teachers also felt there was a lack of funding, time, and equipment to give the children a quality experience during the time allotted for physical education classes.

The results from the research suggested that teachers considered physical education class to provide students with opportunities to become active and develop healthful habits that fight against obesity (Morgan & Hansen, 2008). Also, the teachers viewed physical education as a subject that impacts student learning and achievement, as well as developing good social skills and developing learning skills (Morgan & Hansen, 2008). Morgan and Hansen concluded from their research that teachers deem physical education as an accommodating part to the school curriculum; however, plans need to be in place to make sure physical education curricula focus on educational outcomes and are implemented properly.

Research from Stevens-Smith et al. (2006), Wilkins et al. (2003), and Morgan and Hansen (2008) indicated that there is a need for physical education programs in schools. Not only do physical education programs enhance cognitive ability, it can also contribute
to the overall wellness of children (Loundsbery et al., 2013). Physical education can help develop the whole child (Madigan, 2009; Pica, 2006; Wilkins et al., 2003; Young, 1996) and allow for students to become healthy adults. With current research showing correlations between physical activity and student achievement, it is now possible for students to participate in a test determining their current level of fitness.

**FITNESSGRAM®**

In an attempt to reach each student and become more aware of their health status, Mississippi now mandates that students in the fifth grade participate in one of three types of fitness testing programs, using the FITNESSGRAM®, ACTIVITYGRAM®, or the President’s Challenge to Fitness (Mississippi Department of Education, 2013; National Associations of State Boards of Education, 2009).

The FITNESSGRAM® is one of many fitness tests used to help determine the physical fitness of students and the one that will be used in the current study. The FITNESSGRAM® was developed in 1977 by Charles L. Sterling (Plowman et al., 2006) and served as a way to measure fitness levels in students (Meredith & Welk, 2009; Plowman et al., 2006). In 1981, Sterling joined the Cooper Institute for Aerobics in Dallas, Texas. When Sterling teamed with the Cooper Institute for Aerobics, this allowed for the idea of the FITNESSGRAM® to begin to be used in physical education classes (Plowman et al., 2006). As a result, the FITNESSGRAM® was used as a pilot in several school districts in Oklahoma to determine its effectiveness (Plowman et al., 2006). Plowman et al. (2006) stated that after the pilot school districts found success in using the FITNESSGRAM®, it was then used freely throughout the United States.
Students were now able to track their fitness levels throughout their years in school and physical education teachers were now able to make reports for the administrators, parents, and children (Meredith & Welk, 2009; Plowman et al., 2006). According to Meredith and Welk (2009) and Human Kinetics (2014), the FITNESSGRAM® is made up of criterion-referenced standards based on research to assess the fitness performance of children. According to the FITNESSGRAM® website (Human Kinetics, 2014) and Meredith and Welk, these criterion-referenced standards correspond to a level of fitness that guard against circumstances that could result from a lifestyle of being inactive. Assessments from the FITNESSGRAM® are measured in two categories, Healthy Fitness Zone (HFZ) (Bass, Brown, Laurson, & Coleman, 2013; Meredith & Welk, 2009) and the Needs Improvement Zone (NIZ) (Bass et al., 2013; Meredith & Welk, 2009). When children’s assessment scores reach the HFZ, that means children are categorized at a high fitness level; however, children whose measurements that are in the needs improvement zone need to be made aware of their condition because of the risks associated if they continue to live a sedentary lifestyle (Meredith & Welk, 2009).

The FITNESSGRAM® is an assessment developed to measure the fitness levels of the children in physical education programs (Meredith & Welk, 2009; Plowman et al., 2006). This assessment includes an assortment of health-related fitness tests that measure cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition (Bass et al., 2013; Coe, Peterson, Blair, Schutten, & Peddie, 2013; Meredith & Welk, 2009; Plowman et al., 2006). These five components of fitness are each measured through various types of exercises provided by the FITNESSGRAM®.
Meredith and Welk (2009), and Bass et al. (2013) indicated the FITNESSGRAM® uses three different tests to measure cardiovascular endurance. These three tests include the Progressive Aerobic Cardiovascular Endurance Run test (PACER), the one mile run, and the walk test which all measure the aerobic capacity of the students (Bass et al., 2013; Meredith & Welk, 2009). The PACER test measures the student’s ability to run over a long period of time. The PACER objective is for students to perform a shuttle run in a 20-meter area at a certain rate that gets quicker each minute (Meredith & Welk, 2009). Both the one mile run and walk test measure how long it takes students to run or walk one mile (Meredith & Welk, 2009).

Meredith and Welk (2009) stated that the tests used to measure muscular endurance, muscular strength, and flexibility are interchangeable. All three of these fitness areas go hand in hand because they determine the fitness levels of the musculoskeletal system, and therefore have been combined into one expansive category (Meredith & Welk, 2009). According to Bronson et al. (2007), muscles need to be powerful enough to work over a long period of time with the flexibility to go through a complete range of motion. Tests used to measure muscular endurance, muscular strength, and flexibility include (a) the traditional sit-up, (b) the trunk lift, (c) the push-up, (d) the pull-up, (e) the flexed arm hang, and (f) the sit and reach test (Bass et al., 2013; Meredith & Welk, 2009).

Body composition, the last component of fitness, is performed to determine the ratio of lean body tissue to fat tissue located in the body (Bronson et al., 2007). Body composition is measured by taking a skin fold measurement (which measures fat at different spots on the body using a skinfold caliper) or by taking the body mass index
(BMI) (Bass et al., 2013; Meredith & Welk, 2009). The BMI measures an individual’s weight based on their height. It is computed by dividing the weight in kilograms by the square of the height in meters (Must & Anderson, 2006).

As children perform the cardiovascular endurance test, muscular endurance test, muscular strength test, flexibility test, and determine their body composition, this will allow them to see their current levels of fitness and help them to establish personal fitness goals for living a healthy and active lifestyle (Meredith & Welk, 2009). To show a similar study of how the FITNESSGRAM® assessment was used, Bass et al. (2013) and Coe et al. (2013) provide examples of how they conducted research to determine the relationship between physical activity and student achievement. The FITNESSGRAM®, which provides actual measures of fitness, is used by many researchers to help them find the effect of physical fitness on academic achievement. For example, Bass et al. used the FITNESSGRAM® to conduct research on the effect of physical activity on student achievement. The FITNESSGRAM® was used to test students levels of physical fitness in muscular strength, muscular endurance, flexibility, cardiovascular endurance, and body composition (Bass et al., 2013). Along with the FITNESSGRAM®, the Illinois Standardized Achievement test was used to measure academic achievement in the areas of reading and math. Bass et al. noted that results from the research showed that males who scored in healthy fitness zone were three times more likely to pass math and reading examinations. Also, results from the research showed that females who scored in the healthy fitness zone were five times more likely to pass math and reading exams (Bass et al., 2013). More specifically, Bass et al. suggested the results from the research showed
that aerobic capacity and muscular endurance seemed to positively affect academic achievement.

Coe et al. (2013) provided another example of the FITNESSGRAM® being used to determine the effects of physical fitness on academic achievement. Coe et al. determined the fitness levels of students by using the FITNESSGRAM®, and academic achievement was measured by using standardized tests in the areas of mathematics, English, and social studies. Another factor used in the research was socioeconomic status, and it was identified by using the schools free and reduced lunch program. Coe et al. noted that the results suggested some correlation with fitness and student achievement, especially those students that were fit in muscular strength and endurance; however, socioeconomic status played the biggest role on student achievement. Coe et al. found the lower the socioeconomic status of the students, the less chance for student achievement, which has no relationship to physical fitness.

Along with the FITNESSGRAM®, another test known as the ACTIVITYGRAM® measures students’ physical fitness and physical activity habits. The ACTIVITYGRAM® is a behaviorally based activity assessment tool that can help young children and adolescents learn more about their physical activity habits. The assessment is a three-day recall of the various activities performed. The predominate activity in each 30-minute block of time is coded, and the resulting data are used to determine the amount of time spent in activity, the times when a child is active or inactive, and the types of activity performed. (Meredith & Welk, 2009, p. 69)
The other assessment, The President’s Challenge to Fitness, is very similar to the FITNESSGRAM® in that it measures body composition, flexibility, muscular strength, muscular endurance, and cardiovascular endurance (The President’s Council on Fitness, Sports, & Nutrition, n.d.). The only difference is that the President’s Challenge to Fitness is designed to increase and improve physical fitness in people of all ages (The President’s Council on Fitness, Sports, & Nutrition, n.d.). One of these assessments must be performed in grade five and the results kept in the child’s records to verify to the State Department of Education that the fitness test has been administered (Mississippi Department of Education, 2013; National Association of State Boards of Education, 2009). Now with these fitness tests available, it is possible to measure student’s fitness levels while at school.

Summary

Student success is the main goal for all educators; therefore, school curricula need to focus on educating the whole child (Madigan, 2009; Pica, 2006; Tremarche et al., 2007; Young, 1996). This can be done by providing an education that focuses on developing their mental, social, and physical well-being. Subjects such as mathematics, language arts, and the sciences all provide an avenue to help develop children’s mental capabilities, but may not contribute to developing children’s social or physical capabilities. One area of the school curriculum that can help develop children’s physical and social abilities is physical education. Physical education class provides many benefits to children who participate. One benefit physical education class provides is teaching children how to live healthy lifestyles (Pesce et al., 2013).
Obesity is a significant epidemic in the United States and can lead to several disorders including Type II diabetes, cardiovascular disease, and even cancer (Bailey, 2006; Castelli et al., 2007; Taras, 2005; Taras & Potts-Datema, 2005). Taras (2005) and Bailey (2006) stated that when children choose to live a healthy lifestyle, it will not only add to their quality of life, but also the length of their lives. Another benefit associated with physical education class is the development of a child’s psychological health (Bailey, 2006). When students participate during physical education class, it gives them an opportunity to interact with other students and build better self-esteem (Bailey, 2006; Taras, 2005; Taras & Potts-Datema, 2005). By having better self-esteem, students will have less depression, anxiety, and stress (Bailey, 2006; Taras, 2005; Taras & Potts-Datema, 2005). Lastly, physical education class can help students perform academically (Tomporowski et al., 2008; Sallis et al., 1999), and being physically active can help with cognitive development in children (Bailey, 2006; Castelli et al., 2007; Coe et al., 2006; Pica, 2006; Sallis et al., 1999; Sherman et al., 2010; Staiano & Calvert, 2011; Taras, 2005; Tomporowski et al., 2008).

Even with the benefits associated with physical education class, school districts throughout the country are still trying to do away with physical education class for more time spent in tested subject areas such as mathematics, language arts, and science (Stevens-Smith et al., 2006). For example, in Mississippi, students have to take the MCT2 test which measures their ability in the areas of mathematics, language arts, and science. Because of the accountability placed on the teachers from the MCT2, many feel like they need more time with their students to better prepare them for the MCT2. As a result, some teachers ended up pulling their students from physical education class.
However, in 2007, Mississippi legislation required that all students in elementary school receive 150 minutes of physical activity per week. Along with the 150 minutes of physical activity per week, physical education teachers were required to give either the FITNESSGRAM®, ACTIVITYGRAM® or The Presidents Challenge to Fitness to measure the fitness of all fifth grade students (Mississippi Department of Education, 2013; National Association of State Boards of Education, 2009). The test that will be used in this study to measure each student’s fitness levels is the FITNESSGRAM®. This test measures the five components of physical fitness which include muscular strength, muscular endurance, flexibility, body composition, and cardiovascular endurance through various exercises (Meredith & Welk, 2009). From the results of these assessments, educators and parents may be able to determine the fitness levels of the students and help with the ongoing battle to fight obesity. Also, by taking the students’ results from the FITNESSGRAM® and comparing them to the students’ results from the MCT2, it may show the relationship between physical fitness and student achievement.
CHAPTER III

METHODOLOGY

Overview

Previous studies have been conducted to determine if there was a relationship between physical activity and levels of fitness on student academic performance. For example, a study conducted by Castelli et al. (2007) revealed that children who performed better on math and reading had better aerobic fitness, as well as a better body mass index. Castelli et al. also reviewed another study conducted by the California Department of Education. This study also revealed that students who were more physically fit are more likely to score higher on standardized tests. Other research conducted by Sallis et al. (1999) suggested that physical education did not cause harmful effects on students’ academic achievement. Specifically, Sallis et al. found that students who participated in physical education class had more positive results on academic achievement.

However, even with such research available, local school districts, administrators, and teachers continue to pull students, who have scored either minimal or basic on the MCT2 test from the previous year or students that are not achieving in the areas of mathematics, language arts, and science, from elective classes, such as physical education, in order to have more classroom time in the areas of language arts, mathematics, and science. Students who are not as successful academically often benefit from physical education class because it provides them an opportunity to succeed. The researcher wanted to examine this conflict to help show the positive advantages of physical education and the benefits associated with participating in the class.
The purpose of this study was to determine if there was a relationship between levels of fitness and student academic achievement in elementary students. Along with determining if there was a relationship between physical fitness levels to student academic achievement, elementary administrators, fifth grade regular education elementary teachers, and elementary physical education teachers contributed their attitudes on how they perceived levels of fitness affecting student academic achievement. The questionnaire component consisted of Likert questions for the teachers and administrators.

The design of the study was to survey elementary administrators, fifth grade regular education teachers, and elementary physical education teachers along with comparing student fitness scores from the FITNESSGRAM® and academic performance scores from the Mississippi Curriculum Test, 2nd Edition (MCT2). These scores were collected from the school counselors and physical education teachers and the questionnaire was hand delivered to the schools for the elementary administrators, fifth grade regular education teachers, and elementary physical education teachers to complete.

Research Design

The design utilized a quantitative approach to identify the relationship between students’ physical fitness levels to student academic achievement, as well as addressing the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers towards physical fitness and student academic achievement. The data from the FITNESSGRAM® and MCT2 were archival, coming from the 2013-2014 academic school year. The MCT2 provided performance scores in
the areas of language arts, mathematics, and science and the FITNESSGRAM® provided the fitness scores of the students. From this, the students’ fitness level scores were compared to their performance scores from the MCT2. Performance scores from the MCT2 were collected from the school counselor and fitness level scores from the FITNESSGRAM® were collected from the physical education teachers. Student information was collected from both the FITNESSGRAM® and the MCT2. Each of the individual student results from the FITNESSGRAM® and the MCT2 for the students was matched by the researcher. This was achieved by matching the students’ identification number from both tests and pairing them together. Therefore, data were used to compare fitness level scores from the FITNESSGRAM® and performance scores from the MCT2. Only students that took the MCT2 without accommodations were used for the study.

The following questions guided this study:

Research Question 1: What are the differences in the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on how physical fitness affects student achievement?

Research Question 2: What is the relationship between the FITNESSGRAM® fitness level scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the mathematics section of the MCT2 in fifth grade students?

Research Question 3: What is the relationship between the FITNESSGRAM® fitness level scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the language arts section on the MCT2 in fifth grade students?
Research Question 4: What is the relationship between the FITNESSGRAM® fitness level scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the science section on the MCT2 in fifth grade students?

Participants

The participants for this study were chosen from a large rural school district located in southeastern Mississippi. This school district was in the top ten of student population in the state of Mississippi with over 9,000 students. More than 70% of the students in this district received free or reduced lunch and 25% of the student population was in the minority category. All elementary schools in this southeastern Mississippi school district participated in the FITNESSGRAM® fitness test and the MCT2. Also, all elementary schools in the district offered physical education and had a certified physical education teacher teaching the class. This particular school district provided the researcher with a large enough population sample and also administered the two instruments, the FITNESSGRAM® and MCT2, being used to determine if there was a correlation between physical fitness and student academic achievement.

Because the majority of the studies reviewed did not include elementary administrators, fifth grade regular education teachers, or elementary physical education teachers’ attitudes toward physical fitness on student academic achievement, the researcher chose these three groups to survey. The participants for this study came from the elementary schools located in a rural southeastern Mississippi school district. The participants included elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. The researcher secured names of the
administrators from all of the elementary schools in the district from the superintendent’s office. When the researcher met with the administrators at each individual school, the researcher collected the names of the physical education teachers and the fifth grade regular education teachers.

In addition to the attitudes from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers, scores from the FITNESSGRAM® and the MCT2 of fifth grade students were collected. From the list of fifth grade students, the researcher systematically selected every third name to use for the study. The students ranged in age from 10 to 11 years of age, and both male and female students were included in the study.

Instrumentation

The FITNESSGRAM® was the instrument that was used to determine the fitness level of students. The FITNESSGRAM® is one of many fitness tests used to determine the fitness levels of students participating in physical education class and the instrument the researcher used in the current study. Charles L. Sterling developed the FITNESSGRAM® in 1977 (Plowman et al., 2006) and the assessment would eventually serve as a way to measure the fitness levels of students (Meredith & Welk, 2009; Plowman et al., 2006). In 1981, Sterling joined forces with the Cooper Institute for Aerobics which was located in Dallas, Texas. As these two entities began to work together, the idea became plausible to get the FITNESSGRAM® put into school districts in the physical education classes. As a result of Sterling teaming with the Cooper Institute of Aerobics, the FITNESSGRAM® was used as a pilot in several school districts in Oklahoma to determine its effectiveness (Plowman et al., 2006). The pilot
study established that the FITNESSGRAM® was both valid and reliable, thus leading the FITNESSGRAM® to be used throughout the United States. This allowed physical education teachers to make reports of the fitness levels of the students. These reports were able to be given to administrators, regular education teachers, as well as parents (Meredith & Welk, 2009; Plowman et al. 2006).

The FITNESSGRAM® is made up of criterion-referenced standards which are based on research and are used to assess the fitness performance of children (Human Kinetics, 2014; Meredith & Welk, 2009). Also, according to Human Kinetics (2014) and Meredith and Welk (2009) these criterion-referenced standards are matched to a level of fitness that guard against circumstances that could result from an inactive lifestyle. Bass et al. (2013) and Meredith and Welk stated that assessments from the FITNESSGRAM® are scored in two categories, Healthy Fitness Zone (HFZ) and the Needs Improvement Zone (NIZ). If a child’s assessment result reaches the HFZ, then that child has a high level of fitness; however, if a child’s assessment score enters the NIZ, then the child and parents need to be made aware because of the risks involved if they continue to live a sedentary lifestyle (Meredith & Welk, 2009).

The FITNESSGRAM® instrument was created to measure the fitness levels of students in physical education programs (Meredith & Welk, 2009; Plowman et al., 2006). This assessment includes a number of health-related fitness tests that measure body composition, muscular strength, muscular endurance, flexibility, and cardiovascular endurance (Bass et al., 2013; Coe et al., 2013; Meredith & Welk, 2009; Plowman et al., 2006). The FITNESSGRAM® provides several exercises to measure the five components of fitness.
The FITNESSGRAM®, according to Meredith and Welk (2009) and Bass et al. (2013) uses three tests to measure cardiovascular endurance. These tests include the Progressive Cardiovascular Endurance Run (PACER), the one mile run, and the walk test which all measure the aerobic capacity of the students. The PACER test measures the students’ ability to run over a long period of time. The PACER objective is for students to perform a shuttle run in a 20-meter space at a certain pace that gets faster each minute (Meredith & Welk, 2009). Both the one mile run and walk test measure how long it takes students to run or walk one mile (Meredith & Welk, 2009).

Meredith and Welk (2009) indicated that flexibility, muscular endurance, and muscular strength are all interchangeable. These three components make up the musculoskeletal system and have been put into one category. Muscles need to be strong enough to exert force over a long period of time with the flexibility to use that muscle in a full range of motion (Bronson et al., 2007). Bass et al. and Meredith and Welk stated that tests used to measure these three components include (a) the traditional sit-up, (b) the trunk lift, (c) the push-up, (d) the pull-up, (e) the flexed arm hang, and (f) the sit and reach test. The first test, the traditional sit-up, begins with the student on their back, knees bent with their feet placed on the ground, and arms flat on the ground beside them. The student then curls at the waist until their fingers reach a marked point on the ground and then uncurls at the waist to go back to the ground. The students are to repeat this process as many times as they can or until they reach 75 sit-ups (Meredith & Welk, 2009). The second test, the trunk lift, starts with the students lying on their stomachs and then lifting their upper body as high as they can without using their hands. This distance from the mat to the top of their head is measured to determine how high the student can
lift their trunk (Meredith & Welk, 2009). The third test, the push-up, is measured with the students completing a 90-degree push-up as many times as possible at a certain pace. This is measured with the students lying on their stomach with their hands and arms out to their side and their elbows bent at 90-degrees. The students are to push themselves up until their arms are fully extended and then back down until their elbows are bent at 90-degrees without the chest touching the ground. This process is repeated as many times as the student can execute the test properly (Meredith & Welk, 2009). The fourth test, the pull-up, is measured by the students using a bar to see how many times they can pull themselves up until their chin is even with the bar and back down until their arms are fully extended. This process is repeated until the student does not execute the test properly (Meredith & Welk, 2009). The fifth test, the flexed arm hang, is measured in the same movement as the pull-up except when the students pull their chin up above the bar, they are to hold that position for as long as possible (Meredith & Welk, 2009). Time will be taken to see how long the students could hold themselves up. The sixth test, the sit and reach, measures the flexibility of the students’ hamstrings. The students are to sit on the ground with both legs extended forward inside the measuring instrument. The students are then to take their hands, one over the other, and reach as far as they can on the measuring instrument to determine flexibility of the hamstrings (Meredith & Welk, 2009). Meredith and Welk (2009) added that all these tests can be used to measure flexibility and strength and there are several options available in the case that a student cannot perform one specific test.

The last component of fitness, body composition, is measured by taking a skin fold measurement (which measures fat at different spots on the body using a skinfold
caliper) or by taking the body mass index (BMI) (Bass et al., 2013; Meredith & Welk, 2009). The BMI measures an individual’s weight based on their height. It is computed by dividing the weight in kilograms by the square of the height in meters (Must & Anderson, 2006).

In addition to using the FITNESSGRAM® to collect fitness scores, the Mississippi Curriculum Test, 2nd Edition (MCT2) was the instrument used in the study to measure the academic achievement of the students. The MCT2 is an assessment given in grades 3 through 8 in mathematics and language arts. The language arts portion consists of two components, reading and writing (Mississippi Department of Education, 2012). In addition to these two sections, there is also a science component to the MCT2 which is administered in grades 5 and 8 (Mississippi Department of Education, 2012). According to the Mississippi Department of Education (2012), the assessment in the language arts and mathematics sections are made up of criterion-referenced questions that align with the 2006 Mississippi Language Arts Framework-Revised and the 2007 Mississippi Mathematics Framework-Revised. The science assessment is also made up of criterion-referenced questions that are aligned with the 2010 Mississippi Science Framework (Mississippi Department of Education, 2012). These assessments are scored as minimal, basic, proficient, and advanced. The MCT2 is a summative evaluation that is used as a mastery of student’s performance on objectives for the entire year. According the Mississippi Department of Education (2008), the MCT2 test is both reliable and valid. Reliability is focused on determining the relationship among scores from the individual items, while validity refers to interpreting test results usefully and gathering proof to establish test fairness. The MCT2 was analyzed using the Cronbach’s alpha test to
determine reliability for each subject administrated on the test. The language arts section of the MCT2 for fifth grade students was .88 and the mathematics section of the MCT2 for fifth grade students was .88 (Mississippi Department of Education, 2008). Both of these values indicate a strong reliability. Along with reliability, validity was measured by several Mississippi educators aligning the content of the test with the Mississippi Curriculum Framework to measure specific knowledge and skills of the students.

The questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement* (Appendix A), created by the researcher was used to determine the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. When composing the questionnaire, the researcher used the literature as a guide to develop which variables would be measured. When these variables were determined, the researcher designed questions that would accurately measure the variables. The items included a range of opinions and attitudes as to the relationship between physical fitness and student academic achievement.

When the researcher completed the instrument, the researcher made a packet that included the questionnaire (Appendix A) and a validity questionnaire (Appendix B). This packet was sent to six highly qualified educators for them to review. This panel consisted of central office personnel, elementary administrators, regular education elementary teachers, and elementary physical education teachers. Expert A had 37 years experience as an elementary teacher and a master’s degree in elementary education. Expert B had a master’s degree in educational leadership with 42 years in education serving as a physical education teacher, regular education teacher, elementary
administrator, and as an assistant superintendent of elementary operations. Expert C had 29 years in education serving as a physical education teacher and middle and high school administrator. Expert C had a master’s degree in both educational leadership and physical education. Expert D had 37 years of education experience serving in the areas of teacher, administrator, and a school district superintendent. Expert E had a doctorate degree in educational leadership and had served 18 years in education as both a teacher and high school administrator. Expert F had a master’s degree in education and had 37 years experience as both a teacher and instructional facilitator.

When the panel finished reviewing the questionnaire, the researcher had several suggestions in reference to the questions being asked. After reviewing the suggestions, the researcher revised the questionnaire. When the researcher finished revising the questionnaire, it consisted of 21 items, 10 of which collected demographic data and information about the participants classes, and 11, that collected data (using a five-point Likert scale ranging from strongly disagree to strongly agree) measuring administrators’ and teachers’ attitudes of physical fitness towards student academic achievement.

Once the Institutional Review Board (IRB) granted permission (Appendix J), the questionnaire went through a pilot study. The researcher piloted the questionnaire at one of the local area school districts with participants who were veteran regular education teachers. A permission letter (Appendix G) was made for the superintendent of the local area school district. After permission was obtained (Appendix I) from the superintendent of the local area school district, the pilot study was conducted. The purpose of the pilot study was to determine if the items and answer choices are understandable to the pilot study participants. The pilot study participants were asked to read all directions, items,
and answer choices; and, as they completed the questionnaire to write down any concerns they had with wording, clarity, spelling, or any other issues that would have kept the questionnaire from being understood. When the pilot study was completed, the data were entered into a SPSS file to calculate the reliability of the questionnaire.

Procedures

First, the researcher contacted the superintendent of the school district in which the study was taking place to set up a meeting. Before the meeting, a packet of information detailing the study was made to give to the superintendent. Along with the description of the study, the packet also contained a permission letter (Appendix C) to be signed that granted the researcher permission to conduct the study. The researcher gave the superintendent one week to review the information in the packet and then returned to the superintendent’s office to collect the packet. The signed permission forms (Appendix E and Appendix I) from both of the superintendents and all the information pertaining to the study was sent to the IRB at the University of Southern Mississippi. When permission was granted from the IRB (Appendix J), the researcher conducted the pilot study to determine the reliability of the questionnaire.

With the permission of the superintendent and approval from the IRB, additional packets were made for the elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. These packets contained the following items:

1. Administrators’ packets contained: a signed superintendent’s permission letter (Appendix E) allowing permission to participate in the study, a Participant’s
Information Letter (Appendix F) explaining the purpose of the study, and the survey instrument (Appendix A).

2. Fifth Grade Regular education teachers’ packet contained: a signed superintendent’s permission letter (Appendix E) allowing permission to participate in the study, a Participant’s Information Letter (Appendix F) explaining the purpose of the study, and the survey instrument (Appendix A).

3. Physical education teachers’ packet contained: a signed superintendent’s permission letter (Appendix E) allowing permission to participate in the study, a Participant’s Information Letter (Appendix F) explaining the purpose of the study, and the survey instrument (Appendix A).

The researcher gave the elementary administrators, fifth grade regular education teachers, and elementary physical education teachers one week to answer the survey questions. At that time, the researcher returned to the schools to collect the completed questionnaires.

The questionnaires were handled as follows:

1. After the researcher picked up the questionnaires, data were entered into SPSS software to conduct analysis.

2. No identifying information was requested of the respondents.

3. Questionnaires were located in a secure filing cabinet at the researcher’s home.

4. The returned questionnaires were held until the data input was completed and analysis was verified. Questionnaires were then shredded and thrown away.

After collecting the questionnaires, the researcher then set up a meeting with each school’s physical education teacher. During this meeting, the physical education teacher
gathered copies of the fifth grade students’ FITNESSGRAM® fitness level scores for the academic school year of 2013-2014 and gave them to the researcher. The fitness level scores were handled as follows:

1. After the researcher picked up the FITNESSGRAM® fitness scores, data were entered into SPSS software to conduct analysis.

2. The FITNESSGRAM® fitness scores were located in a secure filing cabinet at the researcher’s home.

3. Students were identified by their student identification number. No student names or other identifying information was used in the study. The student identification number given on the FITNESSGRAM® fitness score matched their student identification number on their MCT2 performance level score.

4. The FITNESSGRAM® fitness scores were held until data input was complete and analysis was verified. The FITNESSGRAM® copies were then shredded and thrown away.

During the same time the researcher was on campus to collect FITNESSGRAM® fitness scores, the researcher met with the school counselor. At the meeting with the school counselor, the researcher showed the counselor a signed superintendent’s permission letter (Appendix E) granting permission to participate in the study. After the researcher explained the procedure to the counselor, the counselor gathered only the fifth grade students’ performance level scores from the MCT2 assessment, in the areas of language arts, mathematics, and science. Once copies of these performance level scores were made, they were handled as follows:
1. After the researcher picked up the fifth grade MCT2 performance level scores, data were put into SPSS software for data analysis.

2. The MCT2 performance level scores were located in a secure filing cabinet at the researcher’s home.

3. Students were identified by their student identification number. No students’ name or other identifying information was used in the study. The student identification number given on the MCT2 performance level score matched the student identification number on the FITNESSGRAM® fitness level score.

4. The MCT2 performance level scores were held until data input was complete and analysis was verified. The MCT2 copies were shredded and thrown away.

Data Analysis

Data for this study were analyzed by using SPSS. Data from the elementary administrators, fifth grade regular education teachers, and elementary physical education teachers were broken down and compared between groups. A one-way between subjects ANOVA was used to determine the differences in attitudes of physical fitness towards student achievement from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. Along with the one-way between subjects ANOVA, a multiple regression was used to analyze data from the FITNESSGRAM® fitness scores and the MCT2 performance scores.
CHAPTER IV
ANALYSIS OF DATA

Introduction

The study utilized a quantitative approach to identify the relationship between students’ levels of fitness to students’ academic achievement as well as addressing the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers towards physical fitness and academic achievement. Instruments used in the study were the Mississippi Curriculum Test, 2nd Edition (MCT2), the FITNESSGRAM®, and *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement* (Appendix A). The data from the FITNESSGRAM® and MCT2 were archival, coming from the 2013-2014 academic school year. The MCT2 provided scores from the areas of language arts, mathematics, and science, and the FITNESSGRAM® provided the fitness scores of those students. From this, the students’ fitness scores were compared to their performance scores in language arts, mathematics, and science. As well as using the MCT2 and the FITNESSGRAM®, data was collected through the use of a survey methodology with a questionnaire compiled of attitudes from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers.

Descriptive

The questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement* (Appendix A), was distributed to elementary administrators and teachers of fifth grade students at six elementary schools in a large
rural school district located in southeastern Mississippi. Seventy questionnaires were distributed and a total of 63 (90.0%) were completed and returned to the researcher.

**Demographics**

Table 1 represents demographic data on elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. These participants included 44 (69.8%) females and 19 (30.2%) males. Of these 63 participants, 12 (19.0%) were administrators, 39 (61.9%) were fifth grade regular education teachers, and 12 (19.0%) were physical education teachers. According to the questionnaire, working experience ranged from 0 years to 31 plus years. Twenty-seven (42.9%) of the respondents had 0 to 10 years working experience, 14 (22.2%) had 11 to 20 years working experience, 16 (25.4%) had 21 to 30 years working experience, and 6 (9.5%) had 31 plus years. Education level of the respondents ranged from a Bachelor’s degree to a Specialist degree. Twenty-four (38.1%) respondents held a Bachelor’s degree, 34 (54.0%) held a Master’s degree, and 5 (7.9%) held a Specialist degree. The ranges of age spanned from 21 to 54 plus years. There were 11 (17.5%) participants that ranged from age 21 to 31, 16 (25.4%) participants that ranged from 32 to 42, 21 (33.3%) participants that ranged from 43 to 53, and 15 (23.8%) participants that were 54 years old or older.

Also, the respondents taught various subjects in grade 5. These subjects included language arts, mathematics, physical education, science, and social studies. Language arts classes were taught by 10 (15.9%) of the respondents, mathematics classes were taught by 8 (12.7%) of the respondents, physical education classes were taught by 12 (19.0%) of the respondents, science classes were taught by 11 (17.5%) of the respondents, and social studies classes were taught by 13 (20.6%) of the respondents.
respondents, social studies classes were taught by 4 (6.3%) of the respondents, and 12 (19.0%) of the respondents reported teaching classes labeled as other.

Table 1

*Frequencies and Percentages of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>44</td>
<td>69.8%</td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>30.2%</td>
</tr>
<tr>
<td>Position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrators</td>
<td>12</td>
<td>19.0%</td>
</tr>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>61.9%</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>19.0%</td>
</tr>
<tr>
<td>Working Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-10</td>
<td>27</td>
<td>42.9%</td>
</tr>
<tr>
<td>11-20</td>
<td>14</td>
<td>22.2%</td>
</tr>
<tr>
<td>21-30</td>
<td>16</td>
<td>25.4%</td>
</tr>
<tr>
<td>31+</td>
<td>6</td>
<td>9.5%</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
<td>24</td>
<td>38.1%</td>
</tr>
<tr>
<td>Masters</td>
<td>34</td>
<td>54.0%</td>
</tr>
</tbody>
</table>
Table 1 (continued).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialist</td>
<td>5</td>
<td>7.9%</td>
</tr>
<tr>
<td>Grade Taught</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language Arts</td>
<td>10</td>
<td>15.9%</td>
</tr>
<tr>
<td>Mathematics</td>
<td>8</td>
<td>12.7%</td>
</tr>
<tr>
<td>Physical Education</td>
<td>12</td>
<td>19.0%</td>
</tr>
<tr>
<td>Science</td>
<td>11</td>
<td>17.5%</td>
</tr>
<tr>
<td>Social Studies</td>
<td>4</td>
<td>6.3%</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>19.0%</td>
</tr>
</tbody>
</table>

In addition to collecting data from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers through the questionnaire, data were also collected from 472 fifth grade students at a typical rural local school district in southeastern Mississippi. A G-Power analysis indicated a sample size of 148. Therefore, from those 472 fifth grade students, the researcher systematically chose every third student for a total of 157 students to be used in the study. This was achieved by dividing the total number of students by the power analysis. The data collected included scores from the mathematics, language arts, and science sections of the MCT2, as well as fitness level scores from the FITNESSGRAM®. These scores included muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity.
Table 2 describes the means and standard deviations of the scores from the language arts, mathematics, and science section of the MCT2, as well as, how much data was missing from each category. Table 3 describes the means and standard deviations of the scores from the muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity from the FITNESSGRAM®, as well as, how much data was missing from each category.

Table 2

**Means and Standard Deviations of Mathematics, Language Arts, and Science Scores**

<table>
<thead>
<tr>
<th></th>
<th>Language Arts</th>
<th>Mathematics</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>157</td>
<td>157</td>
<td>155</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Mean</td>
<td>152.59</td>
<td>155.72</td>
<td>154.81</td>
</tr>
<tr>
<td>SD</td>
<td>12.16</td>
<td>10.11</td>
<td>8.88</td>
</tr>
</tbody>
</table>

Table 3

**Means and Standard Deviations of Muscular Strength, Muscular Endurance, Body Composition, Flexibility, and Aerobic Capacity Scores**

<table>
<thead>
<tr>
<th></th>
<th>Muscular Strength</th>
<th>Muscular Endurance</th>
<th>Body Composition</th>
<th>Flexibility</th>
<th>Aerobic Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>148</td>
<td>150</td>
<td>149</td>
<td>150</td>
<td>149</td>
</tr>
<tr>
<td>Missing</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Mean</td>
<td>8.20</td>
<td>13.59</td>
<td>21.40</td>
<td>6.86</td>
<td>26.65</td>
</tr>
<tr>
<td>SD</td>
<td>6.75</td>
<td>8.33</td>
<td>5.09</td>
<td>2.68</td>
<td>16.18</td>
</tr>
</tbody>
</table>
Instrumentation

The questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Academic Achievement* (Appendix A), was created by the researcher. The original questionnaire contained 31 items. Of those 31 items, 21 items were Likert items with participants able to respond by marking strongly disagree, disagree, neutral, agree, and strongly agree. These 21 items measured only one construct which was attitudes regarding physical fitness and student academic achievement. The remaining 10 items asked demographic questions pertaining to the respondents.

In order to evaluate the instrument used, a pilot study was conducted with a group of 32 participants who were veteran teachers at a local school district. Permission was obtained from the Superintendent of the school district (Appendix I) to conduct the pilot study during a faculty meeting in the fall of 2015. The purpose of the pilot study was to determine if the questionnaire was valid and reliable, along with determining if any direction or question was misleading or was not clear. The pilot study participants were asked to read everything thoroughly, and to make note of any concerns they had in regards to spelling, clarity, wording, or any other issue they had with understanding the questionnaire.

The data collected from the pilot study were entered into SPSS to determine the reliability of the questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Academic Achievement* (Appendix A). The first analysis output from the pilot study for Cronbach’s alpha reliability was .88, and since the items were only measuring one construct, the researcher looked for appropriate ways to reduce the number of items while maintaining reliability. This was achieved by looking at the
Corrected Item-Total Correlation of each item. The Corrected Item-Total Correlation was measured at .30. The researcher found nine of the 21 Likert items that were below .30. These nine Likert items were deleted from the questionnaire, which left the questionnaire with 12 remaining Likert items. These 12 remaining Likert items from the data output were put back through SPSS analysis to determine if these 12 items were reliable. The Cronbach’s alpha for the remaining 12 Likert items was .86, which is relatively high; however, there was one of the 12 Likert items with a Corrected Item-Total Correlation below .30. This item was removed, leaving 11 remaining Likert items. These remaining 11 Likert items were once again put through SPSS analysis to determine how reliable they were to physical fitness and student academic achievement. The output for these remaining Likert items proved to be reliable. The Cronbach’s alpha was .87 and all remaining 11 Likert items were higher than .30 on the Corrected Item-Total Correlation.

The completed questionnaire consisted of 21 items, 10 of which collected demographic data from the correspondents and 11 of which collected data (using a five-point Likert scale ranging from strongly disagree to strongly agree) measuring the attitudes on physical fitness and academic achievement from elementary administrators, fifth grade elementary regular education teachers, and elementary physical education teachers.

After analyzing the questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement* (Appendix A), through SPSS to determine the means and standard deviations, the researcher found that items one through 11 had an overall construct mean of 4.13. Elementary administrators had an overall mean
of 4.44, fifth grade regular education teachers had an overall mean of 3.95, and
elementary physical education teachers had an overall mean of 4.42 for the 11 Likert
items from the survey. The overall construct mean was calculated by computing an
overall mean for the 11 Likert responses for each participant. Item 4 (It is important to
provide information to my students on the benefits of being fit) and Item 7 (Physical
education class at my school provides activities to enhance the fitness levels of my
students) had identical means (4.44). Item 6 (Physical fitness plays a major role in a
students’ self-esteem) had the highest mean (4.46). The lowest mean (3.46) was Item 5
(My students feel their fitness level is important). Table 4 reflects the means and the
standard deviations in descending order from the 63 attitudes conveyed by the elementary
administrators, fifth grade regular education teachers, and elementary physical education
teachers.

Table 4

*Means and Standard Deviations in Descending Order of Administrators, Fifth Grade
Regular Education Teachers, and Physical Education Teachers’ Attitudes Towards
Physical Fitness and Student Achievement*

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Physical fitness plays a major role in students’ self-esteem.</td>
<td>63</td>
<td>4.46</td>
<td>.56</td>
</tr>
<tr>
<td>7. Physical education at my school provides activities to enhance</td>
<td>63</td>
<td>4.44</td>
<td>.58</td>
</tr>
<tr>
<td>the fitness levels of my students.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. It is important to provide information to my students on the</td>
<td>63</td>
<td>4.44</td>
<td>.56</td>
</tr>
<tr>
<td>benefits of being fit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. It is important for my students to set fitness goals.</td>
<td>63</td>
<td>4.26</td>
<td>.62</td>
</tr>
</tbody>
</table>
Table 4 (continued).

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Students at my school are given opportunities to enhance physical fitness each day.</td>
<td>63</td>
<td>4.17</td>
<td>.90</td>
</tr>
<tr>
<td>2. Overall fitness affects my students’ academic achievement.</td>
<td>63</td>
<td>4.14</td>
<td>.75</td>
</tr>
<tr>
<td>1. As physical fitness improves students’ academic performance improves.</td>
<td>63</td>
<td>4.11</td>
<td>.82</td>
</tr>
<tr>
<td>8. It is important to provide activities in the classroom to enhance the physical fitness of my students.</td>
<td>63</td>
<td>4.01</td>
<td>.85</td>
</tr>
<tr>
<td>3. It is important to monitor fitness levels of my students.</td>
<td>63</td>
<td>3.98</td>
<td>.81</td>
</tr>
<tr>
<td>9. Physical fitness plays a major role in my student’s attendance.</td>
<td>63</td>
<td>3.95</td>
<td>.88</td>
</tr>
<tr>
<td>5. My students feel their fitness level is important.</td>
<td>63</td>
<td>3.46</td>
<td>.96</td>
</tr>
</tbody>
</table>

Note: 1=Strongly Disagree…5=Strongly Agree

Statistics

Research Question 1: What are the differences in attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on how physical fitness affects student achievement?

In an effort to examine the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on physical fitness and student achievement, the researcher compared the responses of the participants. Table 5 examines the means and standard deviations on how each participant responded to each Likert item from the questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement* (Appendix A).
Table 5

Summary of Attitudes of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. As physical fitness improves students’ academic performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>12</td>
<td>4.58</td>
</tr>
<tr>
<td></td>
<td>Fifth Grade Regular</td>
<td>39</td>
<td>3.87</td>
</tr>
<tr>
<td></td>
<td>Education Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.41</td>
</tr>
<tr>
<td>2. Overall fitness affects my students’ academic achievement.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>12</td>
<td>4.41</td>
</tr>
<tr>
<td></td>
<td>Fifth Grade Regular</td>
<td>39</td>
<td>3.94</td>
</tr>
<tr>
<td></td>
<td>Education Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.50</td>
</tr>
<tr>
<td>3. It is important to monitor the fitness levels of my students.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administrator</td>
<td>12</td>
<td>4.25</td>
</tr>
</tbody>
</table>
Table 5 (continued).

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>3.71</td>
<td>.79</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.58</td>
<td>.51</td>
</tr>
</tbody>
</table>

4. It is important to provide information to my students on the benefits of being fit.

| Administrator                                                        | 12  | 4.50 | .67 |
| Fifth Grade Regular Education Teacher                                 | 39  | 4.38 | .54 |
| Physical Education Teacher                                           | 12  | 4.58 | .51 |

5. My students feel their fitness level is important.

<p>| Administrator                                                        | 12  | 3.83 | 1.02|
| Fifth Grade Regular Education Teacher                                 | 39  | 3.33 | .98 |
| Physical Education Teacher                                           | 12  | 3.50 | .79 |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Physical fitness plays a major role in a students’ self-esteem.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>12</td>
<td>4.66</td>
<td>.49</td>
</tr>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>4.38</td>
<td>.59</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.50</td>
<td>.52</td>
</tr>
<tr>
<td>7. Physical education class at my school provides activities to enhance the fitness levels of my students.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>12</td>
<td>4.41</td>
<td>.66</td>
</tr>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>4.38</td>
<td>.59</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.66</td>
<td>.49</td>
</tr>
<tr>
<td>8. It is important to provide activities in the classroom to enhance the physical fitness of my students.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>12</td>
<td>4.66</td>
<td>.49</td>
</tr>
</tbody>
</table>
Table 5 (continued).

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>3.71</td>
<td>.82</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.33</td>
<td>.77</td>
</tr>
<tr>
<td>Administrator</td>
<td>12</td>
<td>4.33</td>
<td>.77</td>
</tr>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>3.69</td>
<td>.89</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.41</td>
<td>.66</td>
</tr>
<tr>
<td>Administrator</td>
<td>12</td>
<td>4.66</td>
<td>.49</td>
</tr>
<tr>
<td>Fifth Grade Regular Education Teacher</td>
<td>39</td>
<td>3.94</td>
<td>1.02</td>
</tr>
<tr>
<td>Physical Education Teacher</td>
<td>12</td>
<td>4.41</td>
<td>.51</td>
</tr>
</tbody>
</table>

9. Physical fitness plays a major role in my students’ attendance.

10. Students at my school are given opportunities to enhance physical fitness each day.
Table 5 (continued).

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. It is important for my students to set fitness goals.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Administrator  
Fifth Grade Regular Education Teacher  
Physical Education Teacher  

Note: 1=Strongly Disagree...5=Strongly Agree

A one-way between subjects ANOVA was conducted to compare the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. After evaluating the 11 items from the survey, there was a statistically significant difference in the overall total of attitudes towards physical fitness and student achievement at the .05 level for the three groups $F(2,60) = 8.364$, $p = .001$. For the three respondent groups, a Tukey post-hoc test, at the .05 level, revealed there was a statistically significant difference in the attitudes towards physical fitness and academic achievement between elementary administrators and fifth grade regular education teachers ($p=.005$). Elementary administrators had an overall mean of 4.44 and it was significantly higher than fifth grade regular education teachers who had an overall mean of 3.95. Also, there was a statistically significant difference between fifth grade regular education teachers and elementary physical education teachers ($p=.007$). Fifth grade regular education teachers had an overall mean of 3.95 and it was significantly
lower that elementary physical education teachers who had an overall mean of 4.42. However, there was no statistically significant difference between elementary administrators and elementary physical education teachers ($p=.992$).

With an overall statistically significant difference in the attitudes towards physical fitness and student achievement and a statistically significant difference between the attitudes of elementary administrators and fifth grade regular education teachers and fifth grade regular education teachers and elementary physical education teachers, individual ANOVAs were performed to find the differences on the 11 items from the questionnaire with Tukey post-hoc tests. There was a statistically significant difference on Item 1, $F(2,60) = 4.998$, $p = .010$, with a statistically significant difference between elementary administrators and fifth grade regular education teachers ($p=.020$). On Item 1, elementary administrators had a mean score of 4.58 and fifth grade regular education teachers had a mean score of 3.87. There was a statistically significant difference on Item 3, $F(2,60) = 7.186$, $p = .002$, with a significant difference between fifth grade regular education teachers and elementary physical education teachers ($p=.002$). On Item 3, fifth grade regular education teachers had a mean score of 3.71 and elementary physical education teachers had a mean score of 4.58. There was not a statistically significant difference in the attitudes of the three respondent groups on Item 4, $F(2,60) = .639$, $p = .531$. There was not a statistically significant difference in the attitudes of the three respondent groups on Item 5, $F(2,60) = 1.256$, $p = .292$. There was not a statistically significant difference in the attitudes of the three respondent groups on Item 6, $F(2,60) = 1.196$, $p = .310$. There was not a statistically significant difference in the attitudes of the respondents groups on Item 7, $F(2,60) = 1.069$, $p = .350$. There was a
statistically significant difference on Item 8, \( F(2,60) = 8.305, p = .001 \), with a statistically significant difference between elementary administrators and fifth grade regular education teachers \((p=.001)\) and a statistically significant difference between fifth grade regular education teachers and elementary physical education teachers \((p=.047)\). On Item 8, elementary administrators had a mean score of 4.66, fifth grade regular education teachers had a mean score of 3.71, and elementary physical education teachers had a mean score of 4.33. There was a statistically significant difference on Item 9, \( F(2,60) = 4.989, p = .010 \), with a statistically significant difference fifth grade regular education teachers and elementary physical education teachers \((p=.029)\). On Item 9, fifth grade regular education teachers had a mean score of 3.69 and elementary physical education teachers had a mean score of 4.41. There was a statistically significant difference on Item 10, \( F(2,60) = 3.693, p = .031 \), with a statistically significant difference between elementary administrators and fifth grade regular education teachers \((p=.040)\). On Item 10, elementary administrators had a mean score of 4.66 and fifth grade regular education teachers had a mean score of 3.94. There was a statistically significant difference on Item 11, \( F(2,60) = 5.838, p = .005 \), with a statistically significant difference between fifth grade regular education teachers and elementary physical education teachers \((p=.009)\). On Item 11, fifth grade regular education teachers had a mean score of 4.07 and elementary physical education teachers had a mean score of 4.66. Also, Levene’s Test for Homogeneity of Variance indicated that none of the 11 items from the questionnaire were statistically significant.

Along with these findings, elementary administrators, fifth grade regular education teachers, and elementary physical education teachers responded to items on
adequate amount of time students needed to be active per week and how those students received that type of physical activity. Table 6 examines the frequencies and percentages of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on adequate amount of physical activity per week and how their students received physical activity. Thirty-one (49.2%) of the respondents described 121 plus minutes of being active as an adequate amount of physical activity per week, 16 (25.4%) respondents described 30 to 60 minutes of being active as an adequate amount of physical activity per week, five (7.9%) respondents described 61 to 90 minutes as an adequate amount of physical activity, and 11 (17.5%) respondents described 91 to 120 minutes as an adequate amount of physical activity per week. Along with adequate amount of physical activity per week, 27 (42.9%) of the respondents identified that their students received physical activity through recess, and 36 (57.1%) of the respondents identified that their students received physical activity through physical education class.

Table 6

*Frequencies and Percentages of Administrators, Fifth Grade Regular Education Teachers, and Physical Education Teachers Towards Adequate Time Active and Type of Physical Activity*

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate time being active per week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-60 minutes</td>
<td>16</td>
<td>25.4%</td>
</tr>
<tr>
<td>61-90 minutes</td>
<td>5</td>
<td>07.9%</td>
</tr>
</tbody>
</table>
Table 6 (continued).

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-120 minutes</td>
<td>11</td>
<td>17.5%</td>
</tr>
<tr>
<td>121+ minutes</td>
<td>31</td>
<td>49.2%</td>
</tr>
</tbody>
</table>

Type of Physical Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recess</td>
<td>27</td>
<td>42.9%</td>
</tr>
<tr>
<td>Physical Education Class</td>
<td>36</td>
<td>57.1%</td>
</tr>
</tbody>
</table>

Research Question 2: What is the relationship between the FITNESSGRAM® fitness level scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the mathematics section of the MCT2 in fifth grade students?

A multiple regression analysis was used to test Research Question 2. The dependent variable was scores from the mathematics section of the MCT2. The independent variables include muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity as measured by the FITNESSGRAM®. The alpha was set at .05. The results of the multiple regression analysis indicated the five predictors explained a 6% variability in mathematic scores from the MCT2 and indicated a weak relationship between the dependent and independent variables. The results were not statistically significant, \( R^2 = .060, F(5, 141) = 1.802, p = .116 \).

Research Question 3: What is the relationship between the FITNESSGRAM® fitness level scores in the areas of muscular strength, muscular endurance, body
composition, flexibility, and aerobic capacity and performance scores from the language arts section on the MCT2 in fifth grade students?

A multiple regression analysis was used to test Research Question 3. The dependent variable was scores from the language arts section of the MCT2. The independent variables include muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity as measured by the FITNESSGRAM®. The alpha was set at .05. The results of the multiple regression analysis indicated the five predictors explained an 3.3% variability in language art scores from the MCT2 and indicated a weak relationship between the dependent and independent variables. The results were not statistically significant ($R^2 = .033, F(5,141) = .971, p = .438$).

Research Question 4: What is the relationship between the FITNESSGRAM® fitness level scores in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the science section on the MCT2 in fifth grade students?

A multiple regression analysis was used to test Research Question 4. The dependent variable was scores from the science section of the MCT2. The independent variables include muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity as measured by the FITNESSGRAM®. The alpha was set at .05. The results of the multiple regression analysis indicated the five predictors explained a 2.4% variability in science scores from the MCT2 and indicated a weak relationship between the dependent and independent variables. The results were not statistically significant ($R^2 = .024, F(5,139) = .697, p = .627$).
CHAPTER V
DISCUSSION

Summary

The study utilized a quantitative approach to identify the relationship between students’ levels of fitness to student academic achievement as well as addressing the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers towards physical fitness and academic achievement. Instruments used in the study were the Mississippi Curriculum Test, 2nd Edition (MCT2), the FITNESSGRAM®, and the questionnaire, Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement (Appendix A). The data from the FITNESSGRAM® and MCT2 was archival coming from the 2013-2014 academic school year. The MCT2 provided scores from the areas of language arts, mathematics, and science, and the FITNESSGRAM® provided the fitness scores of those students. From this, the students’ fitness scores were compared to their performance scores in language arts, mathematics, and science. As well as using the MCT2 and the FITNESSGRAM®, data was collected through the use of a survey methodology with a questionnaire compiled of attitudes from elementary administrators, fifth grade regular education teachers, and elementary physical education teachers.

Overview

Survey methodology was used and the instrument Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement (Appendix A), was sent to a typical rural local school district in southeastern Mississippi. This questionnaire included 21 total items, 11 Likert items which collected attitudes of elementary administrators,
fifth grade regular education teachers, elementary physical education teachers, and 10 items which collected demographic data. Participants were asked to respond using the scale strongly disagree, disagree, neutral, agree, or strongly agree. Seventy questionnaires were sent to six elementary schools in the local school district with 63 participants completing and returning the questionnaire.

In addition to using survey methodology, hypotheses were also used to form this study. Data from the MCT2 in the areas of language arts, mathematics, and science were collected from 472 fifth grade students. Also, from these 472 students’ data were collected from the FITNESSGRAM®, which included muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity. Of these 472, 157 students were systematically chosen to be used in the study. This was achieved by choosing every third student from the list of 472.

Conclusions and Discussions

Research question one was, “What are the differences in attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on how physical fitness affects student achievement”? Data analysis indicated there was a statistically significant difference in the overall attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. More specifically, there were differences in attitudes between elementary administrators and fifth grade regular education teachers, and between fifth grade regular education teachers and elementary physical education teachers; however, there was not a statistically significant difference between the attitudes of elementary administrators and elementary physical education teachers.
Data analysis indicated there was not a statistically significant difference in the attitudes of elementary administrators, fifth grade regular education teachers, and physical education teachers on Items 4, 5, 6, and 7 from the questionnaire. These items examined the importance of providing information to students on the benefits of being fit, students feeling that their fitness level is important, physical fitness playing a major role in a student’s self-esteem, and physical education class providing activities to enhance the fitness level of my students. Based on these results, it can be concluded that the three respondent groups all perceived these items in the same manner.

However, data analysis indicated there was a statistically significant difference in the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers on Items 1, 3, 8, 9, 10, and 11 from the questionnaire. Overall, fifth grade regular education teachers had a lower mean (3.95) than elementary administrators (4.44) and elementary physical education teachers (4.42) which indicated their attitudes remained neutral overall towards physical fitness and academic achievement.

Further breakdown indicates that Item 1 (As physical fitness improves students’ academic performance improves) indicated a statistically significant difference in the attitudes of elementary administrators and fifth grade regular education teachers. The means from each of the respondents indicated that elementary administrators agreed with Item 1, while fifth grade regular education teachers remained neutral with Item 1. Item 3 (It is important to monitor the fitness level of students) indicated a statistically significant difference in the attitudes of fifth grade regular education teachers and elementary physical education teachers. The means from each of the respondents indicated that fifth
grade regular education teachers remained neutral with Item 3, while elementary physical education teachers agreed with Item 3. There was a statistically significant difference between the attitudes of elementary administrators and fifth grade regular education teachers, and the attitudes of fifth grade regular education teachers and elementary physical education teachers on Item 8 (It is important to provide activities in the classroom to enhance the physical fitness of the students). The means from each respondent group indicated elementary administrators and physical education teachers agreed with Item 8, while fifth grade regular education teachers remained neutral on Item 8. Item 9 (Physical fitness plays a major role in students attendance) indicated statistically significant difference in the attitudes between fifth grade regular education teachers and elementary physical education teachers. The means from each respondent group indicated that fifth grade regular education teachers remained neutral on Item 9, while elementary physical education teachers agreed with Item 9. There was statistically significant difference between the attitudes of elementary administrators and fifth grade regular education teachers on Item 10 (Students at my school are given opportunities to enhance physical fitness each day). The means from the respondent groups indicated that elementary administrators agreed with Item 10, while fifth grade regular education teachers remained neutral on Item 10. There was statistically significant difference in the attitudes between fifth grade regular education teachers and elementary physical education teachers on Item 11 (It is important for my students to set fitness goals). The means from the respondent groups indicated that both agreed with Item 11, but there was .59 difference in the mean
scores for each group. Based on these results from Items 1, 3, 8, 9, 10, and 11, it can be concluded that elementary administrators, fifth grade regular education teachers, and physical education teachers all perceive these areas of physical fitness affecting student achievement differently.

These differences on Items 1, 3, 8, 9, 10, and 11 could be attributed to the specific job responsibilities of each of the respondents. Elementary administrators and the fifth grade regular education teachers value time in the classroom teaching their core academic subjects with those students; whereas, physical education teachers value the time spent in physical education class helping students improve their fitness levels. Also, along with elementary administrators valuing time in the core academic classes, the results indicate they also value time in physical education class. Based on this survey, administrators want a school that is well rounded in both the core academic areas and elective areas. This is evident on several responses from the questionnaire. Research cited in this study examines administrators and teachers attitudes towards physical education class. Wilkins et al. (2003) conducted research by surveying elementary school principals in Virginia. Wilkins et al. concluded that mandating less time in art, music, and physical education did not lead to higher scores on the Virginia Standards of Learning test; alternatively, Wilkins et al. suggested from their research that students at schools that have classes such as art, music, and physical education may actually score higher on state standardized tests.

Along with administrators, teachers voiced their concern regarding time allowed for physical education. Morgan and Hansen (2008) conducted research in Australia to determine teachers’ perceptions on the role and benefits of physical education; also, the
teachers discuss problems of why physical education is difficult to implement in the school curriculum. Cited research conducted by Morgan and Hansen (2008) in Australia indicated that classroom teachers there had to teach not only the core areas such as mathematics, language arts, and science, but physical education as well. Teachers in Australia viewed physical education class as a hindrance because they felt as if they were not trained properly to teach physical education classes. The teachers felt more comfortable teaching subjects such as mathematics and language arts instead of physical education (Morgan & Hansen, 2008). Morgan and Hansen added that teachers also felt there was a lack of funding, time, and equipment to give the children a quality experience during the time allotted for physical education classes.

The results from the cited research suggested that teachers considered physical education class to provide students with opportunities to become active and develop healthful habits that fight against obesity (Morgan & Hansen, 2008). The teachers viewed physical education as a subject that impacts student learning and achievement, as well as developing good social skills and developing learning skills (Morgan & Hansen, 2008). Morgan and Hansen (2008) concluded from their research that teachers deem physical education as an accommodating part to the school curriculum; however, plans need to be in place to make sure physical education curricula focus on educational outcomes and are implemented properly.

In conclusion, elementary administrators understand the need for the core academic classes as well as physical education class. Administrators agreed that physical fitness affects student academic achievement. However, it can be concluded that fifth grade regular education teacher’s value time spent teaching their subjects and their
attitudes towards physical fitness and academic achievement is neutral. Elementary physical education teachers understand the importance and benefits associated with physical education class and agree that physical fitness affects student academic achievement.

Other analysis revealed responses from Items 4, 6, 7, 10, and 11 had the highest means from the group of three participants. Elementary administrators, fifth grade regular education teachers, and elementary physical education teachers all indicated that it is important to provide students with the benefits of being fit, that physical fitness plays a major role in a students’ self-esteem, that physical education class at their school provides the students with activities to enhance their fitness levels, that students are given opportunities each day to enhance their physical fitness, and that it is important for students to set fitness goals. Results from the study signify the need for larger research on physical fitness and student academic achievement.

Research question two was, “What is the relationship between the FITNESSGRAM® fitness level scores, in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the mathematics section of the MCT2 in fifth grade students”? Data analysis indicated there was not a statistically significant relationship between mathematics scores from the MCT2 and levels of fitness from the FITNESSGRAM®, which includes muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity. Even though the variables were not highly correlated, flexibility had the greatest relationship on mathematics scores. These results were not comparable to research cited in this study. Research conducted by Castelli, Hillman, Buck, and Erwin
(2007) found a positive correlation between being physically fit and scores from the Stanford Achievement Test, more specifically, the higher the fitness score from the FITNESSGRAM®, the higher the scores on the achievement test (Castelli et al., 2007).

Castelli et al. (2007) concluded the key findings from this study were physical fitness was related to academic performance, confirming the idea that children who are more physically fit are more likely to perform better on standardized tests. Castelli et al. added that when the study was broken down further it revealed that children who performed better on math and reading had better aerobic fitness as well as a better body mass index.

Research question three was, “What is the relationship between the FITNESSGRAM® fitness level scores, in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the language arts section on the MCT2 in fifth grade students”? Data analysis indicated there was not a statistically significant relationship between language arts scores from the MCT2 and levels of fitness from the FITNESSGRAM®, which includes muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity. Even though the variables were not highly correlated, flexibility had the greatest relationship on language arts scores. Again, findings from this study are not comparable with research cited in this study. London and Castrechini (2012) concluded that students who are fit as compared to those students who are unfit showed differences in both math and language arts test scores. London and Castrechini suggested, however, that overall fitness is a better indicator of academic achievement than obesity.
Research question four was, “What is the relationship between the FITNESSGRAM® fitness level scores, in the areas of muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity and performance scores from the science section on the MCT2 in fifth grade students”? Data analysis indicated there was not a statistically significant relationship between science scores from the MCT2 and levels of fitness from the FITNESSGRAM®, which includes muscular strength, muscular endurance, body composition, flexibility, and aerobic capacity. Even though the variables were not highly correlated, body composition had the greatest relationship on science scores; furthermore, results from this study did not compare to research cited in this study. Even though there was not a specific study that used a science test to measure physical fitness and student achievement, Castelli et al. (2007) revealed the key findings from his study were physical fitness was related to academic performance, confirming the idea that children who are more physically fit are more likely to perform better on standardized tests.

Even with cited research showing a correlation between physical fitness and student academic achievement, the results from the study did not match the cited research. The results may have been skewed because students participating in the FITNESSGRAM® may not have given their best effort during the fitness testing or due to time constraints when administrating the test to large classes and structure of the physical education class. In rural south Mississippi, the structure of the physical education classes might focus on student’s physical fitness, but can be characterized as organized play with participation optional. Due to poor effort from the number of students participating, time constraints, and structure of the physical education class
errors could have occurred in recording results from the FITNESSGRAM® test. These errors could have caused the fitness scores to be inaccurate.

Limitations

This study was delimited to the general population of fifth grade students in a rural school district, scores from the mathematics, languages arts, and science MCT2 test, and only fifth grade students. These factors resulted in limitations that should be further examined and be considered when assessing these findings.

When gathering data from the fifth grade students, all information was kept confidential and a student identification number matched the students. By keeping the students information confidential, the researcher was unable to gather gender, age, or race of the fifth grade students.

Elementary students in Mississippi are tested only in the subjects of mathematics, language arts, and science from the MCT2. Social studies and other academic areas are not given as a standardized test in Mississippi in elementary schools; therefore, the researcher was only able to collect scores from these three subjects and evaluate student achievement based on those three.

FITNESSGRAM® fitness level scores are only kept for fifth grade students. When other grade levels participate in the FITNESSGRAM®, the results for each student are not mandated to be kept on file; however, the State Department of Education in Mississippi mandates that all fifth grade scores from the FITNESSGRAM® are kept on file. Other grade levels might change the overall outcome of this study.

Finally, the 11 items developed for this study, although thought to be valid and reliable measures of the attitudes of elementary administrators, fifth grade regular
education teachers, and elementary physical education teachers, may not provide enough information to accurately or thoroughly describe to the extend to which elementary administrators, fifth grade regular education teachers, and elementary physical education teachers perceived physical fitness and student academic achievement.

Recommendations for Policy and Practice

The results from this study did not prove physical fitness to relate with student academic achievement; however, the benefits associated with physical fitness have been well documented throughout this study. There was a significant difference in the attitudes towards physical fitness and student academic achievement of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. Even with the differences associated in the attitudes of physical fitness and student academic achievement, all three respondent groups indicated that it is important to provide students with the benefits of being fit, that physical fitness plays a major role in a students’ self-esteem, that physical education class at their schools provide the students with activities to enhance their fitness levels, that students are given opportunities each day to enhance their physical fitness, and that it is important for students to set fitness goals.

Based on the cited research, school boards and school superintendents should enforce or create policies for schools in their district to stop sacrificing time in physical education class for increased academic time. Students should not be pulled from physical education class to enhance their academic achievement. Physical fitness is an important part of child’s well-being. Not only must children stimulate their cognitive abilities while they are at school, they must also learn about the advantages to being physically fit.
Physical education classes provide great opportunities for children to achieve fitness goals for themselves. School leaders, administrators, and teachers need to recognize the importance of having a quality physical education program at their schools. Cited research from this study indicated there are several cognitive, psychological, and physical benefits associated with physical education class in schools.

In addition to school boards and school superintendents creating policies to keep school administrators from sacrificing physical education time, they also need to make sure physical education classes are appropriately funded. Cited research from this study indicated that schools lack funding for physical education programs. Without funding, schools cannot provide properly scheduled classes, certified teachers, or equipment necessary for effective physical education classes.

School administrators must express the importance and the positive benefits associated with physical education classes. School administrators need to make physical fitness a priority and treat physical education class just as they do the core academic classes. School administrators could use the data from cited research to make physical education class a building block for academic achievement.

Recommendations for Future Research

Even with the outcome of the study revealing there was not a statistically significant relationship between physical fitness and student academic achievement, this study could be repeated in different ways. One way to repeat the study would be to use the same instruments, variables, and procedures plus gathering demographic data for gender, race, and age. In the current study, this demographic data was not given because the researcher kept the students identification confidential. By incorporating
demographic data such as gender, to account for the physical differences in males and females, race, to account for cultural differences, age, to account for the developmental differences of the students, and socio-economical level indicated by free and reduced lunch, one could determine if a specific gender, race, age, or poverty level was more prone to show a relationship between physical fitness and student academic achievement.

Another recommendation for future research would be to employ the same instruments, variables, and procedures and compare school districts that had a physical education program with certified physical education teachers against school districts that did not have a physical education program or certified physical education teachers.

Also, another recommendation for future research would be to employ the same instruments, variables, and compare school districts that were set in a rural setting against school districts that are located within urban or inner-city areas. The current study only incorporated a large rural school district.
APPENDIX A

ADMINISTRATORS’ AND TEACHERS’ ATTITUDES TOWARDS PHYSICAL FITNESS AND STUDENT ACHIEVEMENT

Please respond to these statements as they apply to your school. Please check the box beside each statement with a strongly disagree, disagree, neutral, agree, or strongly agree.

<table>
<thead>
<tr>
<th>Item Descriptor</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. As physical fitness improves students’ academic performance improves.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Overall fitness affects my students’ academic achievement.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. It is important to monitor the fitness levels of my students.</td>
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</tr>
<tr>
<td>4. It is important to provide information to my students on the benefits of being fit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. My students feel their fitness level is important.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Physical fitness plays a major role in a students’ self-esteem.</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>7. Physical education class at my school provides activities to enhance the fitness levels of my students.</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8. It is important to provide activities in the classroom to enhance the physical fitness of my students.</td>
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<td></td>
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<tr>
<td>9. Physical fitness plays a major role in my students attendance.</td>
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<tr>
<td>10. Students at my school are given opportunities to enhance physical fitness each day.</td>
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<td></td>
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<tr>
<td>11. It is important for my students to set fitness goals.</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
To help assist in the analysis of the study, please provide the following information. All information provided in the study is absolutely confidential and anonymous.

1. Gender: _____ Female _____ Male

2. Age: _____ 21-31 _____ 32-42 _____ 43-53 _____ 54+

3. Which of the following best describes your current position (check one) and how many years have you served in that position?

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>0-10</td>
</tr>
<tr>
<td>Regular education teacher</td>
<td>11-20</td>
</tr>
<tr>
<td>Physical education teacher</td>
<td>21-30</td>
</tr>
<tr>
<td></td>
<td>31+</td>
</tr>
</tbody>
</table>

4. What is your highest level of education completed? (check one)

_____ Bachelors
_____ Masters
_____ Specialist
_____ Doctorate

5. What subject are you currently teaching? (check all that apply)

_____ Language arts
_____ Physical education
_____ Mathematics
_____ Social Studies
_____ Science
_____ Other

6. What grade level do you teach? (check all that apply)

_____ Kindergarten
_____ 1st Grade
_____ 2nd Grade
_____ 3rd Grade
_____ 4th Grade
_____ 5th Grade
_____ 6th Grade

7. What is the amount of time your homeroom students spend being physically active (physical education class, recess, and movement in class)? (check one)

_____ Less than 100 minutes
_____ 100-149 minutes
_____ 150+ minutes

8. What is the average number of students in your classes?

_____ 1-10
_____ 11-20
_____ 21-30
_____ 31+
9. What would you consider as an adequate amount of time for physical activity each week for elementary students? (check one)

_____ Less than 30 minutes
_____ 30 – 60 minutes
_____ 61 – 90 minutes
_____ 91 – 120 minutes
_____ 121+ minutes

10. In my school, students receive a majority of their physical activity through:

_____ Recess
_____ Physical education class
_____ Activities in other classes
_____ Other
Thank you for assisting in the development of this questionnaire and taking time to review these questions and provide valuable feedback.

Please answer the following questions:

1. Readability: Does the instrument contain language that can easily be understood by the teachers and administrators?

2. Did you find any statements in the instrument confusing? If yes, explain.

3. Topic: Does the instrument address appropriate issues related to physical fitness and student achievement?

4. Did you find any statements that did not relate to the topic: physical fitness and student achievement?

5. Do you have suggestions for other statements that you would include about the topic: physical fitness and student academic achievement?

6. Are the response choices appropriate and easy to understand?

7. How much time do you estimate it would take a participant to complete the questionnaire?

8. Did you find that this instrument was too long, too short, or the right length?

9. Please make any additional comments or suggestions regarding the questionnaire.
APPENDIX C

SUPERINTENDENT PERMISSION FORM

Dear Superintendent:

I am Will Parker, a doctoral student working on my dissertation in Educational Leadership at The University of Southern Mississippi. My proposed research topic is determining if there is a relationship between student physical fitness and student academic achievement by comparing the FITNESSGRAM® fitness test and the Mississippi Curriculum Test, 2nd Edition (MCT2) achievement test of fifth grade students. Along with this, I am also surveying elementary administrators, fifth grade regular education teachers, and elementary physical education teachers regarding their attitudes of physical fitness and student achievement.

My interest in this topic is personal and professional; I am a former elementary physical education teacher and now a current comprehensive health teacher. I have a Master’s of Education degree in secondary education and a Bachelor of Science degree in Kinesiology.

I would like to request permission to conduct my research in your six elementary schools. I will be asking to collect and use data from your six elementary schools from the FITNESSGRAM® fitness test and MCT2 achievement test of fifth grade students. This information will be compared to determine if there is a correlation between student physical fitness and student academic achievement. No students will be identified by name. I will use their student identification number to compare their level of fitness from the FITNESSGRAM® fitness test and their academic level of achievement from the MCT2. Also, your district and school will not be named in the study; participation is anonymous. Individual responses from the questionnaire will remain confidential, as only aggregated results will be reported. The responses from the questionnaire will contribute to administrators, regular education, and physical education teacher’s attitudes in the area of physical fitness and student academic achievement. Participation in the questionnaire is voluntary. All school, teacher, and administrator identifying information will be kept confidential. Please consider signing the form I have enclosed granting permission for your elementary school personnel to participate in the study.

If you have any questions or concerns, you may contact me at 601-319-8144 or email me at wrp13@hotmail.com. Dr. David E. Lee of the University of Southern Mississippi is my committee chair and his email address is david.e.lee@usm.edu.

Your consent for me to participate in this study is greatly appreciated. Once the study is complete, I will be glad to share the results with you and the other participants in the study.

Thank you for your time and consideration,
Will Parker
SUPERINTENDENT’S PERMISSION TO CONDUCT RESEARCH

I, _________________________________________________________________ of the Superintendent

______________________________________________________________

School District

grant permission for the researcher to use the results from the FITNESSGRAM® fitness test and results from the Mississippi Curriculum Test, 2nd Edition of fifth grade students in all six elementary schools in the district to compare fitness levels and academic achievement. I also grant permission for the researcher to distribute the questionnaire, Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Academic Achievement, to elementary administrators, fifth grade regular education teachers, and elementary physical education teachers to voluntarily respond to the questions proposed by Will Parker, a doctoral student at The University of Southern Mississippi.

__________________________________________
Signature
APPENDIX E

SUPERINTENDENT’S PERMISSION TO CONDUCT RESEARCH

May 14, 2015,

To Whom It May Concern:

SUPERINTENDENTS’ PERMISSION TO CONDUCT RESEARCH

I, __________ Thomas D. Parker ___________________________ of the Superintendent

__________________________________

J. Jones County School District School District

grant permission for the researcher to use the results from the FITNESSGRAM® fitness test and results from the Mississippi Curriculum Test, 2nd Edition of fifth grade students in all six elementary schools in the district to compare fitness levels and academic achievement. I also grant permission for the researcher to distribute the survey, Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Academic Achievement, to elementary principals, elementary regular education teachers, and elementary physical education teachers to voluntarily respond to the questions proposed by Will Parker, a doctoral student at The University of Southern Mississippi.

____________________________

Signature
APPENDIX F

PARTICIPANT INFORMATION LETTER

Consent is waived by the Institutional Review Board at the University of Southern Mississippi to participate in the research project entitled:

“Is there a Relationship between Physical Fitness and Student Academic Achievement?”

1. **Purpose:** My name is Will Parker and I am a doctoral student at the University of Southern Mississippi. You are invited to participate in this study seeking to understand the attitudes of administrators, fifth grade regular education teachers, and elementary physical education teachers regarding how physical fitness effects student academic achievement. Your attitudes, as administrators, regular education teachers, and physical education teachers, will provide information not previously collected. The data collected could be used at the state, district, or school level to help increase student performance. This research could potentially impact the use of physical education programs across the state of Mississippi.

2. **Description of Study:** This study seeks the attitudes of administrators, fifth grade regular education teachers, and elementary physical education teachers. Participants in the study will be asked to complete a pencil and paper questionnaire. The questionnaire consists of 11 Likert-type questions seeking your attitudes regarding physical fitness towards student academic achievement. Also included are 10 questions collecting demographic data and information about classes. The time investment to complete the questionnaire should require 15 minutes. Along with the questionnaire, the researcher will collect fifth grade students’ fitness level results from the FITNESSGRAM® and performance level results from the Mississippi Curriculum Test, 2nd Edition (MCT2) to determine if there is a correlation between physical fitness and student academic achievement. No student information will be identified.

3. **Benefits:** Participation in this study may not benefit you directly, but it will provide insight into administrators, regular education elementary teachers, and elementary physical education teachers attitudes regarding physical fitness and student academic achievement.

4. **Risks:** There are no known social, psychological, physical, or financial research-related risks.

5. **Confidentiality:** The researcher will pick up your response to the questionnaire and all participants will remain anonymous. All responses will be stored in a secure filing cabinet for the duration of the study. When the study is complete, all responses will be destroyed.
6. **Participant’s Assurance:** Whereas no assurance can be made concerning results that may be obtained the researcher will take every precautionary measure consistent with the best scientific practice. Participation in this study is completely voluntary, and participants may withdraw from the study at any without any prejudice, penalty, of loss of benefits. Questions concerning the research should be directed to Will Parker at 601-319-8144. This project has been viewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, 601-266-5997. A copy of this form will be given to the participant.
Dear Participant:

I am Will Parker, a doctoral student working on my dissertation in Educational Leadership at The University of Southern Mississippi. My proposed research topic is determining if there is a relationship between student physical fitness and student academic achievement by comparing the FITNESSGRAM® fitness test and the Mississippi Curriculum Test, 2nd Edition (MCT2) academic achievement test of fifth grade students in the areas of language arts, science, and mathematics. I am surveying elementary administrators, fifth grade regular education teachers, and elementary physical education teachers regarding their attitudes of physical fitness and student academic achievement.

This topic is both personal and professional to me. I am currently a health teacher at the high school level and a former elementary physical education teacher. I also have a Master’s of Education degree in secondary education and a Bachelor of Science degree in Kinesiology.

Your superintendent signed a permission form granting permission for your school to participate in this study. Attached is a questionnaire, Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement. Please take time to complete the questionnaire and give it to your administrators when you finish. I will be back by in one week to pick up the questionnaire. Your participation in this study will help me to better understand the attitudes of administrators, fifth grade regular education teachers, and physical education teachers regarding student physical fitness and its relationship to academic achievement. The survey is voluntary for all participants and participation is anonymous. Individual responses from the questionnaire will remain confidential, as only aggregated results will be reported. There is no risks or benefits involved with completing the questionnaire.

I will also be collecting data from the FITNESSGRAM® fitness test and MCT2 academic achievement test for your fifth grade students at your school. These tests will serve as instruments for me to compare fitness levels of students with their performance academically. No individual students will be identified.

If you have any questions or concerns, you may contact me at 601-319-8144 or email me at wrp13@hotmail.com. This dissertation study has been approved by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal guidelines. Any questions or concerns about the rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi (USM), 118 College Drive #5147, Hattiesburg, MS, 39406-0001, 601-266-5997.

Thank you for your time and consideration,

Will Parker
APPENDIX G

PERMISSION LETTER FOR PILOT STUDY

Dear Superintendent:

I am Will Parker, a doctoral student working on my dissertation in Educational Leadership at the University of Southern Mississippi. I am seeking permission to pilot a questionnaire with veteran elementary regular education and physical education teachers in your school district. My proposed research topic is determining if there is a relationship between student physical fitness and student academic achievement by comparing the FITNESSGRAM® fitness test and the Mississippi Curriculum Test, 2nd Edition (MCT2) achievement test of fifth grade students. I am also surveying elementary administrators, fifth grade regular education teachers, and elementary physical education teachers regarding their attitudes of physical fitness and student achievement.

Through reviewing the literature, I have created a questionnaire, Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Achievement, to gather the attitudes of elementary administrators, fifth grade regular education teachers, and elementary physical education teachers. In creating this questionnaire, I must first pilot my questionnaire to determine the reliability of the questions asked. I would like to ask permission to conduct my pilot study with veteran elementary regular education and physical education teachers in your school district. The questionnaire is compiled of 31 total questions, where 21 are relating to physical fitness and student achievement and 10 are demographic questions. The questionnaire should take no more than 10 minutes to complete.

My interest in this topic is personal and professional; I am a former elementary physical education teacher and now a current comprehensive health teacher. I have a Master’s of Education degree in secondary education and a Bachelor of Science degree in Kinesiology.

If you will allow me to conduct the pilot study, please sign the form granting permission for the teachers in your district to participate in the pilot study.

If you have any questions or concerns, you may contact me at 601-319-8144 or email me at wrp13@hotmail.com. Dr. David E. Lee of the University of Southern Mississippi is my committee chair and his email address is david.e.lee@usm.edu.

Thank you for your time and consideration,

Will Parker
SUPERINTENDENT’S PERMISSION TO CONDUCT PILOT STUDY

I, _______________________________________________________________ of the
Superintendent

______________________________________________________________
School District

grant permission for the researcher to conduct the pilot study and to distribute the
questionnaire, *Administrators’ and Teachers’ Attitudes Towards Physical Fitness and*
*Student Academic Achievement*, to veteran elementary regular education teachers, and
elementary physical education teachers to voluntarily respond to the questions proposed
by Will Parker, a doctoral student at The University of Southern Mississippi.

______________________________________________________________
Signature
May 13, 2015,

To Whom It May Concern:

SUPERINTENDENTS’ PERMISSION TO CONDUCT PILOT STUDY

I, ___________________________ of the
Superintendent
Laurel School District

grant permission for the researcher to conduct the pilot study and to distribute the survey,
Administrators’ and Teachers’ Attitudes Towards Physical Fitness and Student Academic
Achievement, to veteran elementary regular education teachers, and elementary physical
education teachers to voluntarily respond to the questions proposed by Will Parker, a
doctoral student at The University of Southern Mississippi.

______________________________
Signature

www.laurelschools.org
APPENDIX J

INSTITUTIONAL REVIEW BOARD NOTICE OF COMMITTEE ACTION

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 20, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 15060302
PROJECT TITLE: Is There a Relationship between Physical Fitness and Student Academic Achievement
PROJECT TYPE: New Project
RESEARCHER(S): William Rushton Parker
COLLEGE/DIVISION: College of Education and Psychology
DEPARTMENT: Educational Leadership and School Counseling
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Exempt Review Approval
PERIOD OF APPROVAL: 07/15/2015 to 07/14/2016
Lawrence A. Hosman, Ph.D.
Institutional Review Board
REFERENCES


Christesen, P. (2012). When were the first olympics? *Significance, 9*(2), 37-39.


doi:10.1177/0895904809351693


