SIXTH GRADE FITNESS LEVELS AND THE FITNESSGRAM ASSESSMENT PROGRAM

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Sixth Grade Fitness Levels and the FitnessGram Assessment Program
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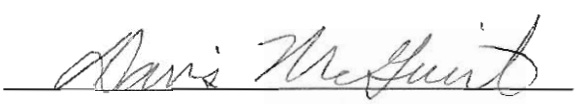

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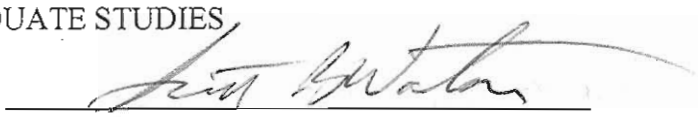

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Abstract

Reginald S. Kimball. SIXTH GRADE FITNESS LEVELS AND THE FITNESSGRAM ASSESSMENT PROGRAM. (Under the direction of Dr. Karen Parker) School of Education, February, 2007.

The purpose of this study was to determine sixth grade students' level of fitness on the FitnessGram physical fitness testing program at the beginning of the 2006 – 2007 school year. This study examined if students entering the sixth grade were in the Healthy Fitness Zone (HFZ) or needs improvement zone of the FitnessGram. The primary participant population for the study was 155 sixth grade students from four different Metro-Atlanta middle schools. Although there were 155 students, gender was not reported for two of the students. Data was collected during the 2006 – 2007 school year during the first 3 weeks of school. The data sources included FitnessGram test scores and the Physical Activity Questionnaire (PAQ). Other factors that were analyzed were gender and ethnicity. The researcher held the FitnessGram orientation meetings with the physical education teachers at the schools where he conducted the research. The orientation consisted of discussing the research with the teachers, watching the FitnessGram DVD, providing educational resources, and demonstrating each of the assessments for the teachers. The findings indicated that although students fell within the Healthy Fitness Zone (HFZ) on five of the six FitnessGram subtests, the majority of students did not do well on the most important test item, aerobic capacity. Results also showed that students who participate in regular physical activity outside of school have a higher level of aerobic capacity than those who do not.

Dedication

This study is dedicated to my Lord and Savior, Jesus Christ. Without his blessings and unconditional love, this project would not have been possible. Although my name is on this dissertation, I was given the health, determination, financial resources, and opportunity to do so by his love and amazing grace. He deserves all the Glory!

Acknowledgments

I would not have made it to the end of this journey without the foundation and support provided to me by my wife, Mary, and my two sons, Keaton Christian and Karson Creed. Their love and willingness to allow me to work on this project and do things without me are something I can never repay them for. I thank the Lord each and every day for them and appreciate their support.

Additional thanks go to Dr. Karen Parker for her incredible tutelage throughout the project and her willingness to assist me where needed. She was very patient and understanding throughout the entire process. I would also like to thank Dr. Clarence Holland, Dr. Davis McGuirt, and Dr. Scott Watson for their invaluable assistance.

Finally, I would like to thank Dr. Jerry Falwell for having a clear vision in 1971, to have a Christian based University that would glorify God. I have seen that dream become a reality through challenging my mind and building my faith. Thank you!

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Chapter 1

Introduction to the Study

Statement of the Problem

Public demand for accountability in education is increasing, and educational leaders are under tremendous pressure to meet these demands. Low student achievement, poor attendance, high dropout rates, and school violence have sparked great debate and ignited many school reform initiatives across the country. One such initiative is the *No Child Left Behind Act* (NCLB). This legislation adds to the many pressures currently affecting educational leaders and the decisions they make. The pressure to perform on standardized tests may cause non-academic subjects, such as physical education and fine arts, to be cut back or eliminated entirely.

In 1996, the Surgeon General of the United States issued a report called *Physical Activity and Health* and summarized the current consensus regarding the health benefits of regular physical activity. It was clearly stated in the report that physical activity is needed to maintain optimal health and be productive citizens. When physical education is eliminated from schools so that more time can be used for academics, the results may be counterproductive.

With the use of the *FitnessGram Assessment Tool*, sixth grade students from four middle schools were assessed on upper body strength and endurance, flexibility, abdominal strength and endurance, aerobic capacity and body composition. The research took place during the 2006 – 2007 school year.

The purpose of this study is to examine sixth grade fitness levels as measured through the FitnessGram assessment tool.

Statement of the Hypothesis

Because fitness levels are vitally important for all students, and because little research exists that compares physical education programs on fitness levels at the sixth grade level, study in this area is warranted. It is hypothesized that:

1. The majority of students entering the sixth grade do not fall within the FitnessGram's Healthy Fitness Zone (HFZ).
2. Students who engage in extra-curricular activities have a higher level of fitness than students who do not.

Research Objective

In addition to the hypotheses stated above, data will be collected to compare and contrast ethnicity, gender, schools and the six FitnessGram subtests. These groups will be compared statistically and results will be reported.

Background of the Study

Physical Activity and Academic Performance

Public school leaders and administrators are under enormous pressures to show, through improved test scores, that they are providing every student with a thorough and efficient education. Some believe the aims promoted by the *No Child Left Behind Act* are clearly too narrow. "Surely, we should demand more from our schools than to educate people to be proficient in reading and mathematics" (Noddings, 2005).

The physical benefits of exercise are well documented as subjects for continuous research. Exercise is beneficial in maintaining a healthy weight and promoting a longer

life. It has also been suggested that physical activity may improve classroom performance. The connection between the two has interesting implications for the educational systems in the United States. In general, children spend less time in physical education classes and exercising than past generations (Rajic et al., 1997). According to the Surgeon General (2001), as cited by the Center for Disease Control (CDC), nearly half of American youths ages twelve to twenty-one years are not active on a regular basis. Only 19 % of all high school students are physically active for twenty minutes or more, five days a week, in physical education classes. Because exercise and academic performance may be related, it is possible that the lack of regular physical activity hurts not only the physical well being of the child, but the mental capabilities of the student as well. According to Rajic et al. (1997), regular exercise can improve academic performance and an effort to participate in frequent physical activity should be made by students.

The benefits of physical activity can affect both academic learning and the physical activity patterns of students. The healthy, physically active student is more likely to be academically motivated, alert, and successful (Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001). The relationship between physical activity and academic achievement has been the subject of much research and speculation. With this in mind, Linder (1999) demonstrated a positive relationship between physical activity and academic performance.

Research supports the importance of movement in educating both mind and body. The benefits of physical education can affect both academic learning and physical activity patterns of students (Dwyer et al., 2001). Physical education is unique to the

school curriculum, providing students with opportunities to learn motor skills, develop fitness, and gain understanding about the importance of physical activity. Many studies have suggested that academic constructs may have greater meaning for children when they are taught across the three domains of learning: cognitive, affective, and psychomotor. Research has also implied that children who engage in daily physical education show superior motor fitness, academic performance, and better attitudes toward school versus their counterparts who do not participate in daily physical education (Dwyer et al., 2001). Children form more effective schemes by physically interacting with their environment, resulting in students missing fewer days of school because of illness and exhibiting greater academic achievement because of the physical vitality gained in physical education (Irandoust & Karlsson, 2002). Schemes, sometimes called "schema" are referred to as ideas or concepts and originated from Piaget's cognitive development theory (LeFrancois, 2000).

Physical activity improves academic performance by causing physical changes in the brain (Sallis et al., 1999). This type of stimulation may actually lead to increased performance in the classroom. Not only does exercise increase blood flow to the brain, it also causes the release of certain hormones that could aid learning (Sallis et al., 1999).

FitnessGram

The nationally recognized FitnessGram (Cooper Institute, 1992) is one assessment that incorporates fitness assessments as one component of a fitness and physical education program. The tool emphasizes knowledge, motivation, and assessment. This tool is computerized and is a comprehensive criterion-referenced program for school-aged youth. The components of the FitnessGram are a health-related fitness assessment, a

software program to score the collected data, and educational materials to aid teachers and assist students in establishing daily physical activity for a lifetime.

As daily physical activity and fitness become recognized as a major contributor to health and disease prevention for all Americans, it is crucial that children become more physically active (Action for Healthy Kids, 2004). The need for physical fitness evaluation seems apparent when we are continually reminded about the consistent rise in mortality in the United States due to our obesity epidemic, chronic degenerative diseases and cardiovascular disease. The government health study, Healthy People 2010 (1998) lists the ten leading causes of death in the United States. At the top of the list is heart disease. Physical inactivity is a positive risk factor for developing cardiovascular disease. Physical activity and daily exercise can help prevent cardiovascular disease and lower the obesity epidemic. Physical education programs are one way to help curb the health problems that are currently facing our nation. Some current research suggests that the higher the student fitness levels, the better the classroom performance (Action for Healthy Kids, 2004). The research also suggests that physical education programs and fitness levels have important individual, societal, and economic implications (President's Council on Physical Fitness and Sports, 1996).

Very few states mandate middle school physical education and in 2000, the state of Georgia eliminated mandated physical education for middle schools. Although physical education is required at elementary and high school levels, middle school students may or may not receive physical education during their middle school years in Georgia. Some students do receive daily physical education throughout the year, while others participate for a few weeks, while some do not have it at all. Illinois is currently

the only state that mandates daily physical education at all levels (Shape of the Nation Report, 2001).

Studies suggest that physical activity during childhood can facilitate optimal growth and development and adult physical activity is related to exercise patterns established in childhood (Cooper, 2001). With the increased pressure of academic accountability; however, the opportunities for students to participate in physical exercise may be diminishing. According to the Secretary of Education, Rod Paige:

> *No Child Left Behind* (NCLB) puts the focus on academics—where it should be—however, I am disturbed by reports I hear about schools doing away with recess and physical education programs. NCLB certainly does not encourage these kinds of severe measures. Studies show that dedicating increased time to physical activity during the school day does not detract from academics; on the contrary, it in fact improves academic performance. Physical activity also increases adolescents' self-esteem as well as their physical and mental health. It's also just common sense: children can't learn when they are listless (U.S. Department of Education, 2004).

Professional Significance of the Study

The literature search suggests that there is relevant research into the importance of daily physical education among middle school students. The research has not, however, specifically suggested the importance of sixth grade physical education programs. Currently, little research into the fitness levels of sixth grade students has been located. This study will contribute to the existing body of knowledge through assisting policymakers, curriculum experts, administrators and teachers to make better decisions

on curriculum development, while improving student achievement, and promoting daily physical education.

In addition, fitness levels are very important for all students. Many studies suggest that the higher the fitness levels the better students perform in the classroom (Satcher, 2005). Understanding both physical education programs and fitness levels may, in fact, impact curriculum development and design for instruction on the sixth–grade level.

The obese child who does not exercise but spends all of his or her time watching TV or playing computer games is an emblem of the health problems facing young Americans today. This obese child, however, can also be viewed as the physical result of a complex social, educational, contextual, and theoretical problems which have converged at the present moment, to create a remarkably unhealthy climate for middle school-aged children (Felton & Dowda, et. al., 2002; Geiger & Petri, et. al., 2002; Maier, 2001; Pritchard & O'Bryant, 2001; Satcher, 2005). On the surface, many educators would agree that "public school physical education programs are an effective and necessary way to promote youth physical activity" (Running & Fitnews, 2004, p. 1). But in actuality, a number of problems have emerged which have not only degraded the quality of physical education being offered in schools, but in many cases caused physical education programs to be eliminated. First, physical education as currently taught has increasingly come under fire from researchers, who find today's practice to be theoretically ungrounded and in many cases useless for promoting children's health. Second, this degradation of programming has largely been enabled by a climate of standardized accountability in education, which has placed so much attention on the tested subjects of math and reading that all other subjects are being short-changed. Third, studies have

shown that, for various reasons, often this dislike stems from the fact that the instruction is inappropriate for their age group. Finally, budget cuts have caused many schools to eliminate physical education programs, when it would not be possible to cut back on curriculum linked to math and reading tests.

As a result of this situation, the obese child is caught in what might be called a "perfect storm" of negatively converging cultural forces. Just as fast food and lethargy become the norm of youthful living, so schools are being pressured to focus primarily on math and reading and thus eliminate physical education. This complex of problems presents an educational leader, administrator, or principal with a serious challenge: How does one present classes so that in-school physical education can actually help to reduce obesity in middle-school aged children? In order to do this, it will be necessary for the policy leader to develop a firm grasp of the scope of the obesity problem, as well as its cultural and institutional causes. While an educational leader may not be able to do much against broad cultural reasons for obesity, in schools something can be done. It is, therefore, necessary for the leader to determine what is wrong with physical education as currently offered, and why so many middle-school aged children especially do not like it, often even shunning it. After having determined the negative aspects of the current physical education landscape, the educational leader will then need to amass resources which will allow him or her to promote a revival or reinstitution of physical education in school. Support may be derived from a growing body of literature which, in response to the overwhelming interest in standardized test results and other mandates in today's educational climate, have had to search for more positive results of physical education. The evidence that physical education exercises lead to improved health and loss of

weight among children is no longer sufficient. It is now necessary that physical education also be shown to have a positive impact on the academic achievement levels of students. Fortunately, some studies have begun to reveal such a link, beginning a process of creating a new or revived—paradigm in which education is viewed as involving both body and mind. Finally, an educational leader will have to organize the implementation of new, reformed physical education programs based on findings of studies concerning what middle-school aged children do not like about PE, how physical education improves health, and how physical education can also improve academic achievement. This process involves a number of stakeholders whose input also should be managed by the educational leader. Overall, then, the challenge of reforming physical education hinges on development of an evidence-based practice properly managed and implemented to produce positive results in student fitness levels. Regardless of the value of physical activity, physical education programs are likely to continue facing cutbacks unless physical education is recognized as a core subject of equal importance to academic subjects.

Bradshaw (2006) noted,

> More attention to physical education and physical activity is needed because of the rising obesity epidemic among youths in the United States and the dwindling of physical education programs in many areas of the country. If physical education were considered a core subject, it would help bring recognition the field and make the public realize its importance. With this recognition, schools would be more accountable. In addition, class sizes might be reduced so that all students

could receive daily physical education, therefore, fitness levels would increase and lead to a healthier and more physically active population (p. 2).

Societal Concerns Become Curriculum Concerns

The Progressive movement in education began with the publication of John Dewey's book, *The School and Society* (1899), in which he establishes a relationship between the school and society. Dewey also had the idea that the school is a community and believed that democracy was an "experience" rather than a form of government.

Schools play a vital role in meeting the needs of society. The resolution of social problems depends upon citizens who have the skill, knowledge, and inclination to tackle them. The education that the school provides enables the schools to become a major factor in the improvement of society through helping young people develop the ability to respond rationally to societal problems. In this way, the school serves not only the needs of the students but also the needs of society. The school is the vehicle for helping young people adapt to and prepare for life in society. Oliva (1992) writes, "The system that we call education responds to change as conditions in its suprasystem (society) change" (p.45). Curriculum planners must consider the characteristics and needs of our present society as well as characteristics that are a prediction of the future.

Sources of Curriculum Development

During the initial steps of curriculum development societal needs are often examined, which is referred to as the needs assessment. During the needs assessment, three elements are considered: (a) the needs of the student, (b) the needs of society, and (c) the specific subject area needs (Tyler, 1949). These factors have been consistent in American education.

It is of the utmost importance that curriculum workers cautiously study and analyze data, which is relevant to students' needs and interest. Tyler (1949) defines the term "needs" in two different ways. First, as "a gap between some conception of a desirable norm, that is, some standard of philosophic value and the actual status. This suggests there is a gap between what is and what should be" (pp. 7-8). Tyler provides an example of students in a school within a certain community who, after an investigation, are found to have dietary problems and well as poor physical health. Tyler goes on to explain how these facts may be linked to poor objectives in health education. These objectives need to be refined to demonstrate a normal or desirable physical condition (p. 6). Tyler's second use of the term needs is one that refers to the "… tensions in the organism which must be brought into equilibrium for a normal healthy condition of the organism to be maintained" (p. 8). In order to maintain a balance or equilibrium, certain needs must be met. "In these terms one of the problems of education is to channel the means by which these needs are met so that the resulting behavior is socially acceptable, yet at the same time the needs are met and the organism is not under continuous, unrelieved tensions" (Tyler, 1949, p. 7).

Oliva (1992) suggests looking at the total range of needs such as educational, social, occupational, physical, psychological, and recreational. When considering these particular needs it is apparent that children share many of these same needs. "In this sense all children have the same needs and it is the responsibility of the school as with every other social institution to help children get these [physical, social, and integrative] needs met in a way which is not only satisfying but also provides the kind of behavior patterns that are personally and socially significant" (Tyler, 1949, p. 7).

Society has often influenced curricular decisions and has acted as a guiding force for school programs. “The function of the school and the model of curriculum embraced at a particular time are reflections of the demands and expectations of the larger society changing sociopolitical forces have exerted changing demands and expectations on the school. In various eras, the tendency is for the school to respond to whatever pressures are most dominant” (Tanner and Tanner 1980, p. 148). Schubert (1986) also agrees by stating, “Today, it is quite evident that the values of society are perpetuated through schooling” (p. 197).

Curriculum planners, with the assistance of subject matter specialists, are needed to choose the basic knowledge, skills and concepts from each discipline to be included in the curriculum. “A central problem of this horizontal organization that we call scope is the delimitation of the concepts, skills, and knowledge to be included” (Oliva, 1992, p. 508).

The needs of students, society, and subject matter specialists influence the scope of the curriculum. In the field of health and physical education these needs come together and the schools are called upon to help solve many health-related problems experienced by today’s youth.

When comparing Tyler’s philosophy and the FitnessGram an obvious relationship occurs. The needs of students include health, fitness and fun. Societal needs center around society’s unhealthy and unfit lifestyles. The subject area needs focus around the FitnessGram program. Tyler explains that “needs” represent a gap between a desired norm and the actual status (Tyler, 1949). The current myriad of preventable health

problems plaguing Americans suggest that there is perhaps a gap between the desired health levels of Americans and their actual state of health.

Health and Wellness as Curricular Concerns

In 1918, the Cardinal Principles of Education included health as the most important and the first of the seven objectives of education. “One of the most influential documents in the United States education was the pamphlet Cardinal Principles of Education, a statement of seven goals in 1918 by the NEA Commission on the Reorganization of Secondary Education” (Haas, 1994, p. 47). Since being published in 1918, over 150,000 copies have sold making it a “government best seller”. More importantly, the document has influenced thousands of curricular programs.

Health and physical fitness continued to goals in American education. In 1984, John Goodlad and his colleagues addressed themes of social purposes served by schools. One section that was developed focused on “emotional and physical well-being”. More specifically this section addressed the need to “develop knowledge of one’s own body and adapt health practices that support and sustain it, and among other related goals to “develop physical fitness and recreational skills” (p. 50).

Recent Societal Health Concerns and Health Curriculum

Many national health concerns have affected the scope of curriculum. With societal concerns and student’s needs, it is apparent that we must analyze some of the health-related problems experienced by today’s youth. Not only are schools offering its young people programs focusing on physical fitness, nutrition and health, but these programs have also been confronted with a number of health related problems or national health crises which have demanded the attention of curriculum planners and subject

matter specialists. The schools have been called upon, once again, to act as the cure all of society's ailments. This includes substance abuse, tobacco use, obesity issues, and AIDS.

The statistics related to all of these health problems are of concern; therefore, the scope of the curriculum has expanded to include preventive programs to assist with these very serious issues. Coronary heart disease could prove to be our nation's toughest fight to date and the increase of sedentary lifestyles is not helping that fight.

Cardiovascular Diseases

Cardiovascular diseases such as coronary heart disease (CHD) and stroke are the number one killers of Americans. *Healthy People 2010* (1998, p. 22) lists the 10 leading causes of death in the United States and heart disease is at the top of the list. In the 1996 Surgeon General's Report on Physical Activity and Health (U.S. Department of Health and Human Services, 1996) coronary heart disease in the United States had a higher mortality rate than all types of cancer combined. The disease is thought to begin in the childhood years and results in fatty substances in the arteries, which reduces blood flow and oxygen delivered to the heart (The President's Council on Physical Fitness and Sports, 1996).

Risk factors that are associated with coronary heart diseases include: smoking, high blood pressure/hypertension, diabetes, obesity, and physical inactivity. Obesity is also increasing at an alarming rate in the United States. According to the United States Department of Health and Human Services (2000), 55% of all adults are overweight or obese. Controlling obesity in the United States is difficult. Bar-Or and Baranowski (1994) suggest that physical activity in adolescence (defined as ages 11-12) reduces the risk of

obesity and helps in its treatment. Heyward (1998) recommends 30 consecutive minutes of moderate physical activity daily to benefit health and prevent disease.

Regular physical activity that is performed on most days of the week has positive health outcomes. Regular physical activity can reduce the risk of developing a wide array of health illnesses. According to the CDC,

> … daily physical activity improves health in the following ways: reduces the risk of dying from heart disease, reduces the risk of dying prematurely, reduces the risk of developing diabetes, reduces the risk of developing high blood pressure, reduces the risk of developing colon cancer, reduces feelings of depression and anxiety, helps control weight, helps build and maintain healthy bones, joints, and muscles, and promotes psychological well-being. (1996, p.1)

Physical Education Curriculum

When program objectives, developed in the scope, are accomplished they should make a significant contribution to the overall goals of education in the United States. They should aid in producing well-rounded individuals that are ready, able, competent, and capable of contributing to society. Over the past 14 years, professionals have worked collaboratively to develop and identify a set of standards that give direction to the physical education curriculum. The National Association of Sport and Physical Education (NASPE) collaborated with the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) to answer the question "What should students know and be able to do?" The work of this committee resulted in the publication *Outcomes of Quality Physical Education Programs* (1992).

Moving into the Future (1995), a more current publication by NASPE, recommends content standards for physical education. This enables stakeholders to better understand how physical education teachers should teach and what students should learn. NASPE also defines a physically educated person (Appendix I). With the current shape of our nation and our young people, it is imperative that curricula be constructed to place physical education into the core area of importance in education.

Methodology

Subjects

The population for this study was drawn from four southeastern United States public middle schools, which consisted of 155 coeducational students. Although all eight middle schools agreed to the research, only four schools were selected because of the diversity of students and the distance between the schools. The researcher did not assess students from schools that were close geographically; therefore, he conducted the research with the schools that were the furthest from one another. The students' fitness levels were assessed using the *FitnessGram* to determine if they are within the Healthy Fitness Zone, or if they need improvement. Demographic data, such as the students' gender, race, and age were also obtained, and correlations between and among these variables and fitness level test results were determined. A physical activity questionnaire (PAQ) was developed and piloted by the researcher to use as a way of assessing students' level of physical activity outside the physical education classroom (Appendix B). This questionnaire was given to students during their regular physical education class before any of the FitnessGram assessments were administered.

Instruments

Information and data for this study were collected through the FitnessGram assessment. The Cooper Institute for Aerobics Research developed the FitnessGram in 1982. The organization is located in Dallas, Texas and is currently known as the Cooper Institute. The FitnessGram is endorsed by the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD). The primary goal for the FitnessGram is to assist students in grades 4-12 to establish physical activity as part of their daily lives. Students are assessed in five different areas of health related fitness, which include aerobic capacity, body composition, muscular strength, endurance, and flexibility.

The category below the HFZ is referred to as *Needs Improvement* to indicate dimensions of fitness that may require special attention. While the effect of low fitness may not influence health until later in adulthood it is important to identify potential risks early on so that adjustments can be made to improve those levels. Therefore, the *Needs Improvement* message should be used prescriptively to help children set goals or targets to improve their fitness. The wording used for this category does not imply “bad fitness” or “poor fitness” but rather areas in which the child should seek improvement (Cooper Institute for Aerobics Research, 1992).

It should be noted that it is also possible for some students to score above the HFZ; the *FitnessGram assessment* acknowledges performances above the HFZ but does not recommend this level of performance as an appropriate goal level for all students. However, students who desire to achieve a high level of athletic performance may need to consider setting goals beyond the HFZ. From a similar perspective, standards are not presented for students in grades K-3. This is partly because of the challenges associated

with determining standards but also a philosophical decision by the Scientific Advisory Board. Performance levels are not the most important objective for young children in this age range. Instead, the emphasis for young children should be on enjoying activity and on learning to perform the test items successfully (Cooper Institute, 1999).

Procedures

Although the researcher developed a parental consent form and a student assent form, the University's IRB and the school principals agreed that the consent forms were not needed. The researcher met with all physical education teachers from the four schools and went through the purpose and administration of the FitnessGram assessment. The researcher then administered the PAQ and later assessed the students individually on the five components of fitness through the FitnessGram.

Definitions of Key Terms

To ensure a clear understanding of expression and to provide consistency throughout this study, the following terms have been defined:

Body Composition. The amount of fat cells compared to lean cells in the total body mass (Graham, Holt-Hale, & Parker, 2004).

Back Saver Sit and Reach (BS). The assessment used to safely measure flexibility predominately of the hamstring muscles. (Meredith, M.D. & Welk, G.W., 2005).

Cardiovascular Endurance. The body's ability to undergo vigorous exercise for a long period of time (Graham, Holt-Hale, & Parker, 2004).

Coronary Heart Disease (CHD). A disease of the blood vessels of the heart that causes heart attacks (Sandmaier, 1998).

FitnessGram. Comprehensive fitness program that emphasizes knowledge, motivation and assessment (Cooper Institute for Aerobics Research, 1992).

Flexibility. The range of motion in a joint (Hinson, 1995).

Healthy Fitness Zone (HFZ). These standards have been established to represent a level of fitness that offers some degree of protection against diseases that result from sedentary living (Cooper Institute, 1999). (Appendix A: Healthy Fitness Zone).

Health Related Fitness/Fitness Levels. Fitness related to a person's risk for developing degenerative conditions and includes the following five components: body composition, cardiovascular endurance, muscular endurance, muscular strength and flexibility (Hinson, 1995).

Heart Rate Reserve (HRR). The difference between resting heart rate and maximum heart rate.

Moderate Physical Activity. Physical activity that uses 150 calories of energy per day (Presidents Council on Physical Fitness and Sports, 1996).

Muscular Endurance. A muscle's ability to produce power for a long period of time (Graham, Holt-Hale, & Parker, 1993).

Muscular Strength. The amount of power a muscle can produce (Graham, Holt/Hale, & Parker, 1993).

Needs Improvement. A level of fitness that the child should try to improve upon, but not failure (Cooper Institute, 1999).

Physical Fitness. The condition of the body and its ability to perform activity (Hinson, 1995).

Sedentary. Not participating in any type of physical activity (Center for Disease Control and Prevention, 2003).

Analysis of Data

Data Organization

Data was analyzed to assess if differences exist on the FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Gender, Age, Ethnicity, Participation of Physical Activities Outside of School, Physical Activities Outside of School per week, Healthy Fitness Zone (Yes vs. No), Hours Physical Activities Outside of School per week. Data was entered into SPSS 12.0 for Windows. Descriptive statistics were conducted on the demographic data.

Statistical Procedures

To compare the FitnessGram scores by school, ANOVA's were conducted for differences in age, gender, and ethnicity.

Significance of Study

Implications

The literature search suggests that there is relevant research into the importance of daily physical education. The research has not, however, specifically suggested the importance of sixth grade physical education programs. Currently, little research into fitness levels of sixth grade students has been located.

In addition, fitness levels are very important for all students. Many studies suggest that the higher the fitness level, the better students perform in the classroom (Satcher, 2005). Understanding both physical education programs and fitness levels may, in fact, impact curriculum development and design for instruction on the sixth–grade level.

Applications

This study will contribute to the existing body of knowledge through assisting educational leaders to make better decisions on curriculum development, while improving student achievement, and promoting daily physical education.

Summary

The first chapter introduced the need to examine the importance of regular physical activity through assessing students with the FitnessGram. The problem, research questions, definitions of key terms, assumptions, limitations, significance, and design of the study were described in this chapter. The second chapter presents a review of the professional literature.

Chapter 2

Review of Literature

Introduction

This chapter presents several important topics that relate directly to educational leaders and physical education programs. The organization of topics include the problem with physical education, obesity and physical education, physical education in schools, reforming physical education, physical education and academic performance, educational leadership and reform of physical education, educational leadership and re-conceptualizing physical education, instructional and curriculum reform and physical education.

The obese child who does not exercise but spends all of his or her time watching TV or playing computer games is an emblem of the health problems facing young Americans today. This obese child, however, can also be viewed as the physical result of a complex of social, educational, contextual and theoretical problems which have converged at the present moment, to create a remarkably unhealthy climate for middle school-aged children (Felton & Dowda, et. al., 2002; Geiger & Petri, et. al., 2002; Maier, 2001; Pritchard & O'Bryant, 2001; Satcher, 2005). On the surface, almost every educator would agree that "public school physical education programs are an effective and necessary way to promote youth physical activity" (Running & Fitnews, 2004, p. 1). But in actuality, a number of problems have emerged which have not only affected the quality of physical education being offered in schools, but in many cases caused physical education programs to be eliminated. First, physical education as currently taught has

increasingly come under fire from researchers, who find today's practice to be theoretically ungrounded and in many cases useless for promoting children's health. Second, this degradation of programming has largely been enabled by a climate of standardized accountability in education, which has placed so much attention on the tested subjects of math and reading that all other subjects are being short-changed. Third, studies have shown that participants in physical education classes often do not like them. This dislike stems from instruction that is inappropriate for the students' age group. Finally, budget cuts have caused many schools to eliminate physical education programs, in a climate where it would not be possible to cut back on curriculum linked to math and reading tests.

As a result of this situation, the obese child is caught in what might be called a "perfect storm" of negatively converging cultural forces: just as fast food and lethargy become the norm of youthful living, so schools are being pressured to focus primarily on math and reading thus eliminating physical education. This complexity of problems presents an educational leader, administrator or principal with a serious challenge. How does one present classes so that in-school physical education can once again actually help reduce obesity in middle-school aged children? In order to do this, it will be necessary for the policy leader to develop a firm grasp of the scope of the obesity problem, and its cultural and institutional causes. While an educational leader may not be able to reverse the causes for obesity, in schools something can be done. It is therefore necessary for the leader to determine what is wrong with physical education as it is currently offered, and they reason why so many middle-school aged children especially do not like it. After having determined the negative aspects of the current physical education landscape, the

educational leader will then need to gather resources which will allow him or her to promote a revival or reinstitution of physical education in the school. The support may derive from a growing literature which, responding to the overwhelming interest in standardized test results in today's educational climate, have had to search for more positive results of physical education. It is not enough that evidence suggests that physical education exercises lead to improved health and loss of weight among children. It is now necessary that physical education also be shown to have a positive impact on the academic achievement levels of students. Fortunately, some studies have begun to reveal such a link, beginning a process of creating a new or revived paradigm in which education is viewed as something that involves both body and mind. Finally, an educational leader will have to organize the implementation of new, reformed physical education programs based on findings of studies concerning what middle-school aged children do not like about PE, how physical education improves health, and how physical education can also improve academic achievement. This process involves a number of stakeholders whose input will also have to be managed by the educational leader. Overall, then, the problem of reforming physical education rests on developing an evidence-based practice properly managed and implemented to produce actual results in the student body's fitness levels. The evidence that physical education will have to be based on concerns whether or not physical education does in fact improve the health of students, and even impact positively the overall academic achievement of the student.

The problem with Physical Education

In this section, problems with the current practice of physical education (PE) will be reviewed. Any leader seeking to reform current practice will of necessity have to

provide solutions to these problems. The problems relate to the level of obesity in children in the U.S. today, the fact that many current physical education programs in schools today are ineffective and not liked by students, and, finally, the fact that too many schools have in fact succumbed to various pressures and eliminated physical education.

Obesity and Physical Education

At the root of the physical education crisis is the urgent health crisis created by obesity levels of American youth (Felton & Dowda, et. al., 2002; Geiger & Petri, et. al., 2002; Maier, 2001; Pritchard & O'Bryant, 2001; Satcher, 2005). At present, "Nine million children in the U.S. are overweight" (Satcher, 2005, p. 26). This figure amounts to triple the number of children who were obese twenty-five years ago. One study reported that "obesity rates among children aged six to eleven increased 147% from 1971 to 1984" and that number continues to climb in every year since (Geiger & Petri, et. al., 2002, p. 401). Today, eight out of ten children "consume too much fat in their diets" and few children "eat the recommended five servings of fruits and vegetables each day" (Geiger & Petri, et. al., p. 401). A diet of fast foods, sugar, soda, and snacking is largely to blame for this situation.

The diet of overweight children would be bad enough for them, but the problem escalates to the level of obesity when combined with a lifestyle issue. Most American children have become accustomed to living a sedentary lifestyle and "spend an average of four hours of leisure time each day in sedentary activities" (Geiger & Petri, et, al., 2002, p. 401). Inactivity related to television watching and video game playing is one of the leading culprits in the children's health debate today. The doubly negative impact of diet and sedentary lifestyle has had a deleterious impact on the bodies of the young. In one

study, “about 70% of girls and only 40% of boys ages six to thirteen (did) not have enough muscle strength to do more than one pull up” (Maier, 2001, p. 2). Also, “50% of those ages twelve to twenty-one do not get physical activity on a regular basis, and only 38% engage in any form of physical activity every day” (Maier, 2001. p. 2). Another study found that “fewer than two thirds of youth report participating in vigorous physical activity on three or more days per week” (Felton & Dowda, et. al., 2002, p. 250). Moreover, these statistics decline as students age, with middle-school children getting less exercise than elementary and high school less than middle school children. This is especially true among girls: in a study from 1999 it was found that “girls reporting vigorous physical activity on three or more days per week declined from 68% in ninth grade to 52% in twelfth grade” (Felton & Dowda, et. al., p. 250).

There are socio-cultural aspects to this inactivity among youth as well. A study by the Center for Disease Control found that “physical inactivity was highest in rural areas (36%) and lowest in the metropolitan areas (17%)” (Felton & Dowda, et. al., 2002, p. 250). While this would seem to be counterintuitive (as rural people live nearer the great outdoors), in truth most physical activity today is orchestrated by education or economic opportunities, and where school budgets are tight and economic opportunity limited, physical activity among youth drops (Felton & Dowda, et. al., 2002). Studies have also shown that physical activity levels differ by race, “with blacks generally reporting significantly less physical activity than whites” (Felton & Dowda, et. al., p. 250). This finding also goes against the popular image of the African American athlete, but activity levels for the general population is dependent upon services, and programmatic opportunities, which decline in inner city contexts (Felton & Dowda, et. al., 2002).

Among African Americans, “black women are at particularly high risk for inactivity” (Felton & Dowda, et. al., p. 250). In one study, “black girls reported significantly lower levels of physical activity and significantly higher levels of watching television” (Felton & Dowda, et. al., p. 255). In a study of television watching rates, it was found that 43% of all students watched TV “more than two hours on an average school day” (Felton & Dowda, et. al., p. 30). However, breaking the figure down by race, it was found that “74% of black students and 35% of white students” (Felton & Dowda, et. al., p. 30) were watching TV that much.

The immediate consequence of the combination of bad diet and sedentary lifestyle accounts for higher obesity rates. More disturbing is that once obesity sets in, these youth are more prone to health problems for the rest of their lives. At present, “nearly 40% of children ages five to eight have conditions that could significantly increase their risk of early heart disease” (Maier, 2001, p. 2). Inactivity of the kind being experienced by so many youth is “linked to seventeen chronic diseases and heart conditions, including diabetes, high blood pressure, certain cancers and osteoporosis” (Maier, p. 2). Such inactivity also “doubles the chances for heart diseases” (Maier, 2001, p. 2). Obesity itself has “been linked to cardiovascular disease, hypertension, diabetes, cancer, joint stress and other health problems” (Pritchard & O’Bryant, 2001, p. 10.

Physical education in schools

Given the levels and consequences of youth obesity, it is alarming that many schools are in fact cutting back on the amount of time they allot to exercise in physical education, or even eliminating physical education programs outright (Butler & Hodge, 2004; Couturier & Chepko, 2005; Derry, 2002; Maier, 2001; Masibay, 2003; Meyer,

1997; Miller & Heinrich, 2001; Osborne & Bauer, 2002; Pranzo, 2002; Ryan, 1999; Satcher, 2005; Smothers, 2003). One study found that "over the past three decades the amount of time allotted in school for physical education has gone from an hour a day to maybe twice a week for 30 minutes" (Maier, 2001, p. 2). Another study by the American Association for Child's Right to Play reported that "an estimated 20% of all elementary schools in the U.S. have dropped recess in favor of more classroom time" (Satcher, p. 26). Currently, at school, "fewer than 25% of children in the U.S. get at least 20 minutes of any kind of daily physical activity, and fewer than 30% of U.S. high school students attend physical education class every day" (Satcher, p. 26). This decline in physical education time may be attributable in part to the No Child Left Behind Act, not only because it has created a climate where it is believed that only tested subjects—math and reading—are important, but also because, quite specifically, programs are being curtailed on the belief that devoting more time to math and reading will improve scores.

In addition to the quantifiable decline in the amount of time given to physical education in schools, more and more schools are dumbing down PE, or have simply let the programs slide into irrelevance. Whereas gym class used to be a place where students would have to run a mile or do push-ups, studies now show that "activity levels in and out of PE classes have nose-dived" (Masibay, 2003, p. 1). The president's fitness test, which has formed the basis of physical education since the Kennedy administration, has recently been compromised, and, where it continues to be administered as the benchmark for "passing" physical education, schools "are finding many students have difficulty passing it" (Maier, 2001, p. 4). In California, "79% of the students recently failed the fitness tests" (Maier, 2001, p. 4). The fact that so many students are failing the test has

caused teachers to turn against it, thinking that this “public humiliation” once a year only discourages children from participating in physical activity (Maier, p. 4). As a result, only one state, Illinois, continues to have a “daily requirement for physical education”, while most states settle for physical education which is much less rigorous and, measured against the test, substandard (Maier, 2001).

The decline of physical education, anecdotal evidence suggests, may also be being disguised by popular appearances to the contrary. Many believe that the growth in sports on all levels of schooling means that children must be healthier. Unfortunately, only a small fraction of students participate in organized sports, leaving all others to get their only physical activity from PE (Maier, 2001). Sometimes, a sport will return to fashion, creating an impression that a boom is occurring in physical activity. The return to popularity of the once-shunned dodge ball is a case in point: upon its return, playing dodgeball soon became the focus of PE in some schools, with physical educators lamenting that “it doesn’t teach them to become physically active for a lifetime” (Maier, p. 1). As this anecdote indicates, many PE classes have succumbed to fashion, and impromptu changes to keep kids entertained. This trend reflects the degradation of physical education, as well as the declining student interest in the course as currently offered. One study showed that “students only exercised vigorously for 9% of the PE class time” (Meyer, 1997, p. 1). By far the “activity” that they spent the most time doing in PE, amounting to 70% of class time, was standing in line (Meyer, p. 1). Some schools recruit physical education teachers from coaches or other non-academic sources, and so the teachers have a poor grasp of what should go into a class. As a result, too often such a teacher “simply allows the students to have fun every day, makes no demands upon them

for skill improvement, and gives high grades to all" (Pranzo, 2002, p. 1). Some teachers practice highly organized drills, which have little value either pedagogically or physically, resulting in a syndrome that "the 'best looking' classes in a gym are an almost total waste of time" (Pranzo, p. 4). Though as a result of such drills "everyone feels that they have accomplished something" in fact they learn nothing, and as soon as such a student is "thrown into a real game situation, all their skills fall apart" (Pranzo, p. 4). Other teachers mount complete games during class, which also look quite good, and which parents like, but they too are of limited value in terms of the curriculum of physical education (Pranzo, 2001). In assessing middle school physical education, Pranzo (2001) argues that, even if they do not execute on the level of high quality players, all middle school students should be able to step onto a basketball court and "look like the players on TV" (p. 3). Thus, "if you see students kicking a soccer ball with their toes, you can bet the teacher hasn't taught them correctly, doesn't know how to properly kick a soccer ball, or doesn't care whether the students learn" (Pranzo, p. 3). In a climate where schools are repeatedly communicating to students that testable subjects like math and reading are more important, physical education class often degenerates into a session that allows students to enjoy themselves in play. However, just letting kids play games is not physical education. The physical educator is thus left with the question of how to continue to teach physical education, and make demands on students, when all they want of it is to "have fun"(Pranzo, p. 4). Even some newer programs which have been validated by studies, such as more "lifestyle-appropriate pursuits, such as yoga, rock-climbing, martial arts, cycling, triathlon training and dance" (Borland, 2002, p. 2), may be undermined by an ethic which demands only fun from PE.

A still more serious problem for physical educators, then, is that many middle and high-school students begin to choose not to attend physical education classes. In one study, “at least 29% of school children do not attend gym classes” (Maier, 2001, p. 1). Many students, especially the older ones, simply cut class. While in one survey teens taking PE reported that they liked PE because it provided them with an opportunity to exercise and get fit, many of them simply stated that they thought it was fun (Masibay, 2003). However, they did not like running. Many expressed the view that the activities in PE were boring, and many did not like dressing or undressing for class(meaning that they had to exercise in clothes, and then go to classes after getting “all sweaty”) (Masibay, 2003). In sum, this particular survey of teens and their likes and dislikes in PE indicated that what they wanted from PE was to learn how to stay fit (52%), and they were less interested in learning sports skills (20%), and still less so in learning how the body works (10%) (Masibay, 2003).

In other studies, students have repeatedly reported that they felt that “the curriculum is boring (and) lacks personal meaning” (Couturier & Chepko, 2005, p. 1). Another major area of concern is that the domination of athletes in school carries over into physical education, and as a result “the environment is too competitive (and) they are likely to be ridiculed or embarrassed” (Couturier & Chepko, p. 1). Students also complain about apparently incidental issues such as the potential for injury, and the inconvenience caused by “the necessity of changing and/or showering” (Couturier & Chepko, p. 1). Indeed, in the study 64% of students reported hating going to the next class sweaty, 52% said there wasn’t enough time to shower, if offered the opportunity to do so, and 40%

did not like the mechanics of bringing gym clothes to and from school and using lockers (Couturier & Chepko, 2005).

Most studies indicate, however, that the major determinant in whether or not students are motivated to stay with physical education is the curriculum. Students often complain that there is too much repetition, often from year to year, and that the physical activities assigned them are uninteresting. Almost three-fourths of all PE students stated in one study that they would like to design the curriculum, pick their own activities, and work at their own pace as well (Couturier & Chepko, 2005). This was less true, however, in middle school, where PE students appeared to be slightly more deferential to their teacher.

The last point raises the interesting issue of age-appropriate activities in physical education classes. One study found that, in making known their activity preferences for PE, middle and high school students differed significantly. Middle school students preferred swimming, and learning new games; in addition, they were less afraid of others making fun of them, or of changing in front of others (Couturier & Chepko, 2005). High school students, by contrast, preferred fitness activities, hated swimming, liked getting out of class, and appreciated the health-related aspects of moving more, but also expressed more concern about being ridiculed and did not like changing in front of others. In sum, teachers on both levels must expand and accommodate their curriculum choices to the likes and dislikes of the student body at a given age in order to keep students involved in PE. In addition to reforming curriculum to accommodate developmental levels of interest, schools may also have to “get creative” to accommodate

the time it takes for students to shower, dress, and reach their next period class (Couturier & Chepko, p. 10).

The research seems to suggest a relationship between the level of comfort an age-group has with their bodies and their acceptance or refusal of PE. Middle-school children appear to be only experiencing a burgeoning body interest, while high school students are immersed in body-image culture. This raises the question of whether or not boys and girls should attend PE together. At present, based on ideas developed a generation ago, many PE classes are coeducational. However, a number of studies are finding that student resistance to PE may hinge on this very issue. Starting with the passage of Title IX in 1972, and expanding during the "fitness craze" of the 1980s (Smothers, 2003, p. 1), the participation of girls in school sports has increased. However, while studies indicate that female athletes have overcome gender role conflict issues with regard to the idea of women playing various sports, non-athlete females continue to harbor such gender role conflict ideas that inhibit their full participation in PE (Miller & Heinrich, 2001). Looking into this issue, some researchers have argued that such a role conflict does not exist, and was simply implied by the literature. Another researcher speculated that non-athletic females tend to be more "gender schematic" in their self-perception, meaning that they see themselves as "women" and place a high value on their looks, and that "a person who is highly gender schematic would spontaneously use gender, rather than other more relevant characteristics such as age or ability, to organize incoming information about sport participation" (Miller & Heinrich, p. 6). Even this interpretation, however, indicates that PE educators may have to do more to enlist the interest of girl students.

A major gender issue in physical education is that many of the classes today are coeducational. Coeducational classes began to become common in the 1970s, after the passage of Title IX, when numerous efforts were made to redress the apparent imbalance of sports and PE practice in favor of males. The rationale was that “mixed gender classes provide the same opportunities for participation, thus providing a more equitable learning environment for students” (Osborne & Bauer, 2002, p. 83). As a result of Title IX and all subsequent reform, athletics is now routinely viewed as a viable option for females; many students at the middle and high school level continue to balk at coeducational PE classes. Some educators in PE feel that as a result of the inclusion of girls in PE, many boys now have to hold back, and as a result the program “has become watered down because of the girls” (Ryan, 1999, p. 12). Another researcher found the opposite effect, that activities that the girls alone once enjoyed have been scuttled, the actual classes are “grossly imbalanced in terms of gender” (Ryan, p. 12), and in general “the realities have been horrendous” (Ryan, p. 12). Another PE educator argued that girls “worry about the presence of boys, and often have less success when they are tentative in any activity because they do not want to be embarrassed in front of the boys” (Ryan, p. 12). There is also an entirely different mindset at work between genders, as “boys have a tendency to put win-win-win pressure on girls during an activity, instead of just doing the activity for enjoyment” (Ryan, p. 12). Another study found that when placed together, boys and girls tend to play to stereotypes, and thus boys who are not macho or aggressive in their athleticism are often grouped with the girls (Osborne & Bauer, 2002).

In a series of interviews of stakeholders in PE, gaps were found between teachers and students and between older and younger students on these views. Teachers and older

students agree that co-ed PE is good because it affords students a chance to “interact with the opposite gender” (Osborne & Bauer, 2002, p. 86). Teachers believe that it is a good thing for boys and girls to interact in sports, so that they develop a better “appreciation of the characteristics, abilities and motivations of the opposite gender” (Osborne & Bauer, p. 84). Among students, however, especially in high school and below, coed PE makes them uncomfortable, with girls finding boys to be uncooperative, and boys feeling that the girls didn’t try very hard and yet still received good grades (Osborne & Bauer, 2002). Studies have found that these problems interfered with lessons. Moreover, students reported that they were better able to interact with others from their gender, and that if the class was non-coed they could do so in a way that “was more open about their thoughts and feelings” (Osborne & Bauer, p. 87). Because of the conflicts resulting from co-ed situations in PE, many students began to form a viewpoint that they did not like PE (Osborne & Bauer, 2002). Because of findings like these, a number of researchers have begun to advocate the return to same-sex classes as one way to revive PE.

The theoretical reasoning behind this development is that “the environments created within physical education classes are critical to the development of girls’ positive or negative feelings toward physical activity” (Derry, 2002, p. 1). If girls have positive sport or PE experiences when young, there is a far greater likelihood that they will continue to enjoy physical activities in adulthood. It is believed that the climate created by co-education in PE exacerbates the stresses that may cause teen girls to drop out of PE, including “level of enjoyment with participation, self-esteem, health benefits received through participation and perceived athletic competence” (Derry, p. 1). If the presence of boys compromises participation, makes girls overly conscious of their bodies,

and makes them embarrassed by their level of sports competence, they are much more likely to drop out of PE (Derry, 2002). As a result, one survey found that 75% of the girls said that “they would prefer a single-sex class” (Derry, p. 2). Of those already in single-sex classes, 84% wanted to keep it that way.

Finally, reinforcing these overwhelming findings, “two-thirds of the teachers believed that they spent too much management time in coed physical education classes” as boys tended to act off-task more in the presence of girls, while there was “little management involved in single-sex physical education classes” (Derry, 2002, p. 40). Teachers also report that girls exhibit anxiety before coed PE, and spend an inordinate amount of time applying makeup and lipstick, because they are overly concerned with how they look, even in PE (Derry, 2002). Indeed, girls reported that “they did not like being ‘looked at’ by boys in either their gym outfits or during physical exercise or activity” (Derry, p. 60). Once in class, girls are often intimidated by boys, and boys feel a need to exert muscle mass in a way that girls cannot compete with (Derry, 2002). As a result, “girls repeatedly stated that they chose not to participate in coed classes because of the evident physical disadvantage as well as the perceived intimidation felt when participating with boys” (Derry, p. 6). With special regard to middle school, “girls mentioned that co-ed physical education was fine in elementary school, but now that they are older and their bodies are developing, many would prefer a more comfortable environment to learn and engage in physical activity” (Derry, p. 6).

Another area of inclusion that was once promoted in physical education, but is now being called into question, is the inclusion of students with disabilities. While inclusion was once idealistically supported, too many disabled students are reporting

"limited opportunities to participate fully in their classes" (Butler & Hodge, 2004, p. 69). Some of the same themes emerge: the abled boys are too aggressive and intimidating. Using Allport's contact theory, which argues that contact with others reduces ignorance and leads to more positive images and interactions, Butler & Hodge (2004) measured the quantity and nature of interaction between abled and disabled students in a PE class. They found that the interactions were positive but limited, and "typically unidirectional" (Butler & Hodge, p. 9). Nonetheless, it appeared to them that such interaction did lead to the formation of more positive inter-group attitudes toward each group (Butler & Hodge, 2004).

Obesity, quality of programming, and student response present educational leaders with a difficult problem. The growing problem of obesity tends to continue to worsen. If boys and girls do not like working out together, as both are overly concerned especially in middle school with body image, this problem is exacerbated in the case of obese children in PE class. As a result of these issues, the research indicates that new kinds of physical education classes must be developed.

Reforming physical education

As a result of the aforementioned problems, physical education in public middle schools today stands in need of reform. Much of the reform physical education currently receives, however, often sounds more like resignation to its decreased status, or pandering to student desire for fun and entertainment. There remains, however, some earnest efforts to reform physical education, even in the face of overwhelming cultural trends (Borland, 2002; Maier, 2001; Meyer, 1997). Government studies continue to push for the fact that "every student in our nation's schools, from kindergarten through grade

12, should have the opportunity to participate in quality physical education" (Borland, 2002, p. 1). National guidelines are that all elementary school children should have 150 minutes of physical education per week, and "225 minutes a week in secondary school" (Borland, p. 2). In a study by the Center for Disease Control and Prevention in 2000, researchers found that well over three quarters of all schools adhere to these standards. But upon closer inspection researchers found that only 6.4% of middle schools held physical education classes to high standards, and that PE courses were often overcrowded and underplanned (Borland, 2002). The Carol M. White Physical Education for Progress Bill has made some funding available for schools to rebuild comprehensive PE programs, but at $50 million, this portion of the No Child Left Behind act allotted for physical education seems meager (Borland, 2002).

Nonetheless, some physical educators seem to be getting the message that PE has to change. Whether it is in such small things as ceasing to use either running laps or doing push-ups as punishment, a practice which has been found to reinforce a negative perception of sports and cause students to leave PE, or in such wholesale programmatic changes as letting PE students fly kites or toss water balloons at lunchtime, an effort is underway to make physical education more positive (Meyer, 1997). Moreover, the activities in physical education are changing from competitive to cooperative. In one middle school in Kansas, PE consists of students "helping each other through an obstacle course on foot or by scooter" (Meyer, p. 1). Most reformed programs in PE today have "an emphasis on cooperation over competition" (Meyer, p. 1). The classes "never put kids in situations where they'll fail and won't want to remain active" (Meyer, p. 1). Moreover, the emphasis in terms of physical education pedagogy has shifted from

learning sports skills, to learning skills which provide lifetime benefits, including "cardiovascular endurance, flexibility and strength" (Meyer, p. 1). Whereas physical education used to stress play in sports that most students stopped playing by age 18, "the new method stresses physical conditioning, movement, body awareness, hand-and-motion skills, teamwork, sportsmanship and the confidence to try new activities" (Maier, 2001, p. 3). This said, there is little evidence that any of these reforms of the physical side of physical education i.e. altering the physical regimen of PE as well as making it more positive or proving that a course has an impact on student physical abilities or health status appear to be enough to alter the current paradigm in which mind is one thing, and body another. In the climate of standardization, where it is mind that is tested, the mind appears to be more important. As a result, the literature has begun to look into the possibility of finding a stronger argument by which to revive physical education advocacy. There appears to be a growing number of studies which are finding that physical education, if taught in a certain manner, can improve academic performance as well.

Physical education and academic performance

In order for an educational leader to marshal support for a significant reform, especially a curricular reform, he or she will need evidence-based studies to promote the science behind the reform. In the case of physical education, the most persuasive science appears to be emerging from the growing idea that physical education positively impacts academic achievement, and that the separation of mind and body that has characterized the framework of education for two centuries must now be closed (Cook, 2005; Field & Diego, 2001; Netz & Lidor, 2003; Satcher, 2005; Shahid, 2003; Vail, 2006). Brain-based

sciences are increasingly showing strong links between the physical and mental, and on the basis of these findings, a growing belief is emerging that physical education should be part of the whole education of the student, because the body impacts mind and its capacity to learn.

Given the current health problems of America's children logic should dictate that "physical education programs should expand faster than students' waistlines" (Cook, 2005, p. 16). The reality, however, is that in the climate of No Child Left Behind, which has defined a core of subject areas to be tested, dominated by math and reading, "physical education is being left behind as cash strapped schools pun both time and pennies to focus on core academic subjects" (Cook, p. 16). In the big picture, the president has even suggested the elimination of the Carol White funding that currently supports what PE there is, but on the day to day level, "PE is added, deleted, added, deleted, and teachers are hired and fired based on what is happening to a budget at a particular time" (Cook, p. 17). As schools increase the time they devote teaching to tests in math and reading, they have no choice but to drop physical education classes.

For some, the current policy environment presents an educational leader with an impossible situation. PE must be scuttled, if schools are going to be able to devote enough time to ensuring high test scores in math and reading. But other researchers approach the problem more positively. Arguing that "as long as PE is not listed as part of the core, schools are going to keep making cuts" (Cook, 2005, p. 17), they argue that the only answer is to make physical education part of the core. Moreover, in the climate of No Child Left Behind, a subject area can only become part of the core if it is shown that the resulting academic achievement improves test scores in those subjects that are tested.

Thus, not only must PE be made part of the core, it must be proven that PE does not only impact the body, but also the mind. This argument thus crosses over into cutting-edge educational theory, which is finding that mind and body are one. Even to present the options of PE as a choice between having fit kids, and "having a school labeled as underperforming" (Cook, p. 16), fails to grasp that there is ultimately no choice. The educational world up to now has placed physical education and academics "in two separate universes, and never the twain did meet" (Vail, 2006, p. 31). Too many educators continue to see mind and body as competing factions, "one fighting for the mind, the other for the body" (Vail, 2006, p. 31). But, overall, as brain science tells us more and more about mind-body links, "the demarcation between mind and body, between academic education and physical education, is wavering" (Vail, p. 31). It is in the wake left by this conceptual wavering that truly new bases for promoting physical education are emerging.

One way in which physical education is gradually becoming part of the core is that some states are beginning to revamp PE so that it is being placed "under accountability systems similar to those for core academics" (Cook, 2005, p. 19). California, for example, has mandated "daily physical education in middle school" and if middle school graduates do not pass a rigorous physical education test, then they are required to take physical education all four years in high school (Cook, 2005). Even so, this approach still indicates that there is work in getting "teachers to place proper importance on (physical education)" (Cook, p. 19). Overall, a climate must be created in which the physical and the mental life are infused in school in a more balanced way.

Only when research proves that physical education activity actually improves academic achievement will many educators listen to this approach. Studies linking physical exercise and academic achievement are prefaced by studies in which physical exercise is linked to other emotional or cognitive state changes. Perhaps as an overture to this approach, some studies are beginning to revise how they view the benefits of various types of exercise. For at least a generation it has been thought that only aerobic exercise can produce "affective benefits" (Netz & Lidor, 2003, p. 405). Studies indicate that aerobic exercises can alleviate "anxiety, depression, negative moods" and lead to a sense of "general well being" (Netz & Lidor, p. 405). As a result of such studies, aerobic exercise has reigned supreme in physical education and in exercise culture for a generation. But one study found that mindful, cognitively-based, low exertion programs such as yoga, Feldenkrais and t'ai ch'ai can produce positive affective changes in a person (Netz & Lidor, 2003). Feldenkrais, for example, "is a system of body retraining designed to make people aware of the components of movement and directing them to select integrated patterns of motion" (Netz & Lidor, p. 409). This "gentle and undemanding" exercise, causing little cardiovascular and musculoskeletal strain, was developed for senior citizens. It was found to produce as good affective effects as aerobic exercise, a finding which "seriously questions the superiority of aerobic exercise over the low-exertion mindful exercise modes in altering mood" (Netz & Lidor, p. 406). This finding not only begins to transcend the mind-body split, but also offers possible ways to do so pragmatically in a PE class.

A further implication of this finding is that, as another study noted, there is a paradox in physical education today. While some students "are spending more time

performing physical activities and they are engaging in strengthening and stretching activities at increasing rates" (Field & Diego, 2001, p. 104), overall participation rates are on the decline. This may indicate that PE currently premised on a mind-body split is too physical and has structured itself with exercises that are too strenuous for most, and too much of a challenge for those going from sedentary to active. As a result, one way to lessen the conflict between the sedentary and the active is to propose a "moderate intensity exercise program" (Field & Diego, p. 105). These programs "have been reported to have a beneficial affect on the immune system" (Field & Diego, p. 105). Students who engaged in moderate exercise reported fewer sick days, as well. In a study that compared high exercise and moderate exercise, researchers found that high exercise students reported higher grade point averages, possibly due to "an increase in neurotransmitters, such as serotonin" (Field & Diego, p. 109). High exercise students also reported better relationships and "better academic performance" (Field & Diego, p. 109).

Other studies go further still, and have produced findings that exercise and physical fitness translates into better execution of certain cognitive functions. One study found that "students who get regular physical education and exercise are better able to concentrate in the classroom" (Vail, 2006, p. 31). Concentration is improved both directly and indirectly. Exercise helps to alleviate the stress and anxiety that often accompanies academics, improving concentration. Moreover, this study also found that by reducing asthma symptoms, a major cause of school absenteeism, exercise also helped to improve student attendance records (Vail, 2006).

Another study looked at how children's fitness scores compared with various cognitive tasks related to good performance in academics. The study also compared "the

fitness scores with the student's math and reading scores in the Illinois Standard Achievement Test" (Vail, 2006, p. 31). Findings indicated that schools that had higher fitness levels, also had higher scores on the test, especially in math (Vail, 2006). The end result of the study was that "there absolutely is an association with grades and fitness levels" (Vail, p. 31).

The idea that there is a link between physical fitness and academic achievement has also been approached from looking at the negative effects of not exercising. From this perspective, there is an "extensive body of literature...confirming the negative impact of poor nutrition on learning outcomes" (Shahid, 2003, p. 1). The study validated anecdotal reports and common knowledge among teachers that when students are hungry they are also unruly, cannot concentrate and are lethargic (Shahid, 2003). This has been especially true at the middle school level, stressing the importance of establishing healthful eating habits early. The literature on nutrition increasingly focuses on the middle school years, for example, because "no other age level is of more enduring importance because the determinants of one's behavior as an adult, self-concept, learning interests, skills and values largely are formed in this period of life" (Shahid, p. 1). Studies show that "children who suffer from poor nutrition during the most formative years score much lower on tests of vocabulary, reading comprehension, arithmetic and general knowledge" (Satcher, 2005, p. 27). In one study of children from families who were unable to provide them healthful food, these children "had significantly lower arithmetic scores and were more likely to repeat a grade" (Satcher, p. 28). Additionally there is evidence to suggest that "even skipping breakfast has been shown to adversely affect student achievement on problem-solving tests" (Satcher, p. 28). Another study found that

"students who participate in daily physical education exhibit better attention, a more positive attitude toward school, and superior academic performance" (Satcher, p. 26). Finally, two additional studies indicate that if schools would only provide extra time for physical education, they could "increase test scores, particularly in the area of mathematics" (Satcher, p. 26).

There is some discussion in the literature that physical education leading to improved academic achievement may be mediated by gender. One such study determined that it was the girls, more than the boys, who benefited from more physical education. In a research paper delivered in 2004 the researchers found that "one more hour per week of physical education can significantly reduce obesity rates among girls, especially those who are at risk" (Cook, 2005, p. 20). At the same time, school test scores rose. On the basis of this finding, the researcher remarked that the current standards for physical education in terms of time are not sufficient to produce a positive effect. A program must be solid, that is, have enough frequency and include enough of the helpful exercises to produce such effects a point which has important implications for physical education planning.

The primary document supporting the argument that physical education improves academic performance is a report issued by the California Department of Education in 2001, which "found that students who do better on achievement tests are also more physically fit than their peers who don't score well" (Vail, 2006, p. 31). The study was undertaken on a group of fifth through eighth graders. The findings were derived from testing the students with FitnessGram, a "nationally recognized test that measures aerobic capacity, body composition, muscle strength, endurance and flexibility" (Vail, p, 30). The

scores on the FitnessGram for students in a particular school were then compared with the academic test scores achieved by the same students. The results "indicate a consistent positive relationship between overall fitness and academic achievement" (Vail, p. 31). In these students, as their FitnessGram reports improved, so did their academic test scores. Once again, "the relationship was greatest in mathematics" (Satcher, 2006, p. 27). Here too, there was something of a gender gap, as "girls in the higher fitness levels demonstrated higher achievement than males at similar fitness levels" (Satcher, p. 27). As a result of the California study, other studies have followed, adding to the overall viewpoint that "there is a distinct relationship between academic achievement and physical fitness" (Cook, 2005, p. 19).

While the California FitnessGram study has provided a foundation on which to build, others remain more cautious in declaring there to be a causal relationship between physical activity and academic performance. Vail (2006) argues that the results of the California test should be "approached with caution" because the test only compares one set of scores with another unrelated set of scores and "it cannot be inferred from these data that physical fitness causes academic achievement to improve" (p. 31). It could just as likely be that the students who took both tests FitnessGram and SAT are supported by other unrecorded factors that were not measured in the study.

In addition to questioning the validity of a research approach that infers a connection between two different kinds of test results, others have undertaken similar studies, only to find "less conclusive" results (Cook, 2005, p. 19). A study undertaken of elementary school children in Virginia in 2004 found that "physical education did not have an impact on test scores" (Cook, p. 19). Similarly inconclusive results were found

when comparing fitness levels and test scores among middle school students in Illinois (Cook, 2005). At present, then, the safest conclusion to draw is that the "relationship between physical activity and (academic) achievement is too complex to say definitely that daily physical education benefits students (academically)" (Cook, p. 19). That said, the literature on the influence of physical education on the strengthening the emotional and cognitive character of students leaves little doubt that physical education helps the overall student, and leaves room for more conclusive evidence that physical education actually does impact academic achievement among middle school students.

Educational leadership and reform of physical education

The literature on the influence of physical education on student achievement, combined with the literature on the current failings of physical education offerings today, suggests that educators should find a way to promote PE as part of the core, with equal importance to a student as reading and math (Akos, 2002; Boscardin, 2005; Chen & Darst, et. al., 1999; Covino, 2003; Greenwood & Stillwell, 2004; McFarland & McDaniel, 2002; Ryan & Bridges, et. al., 2001; Satcher, 2005; Shahid, 2003; Smothers, 2003; Tyre & Murr, et. al., 2006; Walpole & Justice, 2004; Yaussi, 2006). To re-contextualize physical education in the context of a mind-body continuum and then to revamp physical education to meet the needs of this new conceptualization demands a considerable amount of skilled and informed leadership. Without leadership, it is unlikely that any school will have the wherewithal to reform physical education in accordance with new theory, new standards for curriculum, and new insights into the link between mind and body in students. Thus, the field of educational leadership provides the machinery, which will operationalize the reform of physical education. It is therefore

necessary to review how leadership will reshape the conception of physical education, the curriculum of PE courses, and the structure of how PE is integrated into the daily life of students.

Educational leadership and re-conceptualizing physical education

The leadership problem related to the reform of physical education, then, is that such reform cannot simply be a matter of shoring up faltering practice, or fixing random curricular issues in a haphazard manner. The administrative leader of a school can only save physical education if he or she restructures the school so that there is a whole-school attitude change about physical education. This will of necessity entail a re-conceptualizing of physical education, based on research in the mind-body continuum. With regard to middle school boys and girls, an evidence-based theory must be employed so that physical education is tailored to help middle school boys and girls with their particular developmental stage problems and issues. An administrator may have to go so far as to seek to have all teachers in all subject areas include some physical education elements in their daily practice, in order to create a fully integrated mind-body school. Finally, instructional leadership is required in physical education reform, as most current PE curriculum will have to be reformed in accordance with the literature on what middle school boys and girls want and need from physical education.

As in other areas such as reading, “school administrators and classroom teachers are in a tough spot” when it comes to physical education (Walpole & Justice, 2004, p. 262). Just as both stakeholders must work to improve reading in schools, they must also seek to redress weaknesses in physical education. In terms of leadership, the same answer is needed, as “in order to achieve this goal, they must understand scientific

evidence…..translate that evidence into the daily classrooms routines and lives of children and teachers, and implement change in a cost-efficient manner" (Walpole & Justice, p. 262). The added challenge facing administrators in reforming physical education; however, is that PE is by no means considered part of the core curriculum, and thus looked down upon by many stakeholders still laboring in the vales of the mind-body split and who therefore believe that physical education and mathematics achievement have nothing in common. In the educational leadership field, distributed leadership style has been recommended as the best way to streamline the processing of evidence-based knowledge from district to school and principal to all staff. As in the field of special education, where the challenge has been to counteract limited views about what special education should be, it can be said that physical education currently faces a similar challenge in that it needs to change minds throughout the school (Boscardin, 2005). In the field of special education, researchers suggest that the field suffered because, while the centralized bureaucracy operated one way, special education was often implemented by its own individualized bureaucracy, and the two systems often clashed (Boscardin, 2005). Thus, it seems necessary for the administration to assess the current structure and professionalism of PE, and then intervene. One area where an administrator can garner some insight into the mindset of physical educators is to study the gap between theory and practice (Boscardin, 2005). As mentioned earlier, this is where the paradox that organized sports grows while physical education dies may come into play. The administrator may have to determine to what extent sports-related discourse props up a false reality regarding physical education, or the extent to which success at one exonerates failure at the other. The administrator must instill in the process of his or her

investigation of this issue a problem-solving mindset that involves all stakeholders. By distributing leadership into the hands of physical educators, a sense of collegiality and collaboration with the whole of the school may be restored.

At present, how an administrator goes about restructuring the entire culture of a school regarding physical education remains better mapped out for other fields. However, one study looked at how one administrator sought to change the way physical education was thought about throughout a school (Ryan & Bridges, et. al., 2001. The researcher examined what the physical education teachers thought their role was, what students thought of physical education, as well as parents and other stakeholders (Ryan & Bridges, et. al., 2001). The results with regard to teachers indicated that views picked up during their teacher training continue to impact their views in practice. Student views of physical education were shaped by social forces. An intervention was designed to improve views about physical education by retraining teachers and by changing attitudes among students.

One of the most popular ways to transform the structure of a school as a whole in its views on physical education is to promote student health throughout all school events and activities (Satcher, 2005). Also incorporating the idea of distributed leadership, the idea is that physical education will only begin to be viewed more positively if a comprehensive wellness policy is created for the entire school. By such a policy, physical activity and nutrition education is integrated into every subject area in the curriculum. By creating a school health advisory council consisting of students and administrators, ideas are shared to infuse healthful attitudes throughout the school (Satcher, 2005). Even math and reading teachers are called on to “start classes with fun calisthenics or dancing” and

also to “incorporate nutrition information and physical activity into reading, writing, math and other subjects” (Satcher, p. 31). Some mathematics teachers “incorporate math skills into hip hop dance movements” (Yaussi, 2006, p. 101).

Many times, such efforts entail administrative partnerships with other organizations as well. The Arizona Healthy Kids team initiative “worked in cooperation with the Arizona Department of Education and USDA Team Nutrition to create and implement a model healthy school policy in eight pilot schools” (Satcher, 2005, p. 28). In the state of Colorado, state-funded wellness centers have been created in various school districts, to assist students in dealing with any and all health problems (Covino, 2003). The National Association for Sport and Physical Education has joined with Coca Cola to start up the Step With it program that challenges students to walk enough so that they end up taking at least 1000 steps a day (Covino, 2003). Other schools have instituted Wellness Teams consisting of principals and teachers, as well as students, to assess the school health program and strengthen PE by recruiting community advisors and ensuring that the curriculum is evidence-based by consulting with university health educators (Geiger, 2004). Finally, other schools are bringing in university-designed programs in order to revolutionize the way physical education is thought of in school. In one program, teachers were involved in creating environments where physical movement was part of all instruction, and the physical education program was enriched by adding class choice options, including teaching children about health, their bodies, and healthy living, as they worked out in class. The program also involved some curriculum redesign to favor girls’ preference for non-competitive sports such as rollerblading and “Frisbee golf” (Smothers, 2003, p. 1).

At this level, the important factor is always the leadership. Shahid (2003) examined the role that principals play in instilling a culture of health throughout a middle school, especially as middle school presents a “great opportunity for stimulating cognitive, emotional and psychosocial growth and development” (p. 1). The principal, Shahid argues, is responsible for creating an overall climate of healthfulness in school, including seeing to it that the food served at school is healthy and that all students are educated, at this critical age, in nutritional health (Shahid, 2003). One of the major problems uncovered in the study of middle schools was that too many principals “have little or no formal education or training in the promotion of nutritional health among students” and that this “plays a significant role in the nutritional environment of some schools” (Shahid, p. 1). One key finding uncovered by the study was that most middle school principals are not involved in the decisions about the food that is bought and served at the school, and also that most principals would welcome the chance to participate in this decision-making process (Shahid, 2003). The issue of vending machines also is related to this, and here too principals have too little input on the decision. Overall, the study of leadership as it relates to the creation of a nutritional climate in school found that too many principals lack the knowledge to implement change effectively, and too many middle school principals thus felt that “efforts to promote nutritional health among students is akin to fighting a losing battle, a battle that is fought without the reinforcement and support of policy makers, school districts, parents and local communities” (Shahid, p. 3). Lack of knowledge by administration of the importance of nutrition to academic achievement is one of the primary reasons for this

failing, and as a result it is necessary to create awareness programs for all stakeholders involved in middle school life (Shahid, 2003).

In addition to providing an overall school structure which promotes health, nutrition and physical education, it is also necessary that more administrators and principals develop an evidence-based sense of what middle school boys and girls need at this particular time in their lives. In educational leadership today, the "centrality of learning" is increasingly being seen as the rationale and key for all reform. If a leader can instill learning into any field, that field of study can become part of the core. Again, it is believed by some educational leadership scholars that only through distributed leadership can such an ethos be infused throughout a school. To do so, a principal must create a caring environment which disposes all to share opinions and views, and a problem-solving approach to all issues must be developed, as "problem-solving-based educational leadership exemplifies a school culture in which all perspectives and voices are valued as part of the process of identifying and defining best practices" (Boscardin, 2005, p. 26).

With that in mind, the overall paradigm for research-based reform is the idea that mind and body are one. This idea would immediately impact the education of middle school boys, who are increasingly losing ground to girls, and appear to be in something of a crisis, due to expectations of a public school system that are not understanding of the "boy brain" (Tyre & Murr, et. al., 2006, p. 2). This boy brain is "kinetic, disorganized, maddening and sometimes brilliant" (Tyre & Murr, et. al., p. 2). Not only are middle school boy brains less mature than girls, but they process information more slowly, and when faced with standards that declare this natural state to be deficient, respond by doing "almost anything to avoid admitting that they're overwhelmed" (Tyre & Murr, et. al., p.

3). Based on this construct, it is imperative that boys in middle school receive healthy doses of physical activity: chaining them to an academics-only drive to pass standardized test will only exacerbate the boy crisis.

Another way in which middle schools in particular can create a philosophical climate based on brain-based understanding of boys and girls at this age is in the area of body image. Both girls and boys experience negative feelings about their bodies in the middle school age. Researchers argue that poor body image derives both from the pressures of the culture at large, and their social status and history in school, with a poor body image in a boy often being the indirect result of his having been teased in the past (Akos, 2002). As a result, it is important that "schools should develop an environment of acceptance and safety that promotes personal health and strength" so that all students can feel good about their bodies (Akos, p. 50). Physical education programming should be expanded to address such issues as self-esteem. One program "was successful in decreasing body image dissatisfaction among its participants without directly addressing body satisfaction" (Akos, p. 5). It is not enough, then, to simply give middle school students a didactic session on puberty. What is needed is evidence basked developmentally appropriate curriculum including identity formation and issues of self-esteem and self-image, in order to guide middle school children through development.

Another area in which administration must become involved early in the process of creating a school climate supportive of physical education is in the area of interest. Brain-based research has shown that if a student is not interested in what is being studied, learning may not happen. In terms of physical education, data is needed on what boys and girls are interested in, in terms of activities, and then it would make sense to provide them

that (Greenwood & Stillwell, 2004). The idea is that if the movements involved are of interest to the student, the student will make them part of his present life, and even lifelong activity (Greenwood & Stillwell, 2004). A special problem with middle school PE is that it is often modeled after elementary or high school PE, and thus not tailored to the interests and needs of middle school-aged students. The results of the survey found that boys and girls desired different activities, and that middle school students as a whole had different preferences than high school students—for example, liking swimming while, by high school, such activity was not favored. Strengthening the research-based validity of such studies are other studies on the nature of personal interest, and how it is operationalized in sport through what is termed situational interest, or "an interactive psychological state that occurs at the moment there is a match between a person and an activity" (Chen & Darst, et. al., 1999, p. 159). Physical education research shows that student involvement in sport is mediated by their interest and that "student lack of interest in learning tasks has become one of the critical problems leading to disengagement in learning" (Chen & Darst, et. al., p. 161). Thus, the end result of this line of research is that an administrator must know what the middle school boys and girls find interesting in sport and seek to embed those interests in the school and practice of PE (Chen & Darst, et. al., 1999).

Another general approach to creating a climate conducive to physical education is to bring PE into line with other pedagogies. As a result, a number of researchers have explored instilling critical thinking into physical education, and thus transforming PE from doing exercises to changing attitudes and beliefs for lifelong student growth (McFarland & McDaniel, 2002). One educator seeks to instill philosophy into physical

education, going back to Plato and his beliefs in mind-body balance. But to Plato body and mind were related in such a way that he would "support physical education activities that encourage expression, problem-solving, discussion of provocative questions, resolution of alternatives and the use of questions" (McFarland & McDaniel, p. 6). To Plato, "the education of the body must conform to the education of the mind" (McFarland & McDaniel, p. 6). Dewey's beliefs in physical education as part of a broader self-development would also pertain in any attempt to reform the paradigm according to physical education is currently conceptualized (Zeigler, 2002). Indeed, Ziegler (2002) developed a Deweyian model which shows how a young person moves through five types of learning from the physical through the academic and aesthetic to the communicative, to become a whole person. Such a model accords with the general tendency of the literature on physical education to favor a re-conceptualization of the mind-body continuum as the proper basis for reformed physical education.

Instructional and curriculum reform and physical education

The most concrete way in which a leader can ensure that physical education is revived in the middle school context is through his or her role as instructional leader as he or she implements curriculum reform. While the literature on physical education instructional reform in general suggests that in some cases researchers are placing practice before theory, other programs are indeed emerging out of a research-based, evidence-based sense of what is best for boys and girls in physical education in middle school (Burch & Spillane, 2003; Edwards, 2006; Geiger & Petri, et. al., 2002; Horowitz & Kay, 2004; Jorgenson & George, 2001; Kirk & MacDonald, 2001; Lloyd & Bishop, et. al., 2003; Mitchell & Strasburger, et. al., 2001; Pritchard & O'Bryant, 2001; Ryan &

Fleming, 2002; Schnirring, 2005; Smothers, 2003; Tyre & Murr, et. al., 2006). An important construct in educational leadership with regard to curriculum change is the subject matter involved. In order for leadership to be applied, the leader must know something about the knowledge underlying the subject matter and be able to thus navigate the changes effectively. In studies of subject matter, research indicates that each field has subject subcultures that "powerfully influence the process of instructional change, mediating teachers interpretation of reform and the effects of reform on classroom practice" (Burch & Spillane, 2003, p. 523). Principals must oversee reforms, but they also bring to reform certain subject-matter based viewpoints that impact the shape of reform. For example, as math is believed to consist of hard-wired knowledge, reform proceeded by having teachers seek outside training to shore up skills. English is more situational and interpretative, and so reform was introduced into classroom practice immediately (Burch & Spillane, 2003). In addition to measuring how beliefs impact reform, administrators must have opportunities for repeatedly analyzing "existing views and practices about (the subject matter) in order to construct new understandings of current…reforms" (Burch & Spillane, p. 522). An important element in subject matter discourse is how the subject matters are constructed in the school. Subject matters are constructed according to their "degree of definition, whether or not there is agreement regarding the content of the subject, scope, the extent to which a subject is homogenous or is composed of a number of disciplines or fields of study, the degree of sequence, degree to which prior learning is perceived as a prerequisite of later learning, and the degree to which the subject is viewed as core or basic" (Burch & Spillane, p. 522). Added to the degree of sequence is the degree to which one needs to keep updating one's

knowledge of a subject as it changes. Overall, a leader, a principal, a teacher, and a whole school construct a sense of a subject matter based on its definition, scope, sequence and core. This construct is believed to influence how reform proceeds. As a result, since math is seen as highly defined, with little scope but much sequence, and is a core subject, "mathematics teachers report significantly less control and autonomy over curriculum" than English teachers (from a less defined, more scoped, less sequenced, if still a core subject) (Burch & Spillane, p. 521). From this perspective, physical education is currently less defined, and has been conceptualized as having little scope. There is some sequencing in learning tasks, and it is not considered a core subject. It follows that a leader seeking reform in physical education would first seek to re-define and re-scope the definition of physical education, and then proceed to share curriculum reform decisions with teachers (Burch & Spillane, p. 521).

Bernstein presented an interesting theory of how teachers are situated in the complex of curriculum reform by creating a construct in which primary context is where new ideas are developed. Secondary concept is where the ideas are reproduced. The re-contextualizing context is an in-between zone "concerned primarily with the mediation of discursive routes between the primary and secondary contexts" (Kirk & Macdonald, 2001, p. 556). In a study of teachers which expected them to participate in the re-contextualizing zone, researchers found that the organizational structure relegated them to the secondary zone, thus they had little power to change curriculum on their own. This type of study alerts one to the issue that shared leadership is needed to ensure that teachers not only maintain a positive and up-to-date sense of their field, but also that a

high quality teaching force is developed and maintained at a school. Without equity between principal and teacher in this area, curricular reform cannot succeed.

In the standards-based climate of education today, more effort is being made to quantify physical skills and factors unrelated to how a student performs in a sport. The use of the FitnessGram methodology of assessment has been important in giving scientific basis to measurements of “cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition” (Lloyd & Bishop, et. al., 2003, p. 205). It was on the basis of FitnessGram measures that a correlation between fitness and academic achievement was first determined in California. Thus, in one study, the FitnessGram was used to find a correlation between some measures and an overall sense of health. In a test, it was found that the rate of curl-up and push-ups that a child could do were “significantly related to the sum of two site skinfolds in 10 to 12 year-old children” (Lloyd & Bishop, et. al,. p. 221). This data “supports the paradigm that body fatness is an important biological factor that influences distance running performance” (Lloyd & Bishop, et. al, p. 221). Some educators believe, however, that such research often puts students through batteries of tests that are too rigorous, and that “negative feedback regarding test results may discourage students form future physical activity” (Mitchell & Strasburger, et. al., 2001, p. 110). Thus, physical education classes have seen the emergence of in-class heart monitoring and other monitoring efforts, in order to come to a more scientific sense that what students are doing are helpful. One study using a heart monitor “observed the amount of time that was present in a target Heart Rate Reserve (HRR) during an intensity-controlled one mile run” during a class, showed that students were able to pace themselves to finish the mile (Mitchell & Strasburger, et. al., p. 110).

The results also showed that girls spent more time (36%) in the HRR zone than boys (30%), and that, given that both numbers were rather low, the instructors need to teach students how to stay in the HRR zone more often (Mitchell & Strasburger, et. al., 2001). A special finding with regard to middle school is that twelve year old boys spent the most time below HRR, a "poor performance that is most likely due to a lack of effort" (Mitchell & Strasburger, et. al., p. 113). One study found that the half sit-up is as good as the full sit-up in testing children, and better for girls (Pritchard & O'Bryant, 2001). The half sit-up is also preferred because it better shows students the relation of abdominal health to total health, and it is also a reliable measure for strength and endurance (Pritchard & O'Bryant, 2001). One of the benefits of these types of reforms is that they involve simply shoring up or making more scientific activities that are already in place, and thus do not require new equipment, more time, or other changes (Running & Fitnews, 2004).

Another front in the curricular reform of physical education is the use of technology. The use of the Dance Revolution fitness tool in West Virginia, a game that incorporates a history of music with physical movement, was shown to help deal with the obesity problem in that state (Edwards, 2006). BodyFun is a video game that leads 10 year olds through the stages of life, teaching them about nutrition and fitness (Geiger & Petri, et. al., 2002). The game is mastery-based, geared to the interests of the video gaming generation, and thus has some scientific basis for efficacy. In Alabama, the program was used to educate teachers in physical education to expand the curriculum to health and overall fitness issues, and found to be helpful (Geiger & Petri, et. al., 2002).

Technology is also being used in physical education to spread awareness of the importance of fitness throughout schools. Pedometers are increasingly being used in programming designed to make children more aware of how their bodies work, and how much walking they need to do to stay healthy (Smothers, 2003). Aerobic videotapes, and other tech-based programming, are also increasingly being used in physical education curricular reform. The EatFit curriculum, including magazines and computer games, is another example of a tech-based holistic physical education program (Horowitz & Kay, 2004).

Basing curriculum reform on evidence-based studies of what middle school children like and do not like, as well as on a deeper understanding of how their minds and bodies work, the social aspect of physical education has now also become a front of action where change is in the works. A number of educators "are reviving an old idea: separate the girls form the boys" in physical education (Tyre & Murr, et. al., 2006, p. 5). It was indicated previously that middle school boys and girls especially begin to experience problems with coed PE. By returning to single-sex classes it is hoped that girls will once again feel more confident about their abilities, not worry so much about how they look during PE, and feel freer to experiment with exercises and sports which they might otherwise be embarrassed to try if boys were present (Ryan & Fleming, 2002). Based on studies which have found that attitudes and perceptions about physical education impact the way students participate in PE, and that the curriculum often influences these views, researchers have found that co-ed PE has lead to the dominance of male-oriented curricula over the concerns of girls. For example, for girls, "a physical education curriculum focused on competition can…be detrimental to the development of

positive attitudes toward physical education" (Ryan & Fleming, et. al., p. 29). Thus, some say, it is better to reform backwards to single-sex PE, so that girls can begin again to like physical education.

The final area of curricular reform in physical education is cognitive-academic. That is, by figuring out how middle school boys and girls learn, and then including PE in planning for all the curriculum, new ways of getting student interest and also improving minds as well as bodies can be gained. One study found that interest lags, especially among boys, when class size becomes too big (Schnirring, 2005). Taking a fitness-oriented approach to PE, an intervention was developed. Classes were limited to fourteen students and focused on lifestyle issues, as well as a small nutritional component. The program thus instilled academic material into physical education. It was found to improve student health measures, providing "that fairly simple modifications in the school PE curriculum can produce measured health benefits" (Schnirring, p. 2).

One important study found that cognitive improvement materials can be injected into physical education programs without resorting to time-consuming lecturing. The study found that "it was relatively was to infuse fitness and wellness concepts into our physical education activity classes" (Jorgenson & George, 2001, p. 16). This was done through passing out take-home fitness and wellness lessons that the students had to fill out and return. The material helped enhance the physical education course, and showed that "cognitive material can be introduced into physical education activity classes, fitness knowledge can improve, and this can be done with little time commitment" (Jorgensen & George, p. 14). Thus, the study points to the fact that one primary way to improve physical education is to "provide a meaningful curriculum that is effectively balanced

across the behavioral, cognitive and affective educational domains" (Jorgenson & George, p. 14). Moreover, the approach studied allows students to choose "whether to learn fitness and wellness concepts by the traditional lecture-based approach or through a physical activity course approach" (Jorgenson & George, p. 15). Such an approach is believed by researchers to be but a step away from the ideal of combining mind and body in a physical education course. On its premise, such a course design is structured on the idea that physical education and academic achievement go together.

Conclusion

This literature review has considered what educational leaders need to do to reform the current situation of physical education in middle schools today. Faced with an obesity epidemic, sedentary lifestyle, and an overemphasis on standards measuring only math and reading, physical education has not responded to this complex challenge, but has been scaled down or even eliminated by many schools (Felton & Dowda, et. al., 2002; Geiger & Petri, et. al., 2002; Maier, 2001; Pritchard & O'Bryant, 2001; Satcher, 2005). In order to address the health problems facing middle school children, leaders must work to restore physical education to the curriculum in a way which works for all stakeholders. This can be done by restructuring the climate of the school through shared power and decision-making, by changing the paradigm according to which body and mind are related to one another, and by curricular reform (Cook, 2005; Field & Diego, 2001; Netz & Lidor, 2003; Satcher, 2005; Shahid, 2003; Vail, 2006). In the context of the pragmatic situation of No Child Left Behind, with its emphasis on core subjects, the best way to proceed is to make physical education a core subject as well. This new approach to physical education is increasingly supported by claims that physical education has a

positive impact on emotional health and also, more importantly, academic achievement. As a result of this type of finding, more researchers are seeing physical education in the context of evidence-based studies of the development of the minds and bodies of middle school boys and girls, and suggesting appropriate changes to programs (Burch & Spillane, 2003; Edwards, 2006; Geiger & Petri, et. al., 2002; Horowitz & Kay, 2004; Jorgenson & George, 2001; Kirk & MacDonald, 2001; Lloyd & Bishop, et. al., 2003; Mitchell & Strasburger, et. al., 2001; Pritchard & O'Bryant, 2001; Ryan & Fleming, 2002; Schnirring, 2005; Smothers, 2003; Tyre & Murr, et. al., 2006). Others are calling for PE to be reinvigorated by a fitness and wellness curriculum that instills lifelong healthy-living values in children, so critical to the middle school years. Finally, such reform is possible only through inspired educational leadership, informed of the new paradigm, and willing to change the way physical education is thought of and acted upon in middle schools today.

Chapter 3

Methods

This study examined the levels of fitness on students in the sixth grade to determine if they met the criteria of the Healthy Fitness Zone (HFZ) on the FitnessGram. The purposes of Chapter III are to describe: (a) the sample population selected for this study; (b) the instruments that were administered for data collection; (c) the methods, materials and procedures utilized to implement and collect the data for the study; (d) the selection and use of statistical procedures employed in the analysis of the collected data; and (e) the summary of the methodology.

This study was quantitative in nature and there has been no known previous research on sixth grade students and the Healthy Fitness Zone (HFZ). In an attempt to determine the relationship between sixth grade students and their results on the FitnessGram, this research project compares sixth graders' levels of fitness from four different middle schools to the HFZ of the FitnessGram. All students were assessed at the beginning of the 2006-2007 school years to determine their level of fitness as measured through the HFZ.

Basic Research Design

The purpose of this study was to determine if students entering the sixth grade met the criteria of the HFZ as prescribed by the FitnessGram. Additionally, the researcher examined the relationship between individual test scores and the length of time spent engaged in physical activity outside of the school setting. The researcher asked the following questions:

1) Are the majority of students in the sixth grade not meeting the expectations of the HFZ?
2) Do students who engage in physical activities outside of school have a higher level of fitness than those students who do not?

Preliminary Procedures

Prior to the implementation of this study, a thorough review of literature was completed. The review of literature focused on the obesity epidemic in children, fitness levels and lack of physical education programs in schools. Project approval for use of human subjects was issued by the University. Approval by the board of education and piloting of the Physical Activity Questionnaire allowed data collection to begin on August 14, 2006.

Selection of the Sample

Although all eight middle schools agreed to the research, only four schools were selected because of the diversity of students and the distance between the schools. The researcher did not assess students from schools that were close geographically; therefore, he conducted the research with the schools that were the furthest from one another. The school district is located approximately twenty-five miles southeast of Atlanta and consists of approximately 38,440 students. The per pupil expenditure is approximately $6,470. At the beginning of the 2006-2007 school years, there were forty schools, which include twenty-three elementary schools, eight middle schools, seven high schools, one alternative school, one evening academy, and an online academy. The online academy allows high school students to take some of their required courses in the online educational environment. The diversity of enrollment includes 55.3% Caucasian, 34.7%

African American, 4.4% Hispanic, 2.3% Asian and 3.0% Interracial. There are 4,795 employees in the school system and 3,060 of those employees are certified while 1,735 are classified. The county has been recognized as one of the fastest growing in the country. There are new schools being opened every year, and the student population has doubled in the past ten years. With the rapid growth, there are currently 556 portable classrooms being used for classroom instruction. Each of the four middle schools that were used for this study had locker rooms and gymnasiums for students to change out and participate in physical education.

For the purpose of this study, middle schools were the primary focus of research. All middle schools in the county have connections classes which consist of art, band, chorus, family and consumer sciences, health and physical education, music appreciation, skills for adolescence and technology education. Two of the middle schools also have orchestra programs and one of the schools has a decision making class.

The vision of the school system is to Ensure the Success of Each Student. This means creating a culture of continuous improvement with a focus on the needs of individual students. The view of instruction in the district is for curriculum to drive assessment, which will drive instruction, which will then move the organization to better performance.

The middle schools that were used in this study were from different areas of the school district. This allowed the student population to be a very diverse, culturally rich group which consisted of 155 students.

Although each middle school has two periods of physical education class for each grade level, the researcher only chose the fifth period class. This was done to control as

many variables as possible. Each middle school has sixth grade physical education for the last two periods of the day. The students have physical education for twelve weeks and health for six weeks over the course of the eighteen week semester. It is important to note that students do not have recess at any of these schools and their twelve weeks of physical education is the only physical activity they will receive throughout the thirty-six week school year. Sixth grade students were targeted because they are not permitted to participate in middle school athletics. Again, by controlling as many extraneous variables as possible, sixth grade students were the only ones who were assessed.

Instruments Used in Data Collection

Information and data for this study were collected through the use of the FitnessGram Physical Fitness Assessment Program. The fitness of a child should not be based on how he/she compared to the performance of other children, instead it should be individualized and defined by clear health standards (Cooper Institute for Aerobics Research, 1992). The purpose of testing for fitness is not to see how well a child compares to another, but it is to see how physically fit the child is and what implications it makes for his/her health. The goal of fitness is not only to be fit now but also in the future.

To attain this goal, the researcher adopted the FitnessGram as his program to be used as the evaluation and assessment tool. Although fitness testing is not required by the school system, the researcher recognizes this as a need to improve student health and the importance of daily physical activity. It was determined before the research began, that parent consent forms and student assent forms would not be used. The university, the school district, and each school principal agreed that because the research would be

taking place during the regular physical education class and all information would be anonymous, there was no need to have parental and student consent.

The FitnessGram was developed in 1982 by the Cooper Institute for Aerobics Research in Dallas, Texas and is endorsed by the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD). The FitnessGram is also sponsored by Prudential Insurance and in some textbooks is referred to as the "Prudential FitnessGram" (Pangrazi, 1998, 2001; Pangrazi & Dauer, 1995). The primary goal of the FitnessGram is to assist students in grades 4 -12 in establishing physical activity as part of their daily lives.

Six Subtests of FitnessGram

The FitnessGram is designed to assess students through the five areas of health related fitness: aerobic capacity, body composition, muscular strength, muscular endurance and flexibility. The six tests selected by the researcher were the one-mile run, percent body fat, curl-up test, trunk lift, 90 degree push-up, and the backsaver (BS) sit and reach flexibility test. These particular tests were chosen by the researcher because research has indicated that these tests are the most reliable (Cooper Institute, 2005). The researcher also communicated via email with Dr. Marilu Meredith (FitnessGram Project Director) and Dr. Gregory Welk (FitnessGram Scientific Director) regarding the assessments to be used. The assessments are not norm-referenced, therefore, students are not compared to each other but instead to health fitness standards. These particular health standards, (HFZ), were carefully established for each age and gender to indicate good health. Either students fall within the Healthy Fitness Zone or the Needs Improvement Zone of the FitnessGram.

The FitnessGram standards are based on a foundation of fitness knowledge established based upon research conducted by the Cooper Aerobics Institute and supported by the Centers for Disease Control. The Healthy Fitness Zone (HFZ) standards represent an acceptable level of fitness required to maintain an active and healthy lifestyle, as well as, a level of fitness that reduces preventable diseases resulting from a lack of physical exercise or sedentary lifestyle.

Aerobic Capacity

The aerobic capacity category is perhaps the most important fitness area because research strongly indicates that acceptable levels of aerobic capacity are associated with the reduced risk of high blood pressure, coronary heart disease, obesity, diabetes, some forms of cancer, and other health problems (FitnessGram Manual, 2005). Many terms have been used to describe physical fitness, such as cardiovascular fitness, cardiorespiratory fitness, cardiorespiratory endurance, aerobic fitness, and physical working capacity. Although these terms may be defined with slight variation, they can all be considered very similar or synonymous with aerobic capacity. A laboratory measure of maximal oxygen uptake (VO_2max) is generally considered to be the best measure of aerobic capacity.

The FitnessGram program provides three different field tests of aerobic capacity (PACER, the one-mile run, and the walk test). Because all three tests provide estimates of VO_2max, direct comparisons can be made between the results from the different tests. All three tests have demonstrated strong reliability and validity against measured VO_2max, but they vary in how and where they are administered.

For the purpose of this study, the one-mile run was used to measure the student's aerobic capacity (Appendix C). The reason this assessment was chosen by the researcher is because it is very comparable to the PACER test, and the schools that are being assessed use the one-mile run with their students in their physical education programs already. In general, for children nine years of age (third grade) and older, the reliability is high, with reliability coefficients above .80 (Cureton, K.J., 2005). The test instructions are to run on a flat surface. The four schools in this study all have an outdoor track. Also, because the class sizes are quite large, (>30), this assessment allows for fifteen to twenty students to run at one time, while their partner uses the FitnessGram one-mile run sheet to score them. Although the one-mile run does have some reliability and validity issues with very young children, there appears to be no problems with sixth grade students. The administration of the test under conditions of unusually high temperature, humidity or wind should be avoided, as these elements may be unsafe or may lead to an invalid estimate of aerobic capacity. The researcher made it a point to run with the students on overcast days with a temperature of 80 degrees Fahrenheit or below. The score is recorded in minutes and seconds.

Body Composition

The prevalence of overweight and obesity has increased sharply in recent years, and the trends are evident in children as well as adults. High levels of body fat are associated with increased risk of coronary heart disease, stroke, and diabetes. Although children are not generally at risk for heart disease or stroke, increases in blood pressure and cholesterol occur in overweight and obese children. Like other dimensions of health-

related fitness, body composition does affect health status and does improve with regular physical activity.

There are numerous methods available for estimating body composition, including underwater/hydrostatic weighing, bioelectrical impedance, skinfold measures, and other measures such as body mass index (BMI) that are based on height and weight. Each one of these approaches does have some limitations leading to an overall measurement error of 2% to 3% for estimates on body fat; however, skinfold estimates have a lower prediction error and provide a more direct estimate of body fatness, therefore, this is the recommended approach in FitnessGram (Lohman, T.G., & Going, S.B., 1998). The skinfold procedure uses two sites that are easy to measure and whose measurement is not very invasive (triceps and calf).

The skinfold measurement is performed by using a skinfold caliper. The triceps and calf skinfold have been chosen by FitnessGram because they are easily measured and highly correlated with total body fatness (Baechle, 2000). The caliper measures a double layer of subcutaneous fat and skin. The triceps skinfold is measured on the back of the right arm midway between the elbow and the acromion process of the scapula (Appendix D).

The calf skinfold is measured on the inside of the right leg at the level of maximal calf girth. The right foot is placed flat on an elevated surface with the knee flexed at a 90 degree angle. The vertical skinfold should be grasped just above the level of maximal girth and the measurement made below the grasp (Appendix D).

Scoring of the skinfold should be done only after taking the measurement three times in each location. It is recommended that one site be taken once, then the next site

once, and then come back to the first site for the second assessment and so forth. This allows for the median score to be taken. An example would be if the first score is 15, the second is 14 and the third is 13, the median value of 14 would be the final score.

To avoid problems, skinfolds should be made in a setting that provides the most privacy for the student. It is also recommended that girls and boys be separated during this assessment. It is important that the same tester administer the skinfold measurement to the same students at subsequent testing periods. Skinfold measurement should be made on dry skin, prior to exercise, to ensure maximum validity and reliability (Baechle, 2000).

Abdominal Strength and Endurance

The curl-up with knees flexed and feet unanchored is being used because these elements have been shown to decrease movement of the fifth lumbar vertebra over the sacral vertebrae, minimizing the activation of the hip flexors, increasing the activation of the external and internal obliques and transverse abdominals, and maximizing abdominal muscle activation of the lower and upper rectus abdominals relative to disc compression (load) when compared with a variety of sit-ups (Appendix E).

The reliability of the curl-up test is higher for college students than for children, but the values are acceptable for this type of assessment. No matter which abdominal assessment is used, better values are consistently found for older students (high school and college), but even those for the younger students are generally deemed acceptable. Additional research is needed on elementary through high school age students of both sexes (Anderson, 1997).

Determination of validity has been made vulnerable by the lack of an established criterion measure (Anderson, 1997). Anatomical analysis and electromyographical

documentation provide the primary support for the use of the curl-up test to determine abdominal strength and endurance.

The objective of the curl-up test is to complete as many curl-ups as possible up to a maximum of seventy-five at a specified pace. Students will work with a partner during this assessment. One student will be the performer while the other is the observer. The observing partner keeps count and makes sure the curl-up is being performed correctly. While the performing students lies on the mat in a supine position, they bend their knees at an angle of approximately 140 degrees, feet flat on the floor, legs slightly apart, arms straight and parallel to the trunk with palms of hands resting on the mat. Their fingers are stretched out and their head is in contact with the mat. It is imperative that their feet are extended as far from their buttocks as possible, while still flat on the floor. The closer their feet are to the buttocks, the more difficult the movement.

After the performing person is correctly positioned on the mat, his or her partner places a measuring strip on the mat under their partner's legs so that their fingertips are resting on the nearest edge of the measuring strip. The observing partner then kneels down at the head of the performing partner to count curl-ups and watch for proper technique. The observing partner then places a piece of paper below the performers head to make sure that they come all the way down and touch the paper with their head. The observer should watch for the paper to crumple each time their performing partner touches it with his or her head. The performing partner should complete one curl-up every three seconds or twenty every minute. Students are stopped after completing 75 curl-ups, when the second form correction is made, or when they can no longer continue.

In summary, it is of utmost importance that the curl-up is performed with the proper technique and that students are trained beforehand by the instructor. Scoring is the number of curl-ups performed. Curl-ups should be counted when the student's head returns to the mat. For ease in administering the test, it is permissible to count the first incorrect curl-up. Finally, it is important the students are allowed some practice time with the curl-up so that proper technique can be practiced and understood.

Trunk Extensor Strength and Flexibility

The trunk lift is administered and recommended by FitnessGram because of its relationship to low back health, which includes proper vertebral alignment (Appendix F). This helps to distinguish appropriate posture and maintain low back health. Students will learn that trunk extensor strength and flexibility is an important aspect of maintaining a healthy back.

It is important that attention be given to performance and proper technique of this assessment during this test so that injury does not occur. The trunk extensor should be performed slowly and carefully. The maximum score on this test is 12 inches. While some flexibility is important, it is not recommended or safe to encourage hyperextension.

Test-retest studies of the trunk extension test have reported high reliability among high school and college students; however, there are no data on the consistency of results for younger children (Johnson, K.R., 1997). It is to be noted that most school-aged individuals will pass this test easily.

The objective of this test is to lift the upper body off the floor using the muscles of the back and hold the position to allow for the measurement. A gym mat and a measuring device are the only materials that are needed to administer this test. The

measuring device should either be a yardstick or fifteen-inch ruler, because a twelve-inch ruler may end up directly under the performing students' chin causing injury.

The test is administered with the performing student lying facedown with their toes pointed and their hands being placed under their thighs. A coin or similar object is placed on the floor in line with the student's eyes. During the movement, the student's focus should remain on the coin. The performing student then lifts their upper body off the floor, in a very slow and controlled manner, to a maximum height of twelve inches. The head should be maintained in a neutral/straight alignment with the spine. The position should be held long enough for the test administrator to place the measuring device on the floor and determine the distance to the performing student's chin. The performing student is allowed two trials and the highest score is recorded.

When scoring the student, the examiner must only give a maximum score of twelve inches, even if the student performs at a higher level. It is also important to note performing students should stay focused on the coin and should not try to rise higher than twelve inches. This is very important because the Healthy Fitness Zone does not measure anything higher than twelve inches and excessive arching of the back may cause compression of the spinal discs resulting in injury.

Upper Body Strength and Endurance

Strength and endurance of the muscles in the upper body are very important in daily life, maintaining appropriate posture, and maintaining functional health. It is important that children and youth learn the importance of upper body strength and endurance as well as methods to use in developing and maintaining this area of fitness. The ninety degree push-up is the recommended test item of the FitnessGram (Appendix

G). This push-up has been adapted from other assessments, such as the modified pull-up, pull-up, and flexed arm hang. It is important to note that although all of these items are intended to measure upper arm and shoulder girdle strength and endurance, they do not all involve the same muscle groups to the same extent, and handling body weight is more of a factor in some than others.

The ninety degree push-up to an elbow angle of ninety degrees must first be taught by the test administrator and practiced by the students. This is important to ensure appropriate technique. The test requires little or no equipment, and multiple students can be tested at one time. This test also teaches students an activity that can be performed throughout life as a conditioning activity. The ninety degree push-up has generally been shown to produce consistent scores, but reliability depends on how it is administered (Saint Romain, 2001). Scores for student partners are consistently higher than for adult partners, because students normally just count and do not become concerned with appropriate technique. With this in mind, student partners will not be used for this assessment, rather, the test administrator or researcher will assess each individual student.

The test objective is to perform as many ninety degree push ups as possible at a rhythmic pace and can be performed by males and females. Students should be able to perform the push-up at a similar pace to the curl-up. This correlates at one push-up every three seconds for 20 push-ups every minute.

The test ends when the second form correction (mistake) is made. Only one form correction is allowed. A form correction would be stopping to rest or not maintaining a rhythmic pace, not achieving a ninety degree angle with the elbow on each repetition, not maintaining correct body position with a straight back, or not extending arms fully. The

score is the number of ninety degree push-ups performed correctly, and for ease in administration, it is permissible to count the first incorrect push up. This test should be terminated if a student appears to be in any type of pain.

Flexibility

Maintaining adequate joint flexibility is important to functional health and daily living. For most young people, decreased flexibility is not a problem. Many students will easily pass the flexibility item; therefore, the flexibility item of the FitnessGram has been made optional. However, the researcher decided that it was best to assess students on the backsaver sit and reach test so that he could better understand their overall levels of fitness. The back-saver sit and reach assessment is very similar to the traditional sit and reach test except it is performed on one side at a time (Appendix H). By testing one leg at a time a determination can be made regarding asymmetry in hamstring flexibility. This method also helps to avoid hyperextension of both knees. This assessment predominately measure flexibility of the hamstring muscles. Before the students were assessed, five minutes of rapid walking and stretching were performed. This allowed students to get blood flowing through the muscles so that they could avoid injury and stretch more easily. The backsaver sit and reach basically measures the flexibility of the lower back and hamstrings.

Reliability data spanning a period of fifty years have shown that the sit and reach test, and the sit and reach test modified to accommodate anatomical differences are extremely consistent, having correlations of .93 to .99 (Gilbert & Plowman, 1993).

Procedures

The data was collected by the researcher through going to each school and working with the certified physical education specialist to administer the test. The researcher had first viewed the FitnessGram DVD several times to assure proper technique while assessing the students and administering the tests. He also practiced with several classes and trained the teachers at each school. They viewed the DVD and were distributed handouts that clearly explained how the assessments were to be given.

The principals of each school and the university IRB recommended that the parental consent and student assent forms not be used. Their reasoning was because the students were assessed during their regular physical education time, and because all information would be anonymous. Students were given a code to use for the data collection and names were not used. Finally, students filled out the Physical Activity Questionnaire (PAQ) before their physical education classes began. The codes were matched up with the data collection of the fitness tests and the responses from the PAQ's. The testing time was approximately 200 minutes per school and the assessment was given during regular physical education class; therefore, no other classes were disturbed, and the school day was unchanged. Physical education teachers at the schools were trained on the use of the FitnessGram prior to conducting the assessments with their students. The researcher met with the teachers and demonstrated how the tests would be conducted, and he was present during all of the testing with the students at each school. The teachers were also given an opportunity to pilot the tests with their own classes and

at the seventh and eighth grade levels so that they would be more comfortable with the tests.

The researcher assessed students at his school first, school A, and then moved to school B, C and finally, D. He worked with the teachers for approximately three days at each school to assess students and collect the data. The data was carefully entered into the software program on site at each school, because the researcher had his laptop with the FitnessGram software installed. The researcher also made a point to arrive at the schools approximately forty-five minutes before the start of each class and review what would be taking place on that particular day. This time was also devoted to practicing and clearly demonstrating the assessment with the certified physical education specialist at that particular school.

During the backsaver sit and reach assessment, students took off their shoes and assessed each side three times before getting the mean score for both the right and left sides.

All teachers and administrators at the schools were extremely cooperative and helpful.

Data Analysis

The data that was collected was placed into the FitnessGram software and was then calculated to determine whether it was in the Healthy Fitness Zone or Needs Improvement Zone. The software did this automatically when the data was input by the researcher.

The data was then reported through percentages, means, medians, frequencies, and standard deviations. The data was displayed through narrative text, tables, and charts.

Finally, the data was collected via ANOVA's, T-tests, Pearson Correlations, and chi-square tests.

Nine ANOVA's were conducted on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by School (A vs. B vs. C vs. D).

Nine t-tests were conducted on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Gender (Male vs. Female).

Nine ANOVA's were conducted on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Age (10 vs. 11 vs. 12 vs. 13).

Nine ANOVA's were conducted on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Ethnicity (Caucasian vs. African American vs. Hispanic).

Nine *t*-tests were conducted to examine differences on each of the FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Participation of Physical Activities Outside of School (Yes vs. No).

Nine Pearson correlations were conducted to examine whether an association exists between Physical Activities Outside of School per Week and FitnessGram Scores (Mile Run, Push-Ups, Curl-Ups, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat).

Nine Pearson correlations were conducted to examine whether an association exists between Hours Physical Activities Outside of School per Week and FitnessGram

Scores (Mile Run, Push-Ups, Curl-Ups, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat).

Seven chi square tests were conducted to assess whether differences exist between Healthy Fitness Zone (Yes vs. No) on the Mile Run, Curl-Ups, Trunk Lift, Push-Ups, BS Right, BS Left and Body Fat.

Summary

This chapter has explained methods used for this descriptive quantitative study in the researcher's attempt to assess sixth grade students' fitness levels as compared to the HFZ. The next chapter presents the results that were obtained from the methods used and the need for further research.

Chapter 4

Research Findings

As stated in Chapter 1, the purpose of this study was to see if sixth grade students fall within the parameters of the healthy fitness or needs improvement zone of the FitnessGram. The results of this study will be used to determine if a change is needed to help curb the epidemic dealing with lack of physical activity at the sixth grade level. Findings from this study may suggest that educational leaders re-evaluate the need for daily physical education in educational systems so that students can meet and maintain an overall level of fitness, health and well-being, and improve academic achievement.

One hundred fifty five individuals participated in the study; seventy-six (49.7%) were Male, and seventy-seven (50.3%) were Female. Four (2.6%) participants were ten years of age, 126 (81.8%) were eleven, twenty-two (14.3%) were twelve and two (1.3%) were thirteen. One hundred seventeen (77.5%) participants participated in Physical Activities Outside of School while thirty-four (22.5%) did not. The mean response the number of days students participate in physical activities outside of school was 3.18 (SD = 0.42). The mean response for hours per week students participate in physical activities outside of school was 3.72 (SD = 3.78). Frequencies and percents for Physical Activities (None, Running, Biking, Basketball, Football, Baseball, Softball, Cheerleading, Soccer, Skateboarding, Swimming and Other) students participated in are presented in Table 1.

Table 1

Frequency and Percents of Physical Activities Participated In

Physical Activities	Frequency	Percent
None	24	21.2
Running	46	37.1
Biking	47	39.2
Basketball	45	36.6
Football	39	32.5
Baseball	29	25.0
Softball	10	9.1
Cheerleading	10	9.2
Soccer	13	11.7
Skateboarding	14	12.4
Swimming	49	40.5
Other	26	22.6

Note. Students were allowed to answer more than once to each sport, percentages will not equal zero.

Preliminary analysis, a one-sample K-S test, revealed that FitnessGram Scores on Trunk Lift, BS (Back-Saver Sit and Reach) Left, and BS Right were not normally distributed. Logarithmic and square root transformations were conducted, but transformations did not lend favorably. After transformation the variables were still

negatively skewed. However according to Stevens (2002) samples with N > 50 assume normality.

ANOVA's on FitnessGram Scores by School

ANOVA is used when you want to assess if differences exist on some continuous variable (i.e. FitnessGram scores) by some group variable with more than two groups (i.e. age groups). Nine ANOVA's were conducted to examine if mean differences exist on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by School (A vs. B vs. C vs. D). Table 2 presents the ANOVAs and Table 3 presents the means and standard deviations.

Table 2

ANOVAs on FitnessGram by School

FitnessGram Subtests	F	Sig.
Push up	6.18	.001
	(40.28)	
Curl up	21.84	.000
	(41.61)	
Trunk Lift	16.50	.000
	(2.46)	
BS left	3.20	.025
	(2.92)	
BS right	4.62	.004
	(2.92)	

Calf sf	1.21	.307
	(43.38)	
Tri sf	1.26	.290
	(41.88)	
Body Fat	1.43	.237
	(73.11)	
Mile Run	3.59	.015
	(9.06)	

Note. df = 3, 151. Numbers in parentheses represent mean squared error.

Table 3

Means and Standard Deviations for FitnessGram by School

	School A (n = 36)		School B (n = 36)		School C (n = 34)		School D (n = 49)	
FitnessGram Subtests	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Mile Run	13.70	*3.26*	13.16	*3.50*	14.03	*2.50*	12.00	*2.76*
Push Up	9.83	*4.69*	13.94	*6.73*	15.26	*4.32*	15.29	*8.05*
Curl Up	15.86	*6.21*	17.00	*6.82*	23.85	*5.72*	25.35	*6.81*
Trunk Lift	9.58	*1.66*	9.53	*1.73*	9.65	*1.92*	11.49	*1.00*
BS Left	10.07	*1.90*	10.17	*2.05*	10.68	*1.47*	11.08	*1.41*
BS Right	9.74	*1.92*	10.19	*2.10*	10.74	*1.48*	11.04	*1.34*
Calf Sf	17.14	*6.07*	18.56	*5.88*	19.82	*5.53*	19.45	*7.96*
Tri Sf	17.14	*5.93*	18.97	*6.14*	19.94	*5.45*	19.35	*7.63*

Body Fat	25.95	*7.89*	28.08	*7.77*	29.74	*7.05*	29.23	*10.31*

Note. N = 155.

A significant mean difference exists on the Mile Run by School; School C had significantly higher means on the Mile Run compared to participants from School D. A significant mean difference exists on Push-Ups by school; School A had significantly lower means on Push-Ups compared to participants from Schools D and School C. A significant mean difference exists on the Curl-Ups by school; Schools A and School B had significantly lower means on the Curl-Ups compared to participants from Schools C and D. A significant mean difference exist on Trunk Lift by school; Schools A, School B and School C had significantly lower means on the Trunk Lift compared to participants from School D.

A significant mean difference exist on BS Left by School; however, post hoc tests revealed no significant mean differences between Schools. A significant mean differences exist on BS Right by school; School A had significantly lower means on BS Right compared to participants from School D. No significant mean differences exist on Calf SF, Tri SF and Body Fat by school.

T-tests on FitnessGram Scores by Gender

Nine t-tests were conducted to examine differences on each of the FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by gender (Male vs. Female). Table 4 presents the t-tests and means and standard deviations are presented in Table 5.

Table 4

T-tests on FitnessGram by Gender

FitnessGram Subtests	t	Df	Sig.
Push up	3.21	141.01	.002
Curl up	1.46	151.00	.147
Trunk Lift	1.23	151.00	.221
BS left	-7.09	116.82	.000
BS right	-6.50	128.28	.000
Calf sf	-1.47	145.68	.145
Tri sf	-1.39	151.00	.168
Body Fat	-1.05	151.00	.293
Mile Run	-3.88	151.00	.000

Note. N = 153.

Table 5

Means and Standard Deviations on FitnessGram by Gender

	Male (n = 76)		Female (n = 77)	
FitnessGram Subtests	M	*SD*	M	*SD*
Push-Ups	15.29	*7.18*	11.96	*5.54*
Curl-Ups	21.87	*7.52*	20.08	*7.67*
Trunk Lift	10.34	*1.92*	9.99	*1.64*
BS Left	9.69	*1.86*	11.42	*1.03*
BS Right	9.65	*1.86*	11.30	*1.20*
Calf SF	17.97	*5.87*	19.53	*7.22*
Tri SF	18.12	*5.78*	19.57	*7.11*
Body Fat	27.53	*8.49*	28.99	*8.68*
Mile Run	12.38	*3.06*	14.23	*2.85*

Note. N = 153.

Statistically significant differences revealed that Females had greater Mile Run, BS Left and BS Right means compared to Males. A statistically significant difference also revealed that males had greater Push Up means compared to females. No significant differences were revealed between males and females on Curl-Ups, Trunk Lift, Calf SF, Tri SF and Body Fat.

ANOVA's on FitnessGram Scores by Age

Nine ANOVA's were conducted to examine if mean differences exist on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Age (10 vs. 11 vs. 12 vs. 13). Table 6 presents the ANOVAs and Table 7 presents the means and standard deviations.

Table 6

ANOVAs on FitnessGram by Age

FitnessGram Subtests	F	Sig.
Push up	0.76	0.52
	(44.45)	
Curl up	1.83	0.15
	(57.04)	
Trunk Lift	0.58	0.63
	(3.24)	
BS left	0.30	0.82
	(2.90)	
BS right	0.42	0.74
	(3.10)	
Calf sf	0.52	0.67
	(44.25)	
Tri sf	0.34	0.80
	(42.86)	

Body Fat	0.45	0.72
	(74.93)	
Mile Run	3.23	0.02
	(9.23)	

Note. df = 3, 150. Numbers in parentheses represent mean squared error.

Table 7

Means and Standard Deviations for FitnessGram by Age

	10 Years (n = 4)		11 Years (n = 126)		12 Years (n = 22)		13 Years (n = 2)	
Fitness Gram Subtests	M	*SD*	M	*SD*	M	*SD*	M	*SD*
Mile Run	16.03	*2.19*	13.14	*3.10*	12.89	*2.83*	7.91	*.56*
Push Up	12.25	*9.98*	13.46	*6.29*	15.68	*8.14*	14.00	*5.66*
Curl Up	22.50	*5.32*	20.35	*7.81*	24.32	*6.06*	19.00	*8.49*
Trunk Lift	10.75	*1.50*	10.24	*1.74*	9.95	*1.99*	9.00	*4.24*
BS Left	10.50	*1.29*	10.54	*1.69*	10.86	*1.73*	10.00	*2.83*
BS Right	10.00	*.82*	10.46	*1.75*	10.82	*1.84*	10.00	*2.83*
Calf Sf	19.75	*3.77*	18.60	*6.54*	20.00	*7.70*	15.00	*1.41*
Tri Sf	20.25	*3.77*	18.79	*6.45*	19.36	*7.52*	15.00	*1.41*
Body Fat	29.70	*4.61*	28.09	*8.44*	29.61	*10.41*	23.30	*1.73*

Note. N = 154.

A significant mean differences exist on the Mile Run by Age*;* thirteen-year-old participants had significantly lower means on the Mile Run compared to ten-year-old participants. No significant mean differences exist on Push-Ups, Curl-Ups, Trunk Lift, BS Left, BS Right, Calf SF, Tri SF, and Body Fat by Age.

ANOVA's on FitnessGram Scores by Ethnicity

Nine ANOVA's were conducted to examine if mean differences exist on FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Ethnicity (Caucasian vs. African American vs. Hispanic). Table 8 presents the ANOVAs and Table 9 presents the means and standard deviations.

Table 8

ANOVAs on FitnessGram by Age

FitnessGram Subtests	F	Sig.
Push up	3.92	0.02
	(43.12)	
Curl up	1.55	0.22
	(58.87)	
Trunk Lift	0.71	0.49
	(3.26)	
BS left	0.90	0.41
	(3.07)	
BS right	2.20	0.11
	(3.12)	

Calf sf	2.15	0.12
	(42.59)	
Tri sf	1.51	0.22
	(41.62)	
Body Fat	1.87	0.16
	(72.64)	
Mile Run	2.47	0.09
	(9.41)	

Note. df = 2, 149. Numbers in parentheses represent mean squared error.

Table 9

Means and Standard Deviations for FitnessGram by Ethnicity

	Caucasian (n = 87)		African American (n = 59)		Hispanic (n = 6)	
FitnessGram Subtests	M	*SD*	M	*SD*	M	*SD*
Mile Run	12.71	*3.14*	13.71	*3.01*	14.50	*2.26*
Push Up	12.61	*5.94*	15.47	*7.56*	10.83	*3.76*
Curl Up	20.09	*7.91*	22.27	*7.55*	19.33	*3.98*
Trunk Lift	10.08	*1.76*	10.37	*1.85*	9.67	*2.07*
BS Left	10.39	*1.82*	10.76	*1.62*	10.83	*2.04*
BS Right	10.21	*1.88*	10.80	*1.55*	11.00	*2.00*
Calf Sf	18.09	*6.00*	19.32	*7.14*	23.33	*7.66*

Tri Sf	18.39	*6.14*	19.12	*6.91*	23.00	*6.16*
Body Fat	27.54	*8.09*	28.84	*9.06*	34.14	*9.32*

Note. N = 155.

A significant difference was revealed on Push-Ups by Ethnicity; Caucasian participants had significantly lower means on the Push-Ups compared to African American participants. No significant mean differences exist on Mile Run, Curl-Ups, Trunk Lift, BS Left, BS Right, Calf SF, Tri SF, and Body Fat by Ethnicity.

T-test on FitnessGram by Physical Activities Outside of School

T-tests do the same thing as ANOVAs—assess if differences exist on some continuous variable (i.e. FitnessGram scores) by some group variable. However with t-tests the grouping variable has to be dichotomous. ANOVAs are used when there are more than two groups. Nine *t*-tests were conducted to examine differences on each of the FitnessGram Scores (Mile Run, Push-Up, Curl-Up, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat) by Participation of Physical Activities Outside of School (Yes vs. No). Table 10 presents the t-tests and Table 11 presents the means and standard deviations.

Table 10

T-tests on FitnessGram by Participation of Physical Activity Outside of School

FitnessGram Subtests	t	df	Sig.
Push up	0.56	149	.575
Curl up	0.62	149	.537

Trunk Lift	0.39	149	.695
BS left	-1.13	149	.262
BS right	-1.46	149	.146
Calf sf	-0.88	149	.378
Tri sf	-0.78	149	.440
Body Fat	-0.87	149	.389
Mile Run	-2.93	71.80	.005

Note. N = 150.

Table 11

Means and Standard Deviations on FitnessGram by Participation of Physical Activities Outside of School

	Yes (n = 117)		No (n = 34)	
FitnessGram Subtests	M	*SD*	M	*SD*
Push-Ups	13.85	*7.01*	13.12	*5.65*
Curl-Ups	21.05	*7.65*	20.12	*8.11*
Trunk Lift	10.28	*1.79*	10.15	*1.65*
BS Left	10.44	*1.76*	10.44	*1.76*
BS Right	10.35	*1.81*	10.85	*1.52*
Calf SF	18.53	*6.34*	19.68	*7.69*
Tri SF	18.66	*6.27*	19.65	*7.46*

Body Fat	27.98	*8.43*	29.44	*9.41*
Mile Run	12.99	*3.22*	14.47	*2.38*

Note. N = 151.

A significant difference was revealed on the Mile Run by Participation of Physical Activities Outside of School. Students that participated in physical activities outside of school had lower Mile Run means than individuals that did not. No significant mean differences were revealed between students that participate in physical activities outside of school and those that do not on: Push-ups, Curl-Ups, Trunk Lift, BS Left, BS Right, Calf SF, Tri SF, and Body Fat by Ethnicity.

Pearson Correlation between the Number of Physical Activities per Week and FitnessGram Scores

Pearson Correlations are used when the researcher want to see if a relationship exists between two continuous variables (i.e. FitnessGram scores and number of outside physical activities). These variables are not grouped and, therefore are not appropriate for the other tests. Pearson correlations were conducted (see Table 12)to examine if an association exists between physical activities outside of school per week and FitnessGram Scores (Mile Run, Push-Ups, Curl-Ups, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat).

Table 12

Pearson Correlation between Physical Activities Outside of School per Week and FitnessGram Score

	Activities per Week
FitnessGram Subtests	
Push-Ups	.19*
Curl-Ups	.08
Trunk Lift	.13
BS Left	-.10
BS Right	-.18*
Calf SF	-.02
Tri SF	-.02
Body Fat	-.01
Mile Run	-.31**

Note. * $p < .05$, ** $p < .01$. N = 149.

Results of the correlation suggest that as physical activities outside of school per week increase push-ups also increase. Results also suggest that as physical activities outside of school per week increase BS Right and Mile Run decrease. No other significant relationships were revealed (see Table 12).

Pearson Correlation between Hours of Physical Activities Outside of School per Week with FitnessGram Scores

Pearson correlations were conducted (see Table 13) to examine if an association exists between hours of physical activities outside of school per week and FitnessGram

Scores (Mile Run, Push-Ups, Curl-Ups, Trunk Lift, BS Right, BS Left, Calf SF, Tri SF, Body Fat).

Table 13

Pearson Correlation between Hours of Physical Activities Outside of School per Week with FitnessGram Scores

	Hours per Week
FitnessGram Subtests	
Push-Ups	.08
Curl-Ups	-.05
Trunk Lift	-.01
BS Left	-.23**
BS Right	-.33**
Calf SF	-.11
Tri SF	-.12
Body Fat	-.11
Mile Run	-.36**

Note. * $p < .05$, ** $p < .01$. N = 149.

Results of the correlation suggest that as hours of physical activities outside of school per week decrease BS Right, BS Left and Mile Run decrease. No other significant relationships were revealed (see Table 13).

Chi Squares on FitnessGram by Healthy Fitness Zone.

Chi-squares are used when one wants see if there is difference among categorical (nominal) variables, for example if in a study one wanted to see if there was a difference

in whether people fall outside of the Healthy Fitness Zones or not. This is a dichotomous variable (two groups) Healthy Fitness Zone (Yes vs. No). Seven chi square tests (see Table 14) were performed between Mile Run, Curl-Ups, Trunk Lift, Push-Ups, BS Right, BS Left and Body Fat and Healthy Fitness Zone (Yes vs. No).

Table 14

Chi Squares on FitnessGram by Healthy Fitness Zone

			Healthy Fitness Zone	
FitnessGram Subtests	χ^2	N	Yes	No
Push up	92.56*	153	136	17
Curl up	42.88*	153	117	136
Trunk Lift	50.70*	120	99	21
BS left	92.56*	153	136	17
BS right	77.65*	153	131	22
Body Fat	64.06*	153	126	27
Mile Run	21.24*	153	48	105

Note. * $p < .001$

Results of the Chi-square (see Table 14) suggest that on Curl-Ups, Trunk Lift, Push-Ups, BS Right, BS Left and Body Fat a greater number of students fall into the Healthy Fitness Zone compared to those that do not. Results also suggest that on the mile run a greater number of students do not fall into the Healthy Fitness Zone compared to those that do.

Summary

The results presented above clearly indicate that students do fall within the Healthy Fitness Zone of the FitnessGram; however, the most important assessment, which is the one mile run (Meredith, M.D., Welk, G.J., 2005) depicts that students need a great deal of improvement. According to Meredith and Welk, aerobic capacity (one-mile run) is the most important assessment in any fitness program. Research clearly indicates that acceptable levels of aerobic capacity are associated with the reduced risk of high blood pressure, coronary heart disease, obesity, diabetes, some forms of cancer, and many other health problems. In this study, females performed better than males on the mile run, and thirteen year olds performed much better than ten year olds. It is important for educational leaders to recognize the need for daily physical activity to increase so that health benefits will do the same. A more detailed summary and a discussion of the findings are presented in the next chapter.

CHAPTER 5

Conclusions, Summary, Discussion, and Recommendations

This chapter provides a summary of the conclusions, and a discussion of the findings related to the study. In addition, recommendations are provided for further research in the area.

Conclusions

The purpose of this quantitative descriptive research study was to examine the relationship between sixth grade levels of fitness and the FitnessGram Assessment Tool. Specifically, the study examined students at the beginning of their sixth grade year to determine if they fell within the Healthy Fitness Zone of the FitnessGram. The study also determined whether or not students that participated in physical activities outside of school had a higher level of fitness than students who did not. Finally, the study compared the differences in levels of fitness according to age, gender, and ethnicity.

Two hypotheses were tested in an attempt to identify any potentially significant relationships among the participants, in regard to participating in activities outside of school and their fitness level, and being in the Healthy Fitness Zone when entering sixth grade. Significant relationships were found to exist in some of the results. The findings suggest that physical activity outside of school had a significant relationship with fitness levels in incoming sixth grade students.

Summary of Results

Two hypotheses were examined in this study, in which one of the two demonstrated significance. A test of hypothesis (1) demonstrated that the majority of students entering the sixth grade do fall within the HFZ on five of the six subtests. A test of hypothesis (2) demonstrated that students participating in physical activities outside of school have a higher level of fitness than students who do not, as measured on the FitnessGram. It should be noted that the majority of students did not fall within the HFZ on the most important assessment of the FitnessGram, aerobic capacity.

The FitnessGram is not something that is used regularly in the school district where the research took place; however, it is a useful tool to decipher if students fall within the Healthy Fitness Zone (HFZ). The assessment device is an important part in providing data for the achievement of lifetime physical activity and fitness. The FitnessGram emphasizes participation in a wide variety of activities to help develop and promote fitness and endorses the concept that physical activity should be fun and enjoyable (Cooper Institute for Aerobics Research, 1992. p. 3). By understanding more about student levels of fitness, administrators, policymakers and educational leaders can design and implement more appropriate and meaningful curriculum decisions that will benefit students and society as a whole.

Implications

By sharing the results with students and their parents, it is hoped that they will better understand the importance of physical fitness and make physical activity a part of their daily living. It is also anticipated that educational leaders will assist in bringing about daily physical activity time for all students at the middle school level.

Delimitations/Limitations of the Study

1. Only students from a local school district adjacent to Atlanta, Georgia participated in this study and therefore, the results may not be generalizable to other sites.
2. Only sixth grade students participated in this study, therefore, the results may not be generalizable to other grade levels.

Recommendations for Future Practice

The purpose was to determine whether sixth grade students fell within the HFZ of the FitnessGram when entering sixth grade and also if students who participated in activities outside of school had a higher level of fitness as measured through the FitnessGram. Since there were significant statistics reported, the school district should initiate procedures to encourage students to participate more regularly in physical activity. The school district could also employ a health and physical education coordinator to defend daily physical activity across the district and demonstrate its importance.

The researcher understands the need for focusing on daily physical education for middle school students. However, it takes a group effort from teachers, parents and educational leaders to increase students' understanding of the need for daily participation in physical activity. This must be a priority for educators and educational leaders. Neglecting to share the importance and benefits of physical activity could be disastrous to the educational system. Educational leaders can emphasize the importance of daily physical education, using data provided in this study.

Recommendations for Future Research

The current study is significant because it examined the relationship between sixth grade students and their levels of fitness according to the FitnessGram; the study also examined the relationship between sixth grade students levels of fitness when participating in physical activities outside of school and those who do not. The study established significant differences in the two groups.

Further research in this area is still needed. Additional research should and could evaluate specific grade levels other than just sixth grade students to determine their relationship of fitness levels and the HFZ of the FitnessGram. A deeper investigation similar to the existing study would provide some information that would enable educational leaders to improve physical education programs by providing more opportunities for daily physical activity.

Although the researcher was not looking for a difference on the subtests between males and females, results did indicate that females had lower mean scores in the mile run than males. This was interesting and could lead to further research.

The goal of public schools should be to encourage students to be successful in the classroom by creating methods to do so. Results of this study indicated that the majority of students did not fall within the Healthy Fitness Zone on the most important assessment of aerobic capacity. With this in mind and with our nation’s problems with poor health and fitness, it is imperative that educational leaders both encourage and enable daily physical activity among middle school students.

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APPENDICES

Appendix A
Healthy Fitness Zone (HFZ)

Explanation of Healthy Fitness Zone Standards

The Healthy Fitness Zone Standards were set to accommodate the differences in variability of body type among children, (i.e. bone structure, growth and development, maturation, heredity, etc.). The FITNESSGRAM standards were established based upon research conducted by the Cooper Institute and supported by the Centers for Disease Control. These standards represent an acceptable level of fitness required to both maintain a healthy lifestyle and reduce preventable diseases resulting from a sedentary lifestyle.

With regard to aerobic fitness level, research has shown a significant decrease in risk of all-cause mortality from getting out of the lower 20% of the population. Risk levels continue to decrease as fitness levels increase but not as dramatically as getting out of the bottom 20%. Aerobic capacity standards were set to equal getting out of the lower 20% of the population.

Following the recommendations of current research also set body fat percentages. Children with body fat levels above 25% for boys and 30-35% for girls are more likely to exhibit elevated cholesterol levels and hypertension.

All students should strive to achieve a score that places them inside the Healthy Fitness Zone (HFZ). Performance above HFZ should be recognized appropriately but should not be the goal for all students. Teachers and students should work together to set realistic and individualized performance goals. The two samples below depict the HFZ for boys and girls.

THE PRUDENTIAL FITNESSGRAM
STANDARDS FOR HEALTHY FITNESS ZONE*

BOYS

AGE	ONE MILE min/sec		PERCENT FAT		CURL-UP # completed		TRUNK LIFT inches		PUSH-UP # completed		BACKSAVER SIT&REACH** inches
5	Time Standards Not Recommended.		25	10	2	10	6	12	3	8	8
6			25	10	2	10	6	12	3	8	8
7			25	10	4	14	6	12	4	10	8
8			25	10	6	20	6	12	5	13	8
9			25	10	9	24	6	12	6	15	8
10	11:30	9:00	25	10	12	24	9	12	7	20	8
11	11:00	8:30	25	10	15	28	9	12	8	20	8
12	10:30	8:00	25	10	18	36	9	12	10	20	8
13	10:00	7:30	25	10	21	40	9	12	12	25	8
14	9:30	7:00	25	10	24	45	9	12	14	30	8
15	9:00	7:00	25	10	24	47	9	12	16	35	8
16	8:30	7:00	25	10	24	47	9	12	18	35	8
17	8:30	7:00	25	10	24	47	9	12	18	35	8
17+	8:30	7:00	25	10	24	47	9	12	18	35	8

* Number on left is lower end of HFZ; number on right is upper end of HFZ.
**Test scored Pass/Fail; must reach this distance to pass.

THE PRUDENTIAL FITNESSGRAM
STANDARDS FOR HEALTHY FITNESS ZONE*

GIRLS

AGE	ONE MILE min/sec		PERCENT FAT		CURL-UP # completed		TRUNK LIFT inches		PUSH-UP # completed		BACKSAVER SIT&REACH** inches
5	Time Standards Not Recommended		32	17	2	10	6	12	3	8	9
6			32	17	2	10	6	12	3	8	9
7			32	17	4	14	6	12	4	10	9
8			32	17	6	20	6	12	5	13	9
9			32	17	9	22	6	12	6	15	9
10	12:30	9:30	32	17	12	26	9	12	7	15	9
11	12:00	9:00	32	17	15	29	9	12	7	15	10
12	12:00	9:00	32	17	18	32	9	12	7	15	10
13	11:30	9:00	32	17	18	32	9	12	7	15	10
14	11:00	8:30	32	17	18	32	9	12	7	15	10
15	10:30	8:00	32	17	18	35	9	12	7	15	12
16	10:00	8:00	32	17	18	35	9	12	7	15	12
17	10:00	8:00	32	17	18	35	9	12	7	15	12
17+	10:00	8:00	32	17	18	35	9	12	7	15	12

* Number on left is lower end of HFZ; number on right is upper end of HFZ.
**Test is scored Pass/Fail; must reach this distance to pass.

Appendix B
Physical Activity Questionnaire/PAQ

- Please circle the answer that best describes your physical activity level -

1) Do you participate in physical activities outside of school? YES NO

2) What physical activity do you participate in? None Running Biking

Basketball Football Baseball

Softball Cheerleading Soccer Skateboarding

Swimming Other _____

3) How many days a week do you participate in physical activities outside of school? 0

1 2 3 4 5 6 7

4) How many hours a week do you participate in physical activities outside of school? 0

1 2 3 4 5 6 More than 6? _____

Appendix C
FitnessGram Aerobic Capacity/One-Mile Run

Appendix D
FitnessGram Body Composition/Skinfold Test

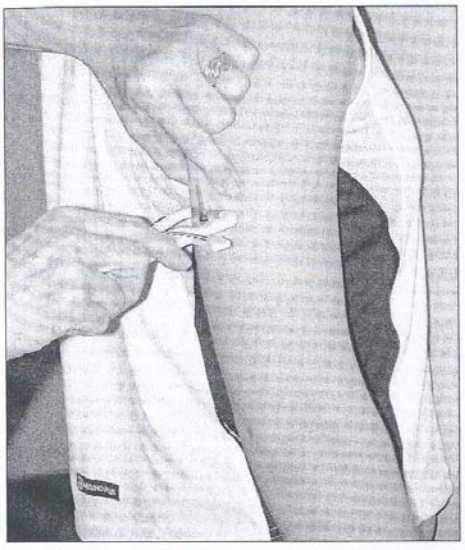

PHOTO 6.3 Triceps skinfold measurement.

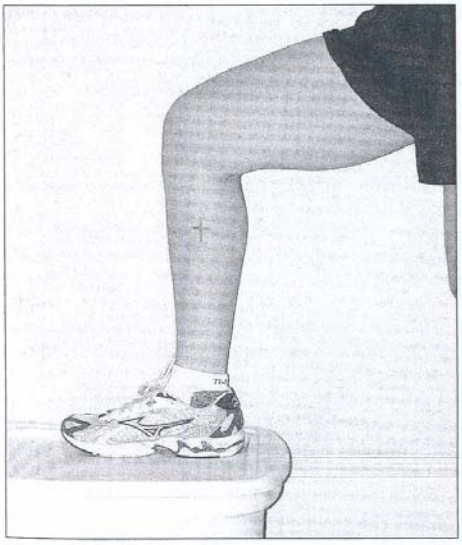

PHOTO 6.4 Placement of the leg for locating the calf skinfold site.

Appendix E
FitnessGram Abdominal Strength and Endurance/Curl-up Test

Curl-Up *(continued)*

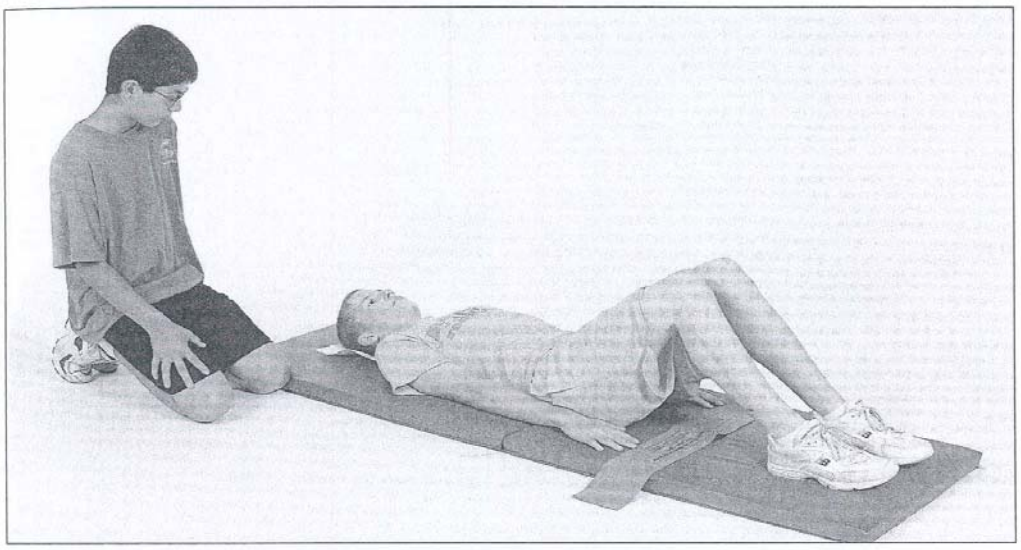

PHOTO 7.1 Starting position for the curl-up test.

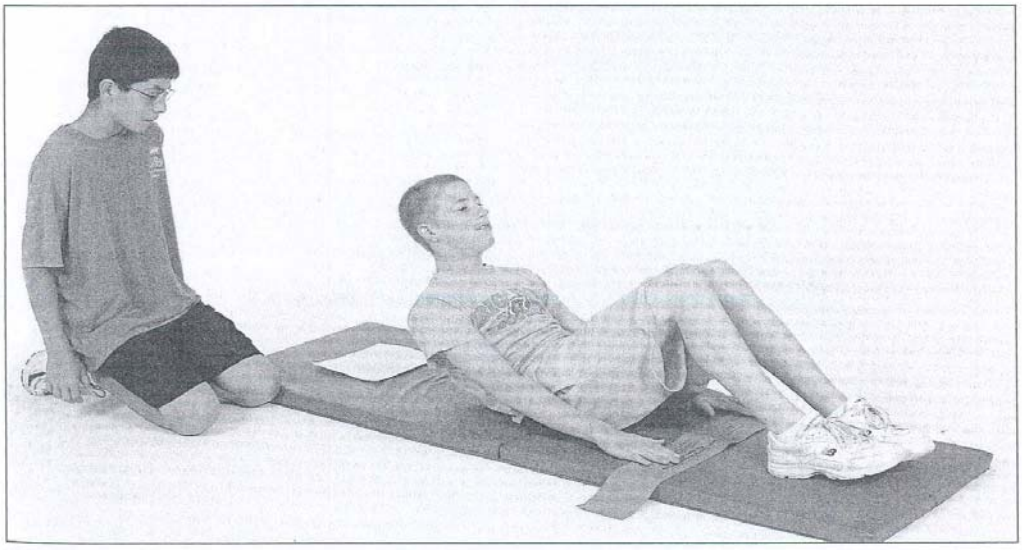

PHOTO 7.2 Position of the student in the "up" position for the curl-up test.

Appendix F
Trunk Extensor Strength and Flexibility/Trunk Lift

Trunk Lift *(continued)*

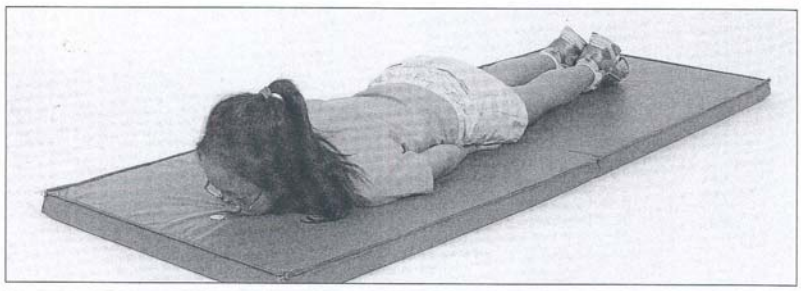

PHOTO 7.4 Starting position for the trunk lift.

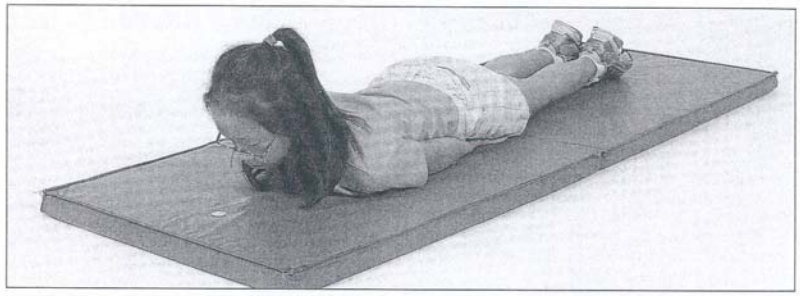

PHOTO 7.5 Student in the "up" position for the trunk test.

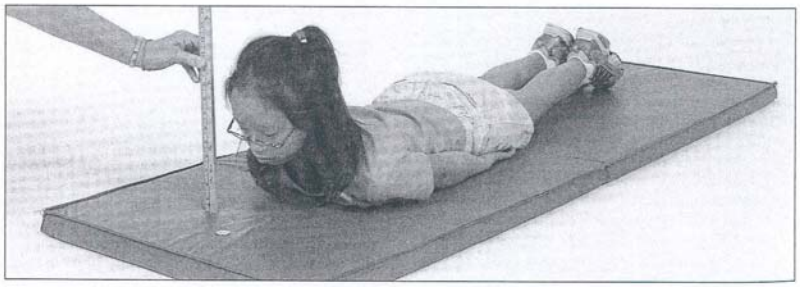

PHOTO 7.6 Measurement of trunk lift.

Appendix G
FitnessGram Upper Body Strength and Endurance/90 Degree Push Up

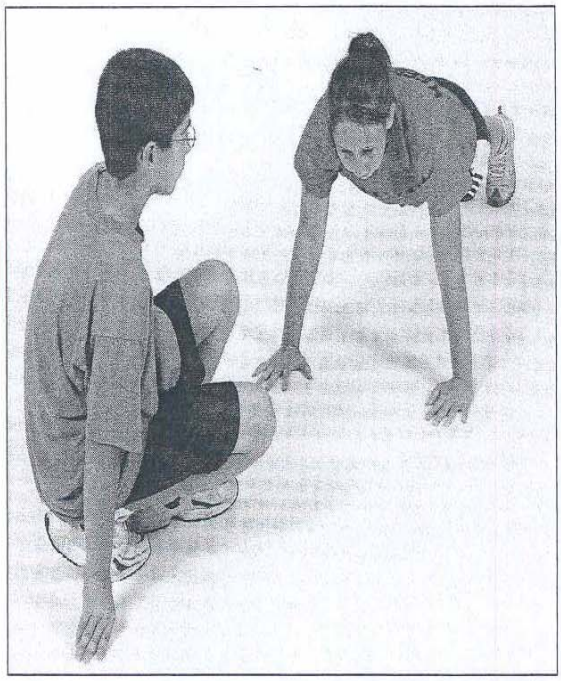

PHOTO 7.7 Starting position for the 90° push-up test.

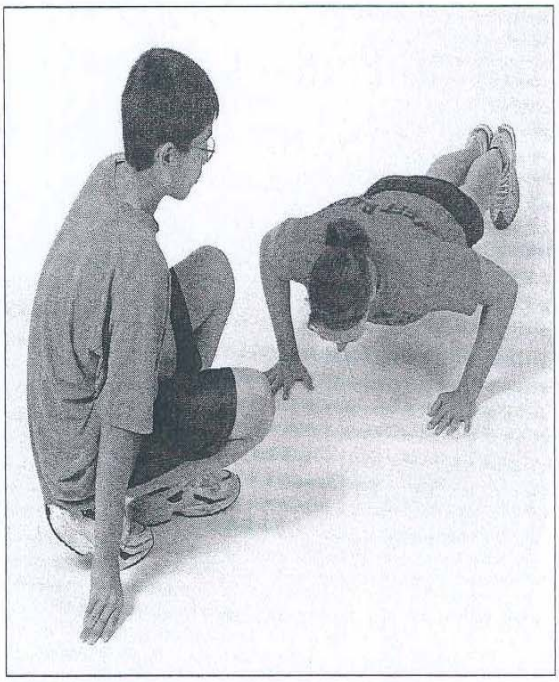

PHOTO 7.8 Student in the "down" position for the 90° push-up test.

Appendix H
FitnessGram Flexibility Test/Back-Saver Sit and Reach (BF)

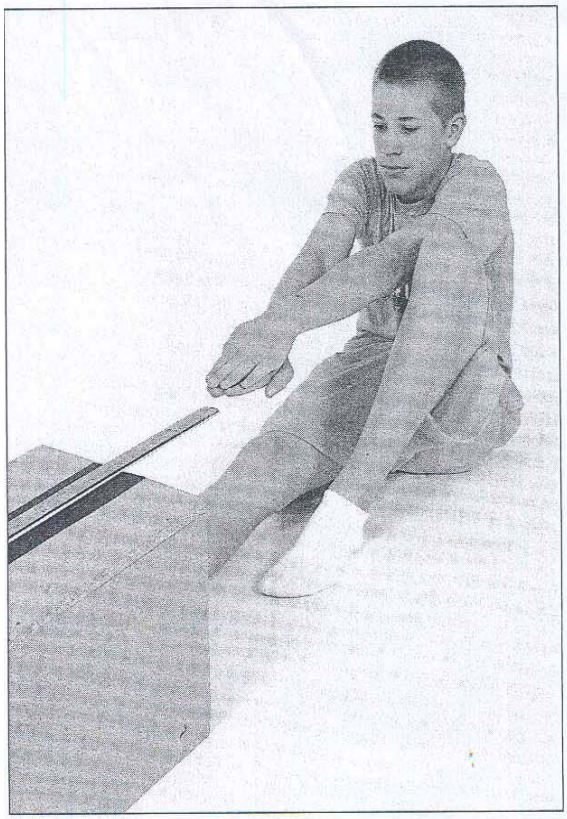

PHOTO 7.15 Starting position for measuring the right side.

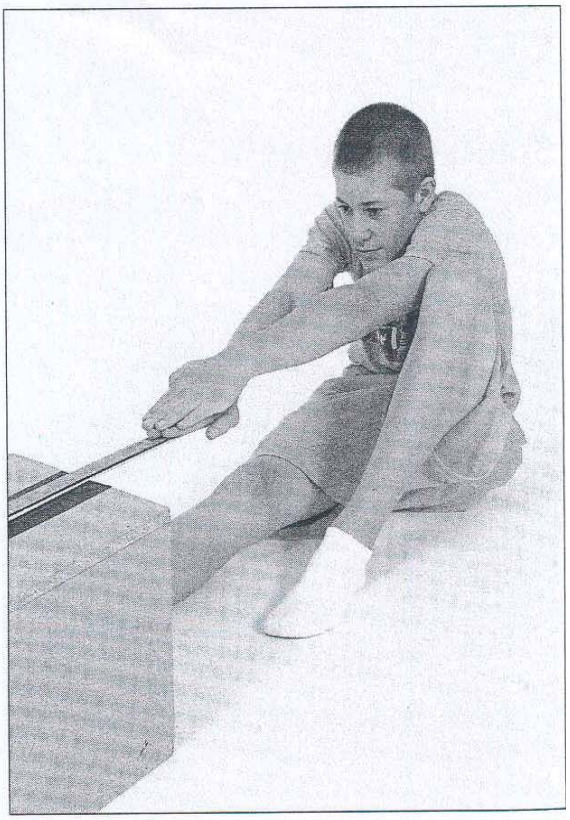

PHOTO 7.16 Back-saver sit and reach stretch for the right side.

Appendix I
A Physically Educated Person/NASPE

A PHYSICALLY EDUCATED PERSON:

HAS learned skills necessary to perform a variety of physical activities

1. ... moves using concepts of body awareness space awareness, effort, and relationships.
2. ... demonstrates competence in a variety of manipulative, locomotor, and non-locomotor skills.
3. ... demonstrates competence in combinations of manipulative, locomotor, and non-locomotor skills performed individually and with others.
4. ... demonstrates competence in many different forms of physical activity.
5. ... demonstrates proficiency in a few forms of physical activity.
6. ... has learned how to learn new skills.

IS physically fit

7. ... assesses, achieves, and maintains physical fitness.
8. ... designs safe, personal fitness programs in accordance with principles of training and conditioning.

DOES participates regularly in physical activity

9. ... participates in health enhancing physical activity at least three times a week.
10. ... selects and regularly participates in lifetime physical activities.

KNOWS the implications of and the benefits from involvement in physical activities

11. ... identifies the benefits, cost, and obligations associated with regular participation in physical activity.
12. ... recognizes the risk and safety factors associated with regular participation in physical activity
13. ... applies concepts and principles to the development of motor skills.
14. ... understands that wellness involves more than being physically fit.
15. ... knows the rules, strategies, and appropriate behaviors for selected physical activities.
16. ... recognizes that participation in physical activity can lead to multi-cultural and international understanding.
17. ... understanding that physical activity provides the opportunity for enjoyment, self-expression, and communication.

VALUES physical activity and its contributions to a healthful lifestyle

18. ... appreciates the relationships with others that result from participation in physical activity.
19. ... respects the role that regular physical activity plays in the pursuit of life-long health and well-being.
20. ... cherishes the feeling that result from regular participation in physical activity.

(Pangrazi, 1998, p. 6)