ADDIS ABABA UNIVERSITY COLLEGE OF EDUCATION AND BEHAVIORAL STUDIES DEPARTMENT OF SCIENCE & MATHEMATICS EDUCATION

The Effect of Physical Activity on Students' Academic Achievement and Attitude in Some selected Secondary Schools in Lemi Kura Sub-City Administration, Addis Ababa.

By

ASNAKU TADESSE MAMO

Dec,2022

Addis Ababa

Ethiopia

The Effect of Physical Activity on Students' Academic Achievement amd Attitude in Some selected Secondary Schools in Lemi Kura Sub-City Administration, Addis Ababa.

By

ASNAKU TADESSE MAMO

A THESIS SUBMITTED TO THE DEPARTMENT OF SCIENCE AND MATHEMATICS EDUCATION IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION IN TEACHING PHYSICAL EDUCATION

Dec, 2022

Addis Ababa

Ethiopia

ADDIS ABABA UNIVERSITY COLLEGE OF EDUCATION AND BEHAVIORAL STUDIES DEPARTMENT OF SCIENCE AND MATHEMATICS EDUCATION

This is to certify that the Thesis Prepared byASNAKU TADESSE, entitled: "The Effect Of Physical Activity on Students' Academic Achievement and attitude in Andode and Bori Secondary Schools in Lemi Kura Sub-City Administration, Addis Ababa." and Submitted in Partial Fulfillment of the Requirements for the Degree of Masters of Education Complies with the Regulations of the University meets the Accepted Standards with Respect to Originality and Quality.

Singed by the Examining Committee

Chairman, Department of Graduate Studies	**Date**	**Signature**
Advisor	**Date**	**Signature**
Internal Examiner	**Date**	**Signature**
External examiner	**Date**	**Signature**

DECLARATION

I, the under signed, declare that this thesis is my original work and has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

Name: Asnaku Tadesse

Signature: _____ Date: _____

This thesis has been submitted for examination with my approval as University Advisor Name: Dr. Desta Gebeyehu

Signature: _____ Date: _____

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deep and heartfelt thanks to my advisor Dr. Desta Gebeyehu and to my co-advisor Dr.Tesfay Asegedom for their polite approach, knowledgeable advice, and constructive comments that have shaped my thesis immeasurably. I always appreciate them not only for their commitment but also for their insightful and critical comments for further improvements.I would also like to express my special thanks to all concerned bodies Andode ,Bori and Beshale High schools management bodies and cluster supervisors and students, for their hospitality, cooperation and participation to provide the necessary information required for my study. I am still indebted to my husband Ashine Niguss for their supports in everything during my thesis work, in addition to this to Yibekal Belay and Zenbe Adefris for their continuous encouragement, idea and moral support starting from the beginning up to the end of this thesis. Finally, I am very mach grateful to my families for their continuous encouragement, financial and moral support.

TABLE OF CONTENT

Contents **Pages**

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

A.A	Academic Achievement
P.A	Physical Activity
P.E	Physical Education
MOE	Ministry of Education
HEPA	Health Enhancing Physical Activity
BDNF	Brain-Derived Neurotrophic Factor

Abstract

This study was aimed to investigate effects of physical activities on students' achievement and attitude towards learning, and the association between the two dependent variables. A total of 215 grade 10th students from two different schools found in Lemi Kura Sub City, Addis Ababa, Ethiopia were the participants of the study. The participant samples were selected from Andode and Bori secondary schools randomly and assigned as treatment and comparison groups. The treatment groups were exposed to multiple physical activities before the start of lessons whereas the comparison groups had learnt the selected subjects as a regular trends. A non-equivalent pretest post test qusi experimental research design was used in this study. Standardized achievement test which was composed of English, mathematics, and biology, and attitude questionnaire with a five point Liker scale instruments were used to data. After checking all the required assumptions for test statistics, an independent sample t-test and Pearson Correlations were employed to compare the mean difference on students' attitude towards performing physical activities, achievement between groups and associations between students' attitude with their academic achievement by the treatment group only. The analysis of an independent sample t-test result indicated that students who were exposed to multiple physical activities prior to their lesson scored the higher academic mean than those students who had learnt the same subjects without performing physical activities. Similarly, the analysis of Pearson correlation coefficient result showed that there was a positive, moderate and significant correlations between students' attitude towards performing physical activities with their academic achievement. To conclude, exposing students with multiple physical activities prior, during and after the lesson helps to improve their academic achievement. In addition, the finding of this study revealed that students with positive attitude of physical activities can perform better in their academic achievement. Further study can be carried out to investigate the effect of physical activities on students' achievement in terms of gender difference and the prediction of physical activities to academic achievement.

Key Words: *Achievement, Attitude, Physical Activities.*

CHAPTER ONE

INTRODUCTION

Under this chapter background of the study, statement of problem, scope of the study, significance of the study, objectives and operational definitions are discussed in more detail and reported as follows.

1.1. Background of the study

Education plays a vital role for the development of any nation across the globe. The education system led the economic and social status of people through the delivery of quality education in the school where learners should be equipped with the necessary skills, knowledge and behavior (Minstry of Education, 2010). No countries have achieved its development stage without education. Education is one of main instruments of development any country.

Physical education is one of the subjects that contributes a significant role in preparing learners to fit with the education system by capable them with the adequate physical fitness and healthy co-status (WHO ,2010a).

Physical education is at the nucleus of comprehensive approach to promoting physical activity through schools. In teaching physical education faces challenges in most countries, and also in our country. These challenges range from reduced curriculum time and a lack of adequately prepared teacher, to the poor state of facilities and a negative perception for teachers, students, parents (Nyakweba, 2005).

Despite continued dramatic increases in children's health issues, physical education programs are being cut more than ever to make room for more core academic time. This trend continues even though the current evidence shows physical education to be positively related to increased academic performance; when time is allocated for quality physical education, there is no detriment to academic achievement (Smith & Lounsbery, 2009). Therefore, it is critical that physical education (PE) programs in schools continue to be analyzed to further show the value of physical activity through physical education programs. Increasing time in physical activity could help address a serious health concern for children, which is the increasing incidence of overweight and obesity.

The association between Physical activity and academic performance has various theoretical concepts. On an informal stage, there are many people who claim to have finished successes

associated with educational achievement due to formative sports. From the output of research, there is considerable evidence that sports participation positively relates to academic achievement among students. The sports participation is an important setting in the lives of students. Over 47 million students participate in organized sports (Coe, Pivarnik, , Womack, Reeves, & Malina,,2006). Since sports area meaningful context in which may be a viable way to promote better development in academic performance. Research results suggesting the value of sports programs for positive student academic performance development. Positive youngsters' development refers to the purchase of capabilities and competencies needed for best teenagers' improvement that maintains into adult hood. These contributions include cognitive, social, emotional, and intellectual competencies, such as confidence, character, or perseverance. Participation in team sports provide various importance for student academic performance and cognitive development, including a high level of enjoyment and challenge, ample opportunities to develop positive relationships, and fulfilling a need to belong .

Examining the association between participation in physical activities and academic achievement is important for many reasons. Understanding the relationship between participation in sport activities, academic achievement and cognitive development is very important for teachers, school psychologists and other stakeholders. If student's participation in sport activities has association with academic achievement and cognitive development, the student athletes should have been encourage and supported to continue sports participation rather than viewed as being distracted from their participation. The current study contributes to the literature by examining the effect of sports participation on academic achievement, and mental health of students (cognitive development).

In addition to being physically active, children need to learn fundamental motor skills and develop health related physical fitness (cardiovascular endurance, muscular strength and endurance, flexibility, and body composition). Physical education, provided at school, is an ideal way to encourage activity and develop fitness among children and, for many children, will be their only preparation for an active lifestyle. The ability to study and remember facts, being able to study effectively and see how facts fit together and form larger patterns of knowledge and being able to think for yourself in relation to facts and being able to communicate your knowledge verbally or down on paper. Good academic performance is also linked having good organizational skills such as a tidy place to work and good time management.

With regarded to Lemi kura Sub City the effect of physical activity on students' academic achievement are under the expectations. Therefore, the aim of this research to examine the effect of physical activity on students' academic achievement and attitude towards learning in Andode and Bori secondary schools in lemi kura sub-city administration, Addis Ababa.

1.2 STATEMENT OF THE PROBLEM

Regular physical activity has been associated to many health benefits. These benefits are particularly applicable in childhood and adolescence because these are stages of life in which healthy habits should be acquired to prevent diseases such as obesity, diabetes and hypertension. In addition, the increase of moderate or vigorous physical activity in childhood and adolescence has a positive effect on mental and physical health that enhances opportunities to improve academic performance. Thus, many institutional campaigns based on the promotion of physical activity have been instituted in the schools in an effort to improve health and academic results. Furthermore, with respect to the consequences of obesity and physical inactivity, there are many studies focused on the relationship between child-hood obesity and academic achievement, although the results are inconclusive and the relationship remains clear.

Most of the studies performed in the last years indicate that students with a more active lifestyle or those who exhibit better physical fitness obtain better academic results than those students with more sedentary lifestyles. Additionally, the relationship between physical activity or physical fitness and the different components of academic achievement has been studied. Some authors indicate that physical activity and physical fitness are significantly correlated with mathematical performance but not with other subjects, whereas most articles note that physical activity and physical fitness are also correlated with performance in other subjects, such as language ability or social sciences; nevertheless, math or numeracy scores seem to exhibit the highest correlation with physical activity.

A recent review, although supporting these results, reported a deficit in the number of articles of high methodological quality. Nevertheless, some studies have not reported significant differences in the academic performance of active children and those who are less active, concluding that more time expended in physical activity may not exert positive effects on cognition and academic achievement; however, negative effects have never been reported. Most studies examining the relationship among physical activity, physical fitness and academic achievement

exhibit a cross-sectional design, and in some cases, promotional campaigns have been performed. Nevertheless, only few reports of longitudinal studies exist that would allow researchers to observe the evolution of the relationship between physical activity and academic performance over time.

The aim of this study is to examine the relation-ship among the physical activity level, physical fitness and academic performance with self-organizing map (SOM) analysis throughout the secondary school stage. Thus far, this issue has been addressed using traditional lineal analyses; however, some evidence indicates that the relationship among these variables may be non-linear. SOM analysis issued to classify and display the lineal and non-lineal relationships among variables. Moreover, one of the most important points of this study is to classify the students to identify different behavioral patterns and to supervise behavioral evolution over time. There is insufficient information available in the literature to predict the evolution of student behavior throughout the secondary stage. Our working hypothesis has been that students with a higher level of physical activity and better physical fitness should cluster with better academic performance.

Adult research on the executive function hypothesis can be extended to predict the physical activity related improvements in children's cognitive function. The cross-sectional studies (Tomporowski, et al., 2008) reviewed by the researchers indicated that the children who were physically fit performed cognitive tasks more rapidly and displayed greater mobilization of brain resources than less fit children. For the experimental studies reviewed by Tomporowski, et al. (2008), academic achievement was the common outcome measure with the most evidence for chronic physical activity having positive effects on academic achievement.

Due to variation in methods with few randomized studies, the overall conclusion from these studies was that the children's academic progress was not hindered due to the time spent in physical education. Overall, the evidence so far indicates gains in children's mental functioning from the physical activity interventions on tasks that involve executive functions. There are many unanswered questions, for instance, if the cognitive benefits decline when the physical activity is terminated, and if there is a relationship to the type, duration, or intensity of the programs. (Tomporowski, Davis, Miller, & Naglieri, 2008). With the many physiological

benefits of physical activity to the positive effects on brain development and cognition, it is evident that physical activity enhances learning.

The reason for selecting this research topic by the researcher was that lack of awareness about the effect of physical activity on students' academic achievement by teachers and principals in government secondary schools of Lemi kura sub city education office in Addis Ababa. In addition, there are some factors that initiated the researcher to motivate to investigate on the effect of physical activity on students' academic achievement. First, the studies which have done by other researchers with another place or the existing research knowledge in theory initiated the researcher to examine the effect of physical activity on students' academic achievement in government Secondary School. Second, there is a great gap between the idea of physical activity and academic achievement. However, the teachers which might face them difficulties on the application of physical activity .So, this study was attempted to examine the effect of physical activity on students' academic achievement and attitude in Andode and Bori secondary schools in lemi kura sub-city administration, Addis Ababa.

1.3. OBJECTIVES OF THE STUDY

1.3.1. General Objective of the Study

The general objective of the study was to examine the effect of physical activity on students' academic achievement and attitude in Andode and Bori secondary schools in Lemi kura sub-city administration, Addis Ababa.

1.3.2. Specific Objectives of the Study

- Investigate the effect of physical activities on students' attitude towards doing it with larger frequencies.
- To examine the effect of physical activity on students' academic achievement and attitude.
- To investigate the relationship between students' attitude of physical activity and their academic achievement and attitude.
- Explore how students view the use of physical activities in relation to improving their academic achievement and attitude.

1.4. RESEARCH QUESTIONS.

The following research questions were designed to achieve the objectives of this study.

1. Is there a significant mean score difference on students attitude towards physical activities between experimental and comparison groups?

2. Is there a significant mean score difference on students' academic achievement between the experimental and comparison groups?

3. What are the relationship between students'' attitude towards physical activity and students' their achievement between experimental and comparison groups?

4. How students could viewed the use of physical activity to support their academic achievement?

1.5. SIGNIFICANCE OF THE STUDY

The study was to examine the effect of physical activity on students' academic achievement and attitude, in specific reference to government Secondary School has paramount significance, which is it may help improve the teaching learning process in schools. This study may help the following g r o u p s :

- ✓ The study may help teachers to improve their methods of teaching.
- ✓ It may help students to understand issues related to physical activity which impact on their academic achievement.
- ✓ It may support the various stakeholders such as educational experts, supervisors, principals, teachers and partners to be aware of negative trends and thereby take bold and swift actions to weed out unnecessary practices and trends.
- ✓ To serve as a spring board to those who are interested to undertake further in- depth investigation in the area.

1.6. **DELIMITATION OF THE STUDY**

The study was focus on examine the effect of physical activity on students' academic achievement and attitude, in Lemi kura sub city Administration Addis Ababa. Addis Ababa city administration has eleventh sub cities and the researcher focuses on Lemi kura Sub City, which is one of the eleventh sub cities of the city administration. It situated in the North Part of Addis Ababa, bounded from south by Yeka, from West by Bole and from North and East by Oromiya region. At present, the sub city has 13 woredas and 6 (six) government secondary schools.

Nevertheless, conditions did not permit the writer to study all problems in all schools. Therefore, this research was delimit two government secondary schools of Lemi kura Sub-city, Addis Ababa.

1.7. LIMITATION OF THE STUDY

It is clear that research work can be not completely free from limitation. To this end, some limitations are the following

- Financial limitations
- Shortage of time
- faced lack of recent and relevant literature on the topic, especially that focused on government secondary schools of Ethiopian condition
- Lack of local reference materials, and other resources including related resvearches in our context were also other additional limitations of the study.

1.8. DEFINITION OF KEY TERMS.

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, morals, beliefs, and personal development.

Physical Education According to Webster's Dictionary, "Physical education is a part of education which gives instructions in the development and care of the body rending from simple callisthenic exercises to a course of study providing training in hygiene, gymnastics, and the performance and management of athletics and games.

Attitude is a great desire to the accomplishment something achieved with great effort or skill.

Academic achievement is the score achieved by students from the given standardized tests and questionnaires.

Physical Activity: Any bodily movement produced by the contraction of a skeletal

muscle that increases energy expenditure to above a resting level (CDC, 2010).

Sport pertains to any form of competitive physical activity or game that aims to use, maintain or improve physical ability and skills while providing enjoyment to participants and, in some cases, entertainment to spectators. Sports can, through casual or organized participation, improve one's

physical health. Hundreds of sports exist, from those between single contestants, through to those with hundreds of simultaneous participants, either in teams or competing as individuals.

1.9. ORGANIZATION OF THE STUDY

The study consists of five consecutive chapters. The first chapter included background of the study, statement of the problem, objectives, significance of the study, delimitation of the study, limitation of the study, definitions of key terms and Organization of the study. Chapter two deals with review of related literature. The third chapter is concern about research methodology. Chapter four is about analysis of data and the last chapter deals with summary, conclusion and recommendation of the study. Finally, lists of reference materials used in the study, questionnaires and interview guides were attaché to the research document.

CHAPTER TWO

REVIEW OF LITERATURE

The following information provides a brief review of literature related to the current studies of academic performance, physical activity, and student behavior. More specifically, this review investigates all aspects of academic performance including academic achievement, cognitive skills and attitudes, and academic behavior and how it relates to physical activity as well as the variables that impact student behavior.

2.1. Concepts in Physical education

Physical Education aims to provide children and young people with learning experiences that enable them to develop: the knowledge, motivation and competence to live a physically active life; physically, morally, intellectually and socially within an educational context where pupils are valued and cared for. Physical Education in primary and secondary schools: forms part of the core curriculum and is also offered as national qualifications; offers a range of physical activities within, and beyond, the curriculum to engage children and young people in purposeful, worthwhile, enjoyable and enriching learning experiences; Addresses a broad range of educational objectives through well planned and developmentally appropriate physical education programmers. Research supports the importance of movement in educating both mind and body. Physical education contributes directly to development of learner's physical competence, fitness, confidence and skills in arrange of activities, such as dance, games, gymnastics, swimming and athletics, outdoor and adventurous activities (Bucher,2008).

In working as individuals, in pairs, groups and in teams during physical education lessons, learners can learn the value of healthy and active life styles by discovering what they like to do and what their aptitudes are at school. In the early school years, active play may be positively related to motor abilities and cognitive development. As children grow older and enter adolescence, physical activity may enhance the development of a positive self-concept as well as ability to pursue intellectual, social and emotional challenges. Throughout the school years, quality physical education can promote social, cooperative and problem-solving competences. Quality physical education programs are essential in developing motor skill, physical fitness and understanding of concepts that foster lifelong healthy lifestyles (Sherrill, 2004).

2.2 Physical education in the school system

A number of crucial components to the delivery of quality education have been identified by NASPE. These include sport and opportunities for play, consistent with the rights of the child to optimum development. Despite recognition of the positive impact sport has on education and child development, physical education is being increasingly challenged within education systems across the world. According to Naul, R. (2002) Challenges include a decrease in: The amount of time allocated to physical education, the number of trained staffs, the amount of training provided for physical education teachers, and spending on resources required delivering physical education in schools. Girls and young people with disabilities face additional barriers, which limit (and in many cases prevent) participation in physical education and sport in many countries.

While physical education systems are vastly different across the world, a recent study conducted in 126 countries indicated that the marginalization of physical education is near universal. A large number of researchers are focusing on comparative studies in physical education and there have been examples of good practice, however, the situation in developing countries and regions has changed little in the past decade. This has serious implications for access to holistic and quality education for young people, particularly those living in developing countries.

2.3 Positive aspects of physical education

Scientific evidence has shown that participation in regular physical activities provides people with all ages, with significant physical, social, and mental health benefits and well-being throughout their lifespan (Biddle, Fox, & Boutcher, 2000). Studies have shown that people who are physically active can live longer than those who are sedentary.

Besides, those who participate in regular physical activity may have advantage in the ability to perform activities of daily living and enjoy aspects of life (Schenker, Coster, &Parush, 2005). The importance of participating in physical activity in reducing morbidity and mortality from chronic disease and conditions has been well documented (Yore, Ham, Ainsworth, Kruger, Reis, Kohl, & Macera, 2007).

According to Auxteret. Al (2005), physical activity is a predictor of subsequent disability in midlife and older populations. Childhood and adolescence are ideal periods for cultivating regular physical activity to reap health benefits across the lifespan (Eriksson, Welander, & Granlund, 2007). Research shows that participation in physical activity can improve

cardiovascular fitness, prevent or delay the development of high blood pressure and reduce symptoms of chronic depressions (Dielh, Brewer, Van Raatle, Shaw, Fiero & Sorenson 2001). Moreover, participation in physical activity increases exercise capacity and plays a big role in both primary and secondary prevention of cardiovascular disorders (Schenker et al., 2006).

A study by Barrows & Tamblyn(1980),reported that physical activity reduces the risk of cardiovascular diseases as well as some cancers and diabetes. Researchers have also stated that physical activity lowers risk of developing colon cancer (Hu et al., 2004).

2.4 Physical Activity and Related Concepts

Physical activity and exercise are often used interchangeably, but these terms aren't similar. Physical activity is characterized as any real development created by the compression of skeletal muscles that bring about a considerable increment over resting vitality consumption. Physical activity, exercise and related terms have been defined somewhat inconsistency over the last decade. It is therefore important to differentiate between a number of related terms which have different meaning. PA can be classified in various ways, including type, intensity, and purpose.

With regard to classification by "purpose," physical activity is frequently categorized by the context in which it is performed. Commonly used physical activity classifications include occupational, leisure time or recreational, household, self-care, and transportation physical activities. Health enhancing physical activity (HEPA) is a term used particularly among the health promotion community, and is defined as "any form of PA that benefits health and functional capacity without tiredness". Another term encountered in the literature is leisure-time physical activity which has performed at the interest of the person. performed at the interest of the person.

The term lifestyle activities describe the activities that a person perform in the course of daily life that can contribute to expend energy, e.g., taking the stairs instead of using the elevator, walking instead of driving, parking further away than usual to walk to a destination. The terms exercise and physical activity are often used interchangeably.

However, exercise could even be a subcategory of physical activity and has been defined as "planned, structured, and repetitive and purposive within the sense that the event or maintenance of 1 or more components of fitness is that the objective", and in some studies sport's participation is assessed and analyzed separately from other leisure time activities.

2.4.1 Physical Activity Recommendations

Daily physical activity could be the simple solution to the growing issue of overweight and obese Americans as it improves one's overall well-being. Daily guidelines for children and adolescents were released in a document from the CDC in detail (ODPHP, 2014).

According to the 2008 guidelines, children are to receive at least 60 minutes of daily physical activity (U.S. Department for Health and Human Services, 2008). Specifically, it was determined that most of the 60 minutes should include at least a moderate-intensity level of activity and at least three days of vigorous-intensity level of activity, including muscle and bone strengthening activities (Sallis, Prochaska & Taylor, 2000; U.S. Department for Health and Human Services, 2008).

While the importance of physical activity is recognized, the reality is these recommendations are not being met by the majority of youth in America and around the globe (Fedewa et al., 2015; Ling et al., 2014; Stone et al., 1998; Trost, 2009; Watson, Timperio, Brown, Best & Hesketh, 2017; Wright et al., 2016). Further, the physical activity levels of children in Kentucky reflect the national average, but once those children reach adolescence, they are significantly 10 physical education, adopting guidelines for physical education times in each grade level, implementing timed recess, improving quality of physical education, supporting bicycle and pedestrian transportation initiatives, and supporting physical activity and health unit in state public health departments (CDC, 2010).

Clearly, there are many areas for improvement to help children and adolescents achieve their daily physical activity goal. This is the case in other parts of the world such as Canada and Australia as well as the U.S., reflecting similar recommendations with an addition of limiting non-active time by reducing time with technology (Janssen & LeBlanc, 2010; Sacchetti et al., 2013). This further supports the need for adults, parents, and teachers to reduce students' screen time in favor of genuine activity. The daily recommendation cannot be achieved, especially in children and adolescents, by simply changing one factor or another.

Many things need to be done to help pave the way for children to increase their activity levels. American children have access to a compulsory education system and are required to attend elementary school so this seems like the best place to start (Wilson, Olds, Lushington, Petkov & Dollman, 2015). Children who live a healthier, active lifestyle are less likely to be unhealthy as adults (Stone et al., 1998; U.S. Department for Health and Human Services, 2008). Schools are

an ideal location to begin to provide more opportunities for physical activity and encourage overall healthy behaviors (Ardoy et al., 2014; Bunketorp et al., 2015; Fedewa et al., 2015; Kibbe, Hackett, Hurley, McFarland, Schubert, Schultz & Harris, 2011; Mahar, Murphy, Rowe, Golden, Shields & Raedeke, 2006; Martin & Murtagh, 2015; Rasberry, Lee, Robin, Laris, Russell, Coyle & Nihiser, 2011; Resaland, Moe, Aadland, Steene-Johannessen, Glosvik, Andersen, Kvalheim, McKay & Anderssen, 2015; Sallis, McKenzie, Alcaraz, Kolody, Faucette & Hovell, 1997; Wright et al., 2016). While there are many variables that can be impacted on the school level, starting anywhere could go a long way and make a tremendous difference in students' health both now and for many years to come.

2.4.2. Physical Activity as an Intervention

Studies have shown that physical activity levels decline consistently through childhood, adolescence and into adulthood (Bartholomew & Jowers, 2011; Bunketorp et al., 2015; Carlson et al., 2008; Fedewa & Ahn, 2011; Lee, Burgeson, Fulton & Spain, 2007; Sibley & Etnier, 2003; Stone et al., 1998).

For the first time in United States history, younger generations might live a less healthy lifestyle than their parents (Hillman et al., 2008; Lees & Hopkins, 2013) and have a shorter lifespan (Olshansky, Passaro, Hershow, Layden, Carnes, Brody & Ludwig, 2005). While it is common knowledge and has already been validated through research that physical activity benefits children in a number of ways.

A 2002 study revealed that more than 60% of elementary-aged children did not participate in any type of organized physical activity outside the school day (Ling et al., 2014). In 2011, it was found that a mere 28.7% of adolescents participated in 60 minutes of physical activity each day (Ling et al., 2014). This means that most students will not meet the daily recommendation for physical activity unless it is accomplished during the school day. Some of these numbers could be attributed to a student's lack of ability or access to activity resources, especially in rural communities (Ling et al., 2014; Trost, Pate, Saunders, Ward, Dowda & Felton, 1997).

Creating opportunities for students to meet the national guideline within the school day could be the best option for reducing childhood obesity (Donnelly & Lambourne, 2011; Strong, Malina, Blimkie, Daniels, Dishman, Gutin, Hergenroeder, Must, Nixon, Pivarnik, Rowland, Trost, & Trudeau, 2005). However, it is obvious that the regulations and guidelines currently in place at schools across the nation are simply not getting the job done because another recent population

survey indicated that guidelines are not being met among the adolescent population (Castelli et al., 2011; Ma et al., 2014; Mahar et al., 2006; Sallis et al., 2000).

More physical activity interventions are needed if children and adolescents have any sort of hope in achieving the guidelines set forth by the CDC. In public schools, physical activity opportunities have steadily declined since the 1970s, promoting a sedentary lifestyle among students (Donnelly & Lambourne, 2011; Sacchetti et al., 2013).

One study noted that this decline has continued because time given for physical activity during the school day is less than it was even in the early 2000s as a result of increased focus on students' standardized test results in the spring (Fedewa & Ahn, 2011). These findings are sobering considering the need for more time dedicated to physical activity rather than less. Public school systems are going in the wrong direction in this area despite the knowledge that physical activity is valuable and necessary in the school setting. One must begin to ask why this trend began, and further, why it is continuing down this path of reduction.

Many believe that this reduction in time dedicated to physical activity during the school day is due to growing pressures from government entities for increased instruction time (Fedewa & Ahn, 2011; Ma et al., 2014). Increased stress to improve standardized test scores has school districts across the nation making the decision to eliminate or reduce the amount of time spent in enrichment programs, such as physical education, in favor of more instruction time in tested areas, regardless of the known benefits of physical activity on students' overall health and wellbeing (Bunketorp et al., 2015; Fedewa & Ahn, 2011; Martin & Murtagh, 2015; Taras, 2005).

The increased emphasis on improving academic achievement through standardized test scores has caused administrators to review their processes and create new ways to improve their schools' performance on the end-of-year exams. Logically, administrators assume that test scores will increase in tested subject areas if the time dedicated to those subjects are increased (Wilkins, Graham, Parker, Westfall, Fraser & Tembo, 2003).

Therefore, time spent in non-tested subject areas must be reduced or eliminated to create more time in the school day for tested subject areas, such as English and Math (Ardoy et al., 2014; Marttinen, McLoughlin, Fredrick & Novak, 2017; Rasberry, Lee, Robin, Laris, Russell, Coyle & Nihiser, 2011; Seymour & Garrison, 2015). However, simply increasing students' time spent in tested subject areas does not ensure improvement on standardized test scores(Ahamed et al., 2006; Trost, 2009; Wilkins et al., 2003).The recent shift toward a decrease in physical education

time in favor of increasing time spent in the classroom is counterproductive, considering the benefits of increased physical activity on one's physical and mental health (Bunketorp et al., 2015; Ma et al., 2014; Mahar, 2011; Singh, Uijtdewilligen, Twisk, Mechelen & Chinapaw, 2012; Taras, 2005).

Unfortunately, administrators know increased physical activity levels can be linked to improved academic performance yet choose to eliminate or reduce physical education requirements for their students (Donnelly, Hillman, Castelli, Etnier, Lee, Tomporowski, & Szabo-Reed, 2016). If it has been previously established that most students are not meeting the daily physical activity recommendation outside of school, one can assume if school-based opportunities are not available, students will not achieve a healthy fitness level. Eliminating a student's opportunity to engage in physical activity on a regular basis may have negative repercussions for years to come. The potential solution for improving students' overall academic performance is to increase the amount of time spent in daily physical activity (Trudeau & Shephard, 2008). This can be done in an elementary setting by combining recess, structured activity time, and activity breaks within the classroom (Carlson et al., 2015; Kibbe et al., 2011; Mahar, 2011; Naylor, Nettleford, Race, Hoy, Ashe, Higgins & McKay, 2015; Strong et al., 2005; Wright et al., 2016).

Most elementary schools already have a rotation of some sort for structured activity time in physical education and a short recess time, assuming nothing prevents the students from participating. However, a recent study concluded that no more than 16% of school districts require regular physical activity breaks outside of recess and physical education (Kibbe et al., 2011). Recess and physical education are wonderful tools for aiding students in reaching the recommended goal and in teaching lifelong cooperative learning skills, but additional opportunities are needed within the school day to support these programs that are already in place (Singh et al., 2012). Further intervention is needed to supplement physical education and allow for more ways to apply physical activity knowledge and skills (Lee et al., 2007). Sending students to physical education once a week is not a stand-alone solution. Increased time and variety of methods of intervention are necessary to achieve the daily physical activity recommendations.

2.4.3 Physical Activity and Cognition

Various studies have been conducted with the aim of investigating the effects of physical activity on children's cognitive function. Twelve out of the most recent 15 studies conducted in this area found significant effects on motor skills and cognitive development while none of the reported negative effects (Gao, Chen, Sun, Wen, & Xiang, 2018; Zeng, Ayyub, Sun, Wen, Xiang & Gao, 2017). The authors concluded that there was a positive association between physical activity and certain cognitive skills such as working memory, attention, academic achievement, and language learning (Gao et al., 2018; Haapala, 2012; Hillman et al., 2008; Roig, Skriver, Lundbye-Jensen, Kiens & Nielsen, 2012).

While a positive relationship has been established, more research is necessary to further investigate this connection and provide evidence as to why this relationship exists. Physical activity causes a change in the human brain when one begins moving actively through an increase in oxygen, blood flow, hormones, and oxygen levels (McPherson, Mackay, Kunkel, & Duncan, 2018; Roig et al., 2012).

Progress has been made in connecting physical activity to brain structure and development, and research shows that an increase in physical activity can cause an increase in brain-derived neurotrophic factor (BDNF) which facilitates learning (Roig et al., 2012; Zeng et al., 2017). BDNF facilitates learning by improving synaptic plasticity and increasing brain circulation (Singh & Staines, 2015; Zeng et al., 2017). When a person is sedentary, much needed increases in blood flow and oxygen to the brain and the rest of the body does not occur. The body must be in motion, causing the heart rate to increase, in order to pump more blood to the brain.

A single bout of exercise can increase cortical excitability which improves performance on specific tasks with executive functioning (Haapala, 2012; Singh & Staines, 2015). Additionally, one study found acute aerobic exercise has a positive effect on the primary motor cortex (Singh & Staines, 2015). Other studies confirmed these findings, but also provided evidence that exercise promotes an increase in brain activation and brain volume in the hippocampus, frontal, and parietal cortices (Haapala, 2012; Hillman et al., 2008; Roig et al., 2012).

Movement is particularly important in children as their brain and cognitive function is still developing (McPherson et al., 2018; Zeng et al., 2017). Higher levels of physical activity in school-aged children have been previously associated with physical and cognitive health across the entire lifespan (Zenget al., 2017). However, recent trends show a decline in physical health

among children (Hillman et al., 2008). The importance of a child moving throughout the school day is far beyond that of student achievement on standardized tests.

Providing opportunities for students to move throughout the day while they are still in crucial cognitive and physical development stages can make an impact on their health for the rest of their life. Students moving throughout the day is beneficial, but structured activity with a physical education specialist is also valuable to ensure correct motor skill development. Some believe a positive relationship between motor skills and cognition exists because they have several consistent underlying processes such as planning and sequencing involved (Zeng et al., 2017).

General movement is important, but the most effective physical activity interventions should include instruction for motor skills to ensure the students are developing these skills while also receiving positive health benefits during movement. Children today are showing limited motor skill abilities and need guidance in this area (Zeng et al., 2017). Schools are failing their students if they do not promote opportunities to develop these abilities correctly because they have the means and opportunity to provide physical education services to all children.

2.4.4 Physical Activity and Academic Performance

There are many known health-related benefits to daily physical activity, but studies are also showing that there is a positive association between physical activity and academic achievement in children and adolescents (Ardoy et al., 2014; Hillman et al., 2008; Lees & Hopkins, 2013; Rasberry et al., 2011; Sibley & Etnier, 2003).

While a positive association is a step in the right direction, this is a rather vague statement about the association that exists between the two variables because causation has yet to be established due to study limitations, effect size, or measurement error (Bunketorp et al., 2015; Resaland et al., 2015; Sallis et al., 2000; Sibley & Etnier, 2003).

Therefore, further investigation is needed in this area to provide validity for the importance of physical activity and its connection to academic performance (Castelli, Hillman, Buck & Erwin, 2007; Taras, 2005). To really understand the association, one must first define both physical activity and academic achievement. Moving forward, physical activity will be recognized as any type of bodily movement that increases energy expenditure beyond what is required at rest (CDC, 2010; Lees & Hopkins, 2013; Rasberry et al., 2011; Trudeau & Shephard, 2010).

Although sometimes used interchangeably with academic performance, academic achievement is strictly based on results from formal and standardized assessments, including grade point average (GPA) (CDC, 2010; Rasberry et al., 2011). It seems that many studies have only looked at a portion of the overall picture of the relationship between physical activity and academics because academic achievement is only a piece of the puzzle that is academic performance.

Academic performance is a general term referring to a student's overall performance in school and includes three separate components: academic achievement (defined earlier), academic behavior, and cognitive skills (CDC, 2010).

Academic achievement is of course a critical factor, but one must not overlook two other key areas: academic behavior and cognitive skills and attitudes. Academic behaviors include on-task behaviors, being punctual, and organized, all of which are critical to student success (CDC, 2010; Rasberry et al., 2011). Cognitive skills and attitudes include traits such as attention, memory, and motivation (CDC, 2010; Rasberry et al., 2011). The picture of the existing association is incomplete without looking at all three components of academic performance in greater detail.

2.4.5 Attitude towards learning

Many studies have been conducted over the last couple decades striving to get a better representation of the relationship that exists between increased physical activity and academic achievement (Ardoy et al., 2014; Bunketorp et al., 2015; Castelli et al., 2011; Haapala, 2012; Tomporowski, Davis, Miller & Naglieri, 2008; Trudeau & Shephard, 2008). While school performance has always been a priority for many, the last few decades have pushed for a greater emphasis on academic achievement as it pertains to high-stakes standardized tests (Wilkins et al., 2003).

Perhaps this push has caused many to equate academic achievement on tests to academic success. There is no doubt that standardized assessment scores signify where an entire school or grade might fall in relation to others, but it is not the only indicator of academic success. In fact, academic achievement and standardized tests have so many other variables that are involved in the equation, it has been difficult to find a strong correlation between physical activity and academic achievement. A few studies demonstrated that increasing physical activity has no negative implications on academic performance (Ahamed et al., 2006; Carlson et al., 2008;

Donnelly & Lambourne, 2011; Hillman et al., 2008; Sallis, McKenzie, Kolody, Lewis, Marshall & Rosengard, 1999; Sibley & Etnier, 2003; Trost, 2009; Trudeau & Shephard, 2010; Watson et al., 2017; Wilkins et al., 2003).

If there are no negative implications, even when reducing classroom time to increase time dedicated to physical activity, one must wonder why the notion to reduce physical activity and increase classroom time continues. Many administrators and educators consider physical education to be a "lower status" subject and opt to dedicate more time to important "academic" subjects such as science and mathematics (Fedewa & Ahn, 2011; Sallis et al., 1999; Sibley & Etnier, 2003). Rather, the subject areas that are assessed at the end of the academic school year.Several studies have established a positive relationship exists between increased physical activity and academic achievement (Ardoy et al., 2014; Hillman et al., 2008; Lees & Hopkins, 2013; Rasberry et al., 2011; Sibley & Etnier, 2003; Trost, 2009; Trudeau & Shephard, 2008).

Therefore, increasing students' activity time will support the efforts of educators to increase performance on standardized assessments over time. Reducing activity time in favor of more class time promotes more sedentary behaviors which has been found to be associated with increased obesity levels and a decrease in academic performance (Haapala, 2012). School systems that are consciously choosing to compromise activity time are working against their own goals. Evidence is mounting that supports students with high levels of physical fitness are associated with higher levels of academic performance (Trost, 2009). This evidence further supports the notion that increasing activity time will aid in improving one's overall physical fitness and thereby improving academic achievement.

2.4.6 Physical Activity and Academic Behavior

Behavior is a complex topic that helps represent an individual's unique personality. Academic behaviors are specific traits that may have an impact on academic performance (CDC, 2010; Ma et al., 2014). These behaviors, or indicators, have been tracked by several different academic studies across all school-aged children. It was found that the following indicators may have a direct impact on academic performance: on-task behavior, organization, planning, attendance, scheduling, and impulse control (CDC, 2010). These are valuable qualities for any individual in school or even in a workplace environment.

If a student is on-task often, they will likely have more success both in the classroom and on state assessments than their peers who spend more time off-task than on-task (Davis & Cooper, 2011; Goh, Hannon, Webster, Podlog & Newton, 2016; Mahar et al., 2006; Trudeau & Shephard, 2010). The same predictive statements could be made for the other indicators as well; take organization for an additional example. A student who attends class with their folders and assignments organized by assignments' due dates will likely have their assignments submitted on time. However, a student who has a few papers crumbled into a backpack in a disheveled fashion might not remember or even realize when their assignments are due.

While all these indicators are important to describe academic behavior, on-task behavior and attention are the most objective to consistently observe (Wilson et al., 2015). Therefore, most of the available research on academic behavior specifically examines on-task behaviors (Ma et al., 2015; Mahar et al., 2006). There are likely many definitions or descriptions from educators on what on-task behaviors look like in their classrooms. However, one study went so far as to define both on-task and off-task behaviors so there would be more objectivity to their study. In this investigation, on-task behaviors were defined as "verbal and motor behaviors that followed class rules and were appropriate to the learning environment or activity" (Mahar et al., 2006). Examples of on-task behaviors would be working on assignments at their desk, involved in group discussion, answering teacher prompts, and overall engagement in the classroom environment (Mahar et al., 2006).

In general, on-task behaviors are any type of behavior that represents attentiveness to the teacher, learning environment, and their peers. Off-task behaviors were broken down into several different categories. Motor off-task behaviors are any type of gross response that disrupts the learning environment such as, leaving one's seat without permission or even aggressive behaviors such as slapping, throwing, or taking someone's property (Mahar et al., 2006). Noise off-task behaviors included both object and voice noise that interrupts the learning situation such as, yelling, laughing, rapping a desk, or slamming books (Mahar et al., 2006).

The final category is passive, or other off-task behaviors, when the students are not involved when they are expected to be such as daydreaming or playing with their hair (Mahar et al., 2006). Students that display these types of behaviors make it more difficult to learn because of the environment they create for themselves (Wilson et al., 2015). These behaviors would be disruptive or at the very least, unacceptable, in any learning environment. Most educators would

likely agree that students that spend more time on-task are easier to teach and more likely to learn (Trudeau & Shephard, 2010).

Further, they would likely agree that off-task behaviors displayed by students are frustrating and difficult to overcome both from a teaching and learning standpoint (Sullivan, Johnson, Owens & Conway, 2014). If students that display on-task behaviors more consistently are more successful academically, one can assume that efforts to increase on-task behaviors would be appreciated. Studies have shown that increases in physical activity have a positive association with on-task classroom behaviors (; Barros et al., 2009; Carlson et al., 2015; Goh et al., 2016; Ma et al., 2014; Mahar et al., 2006; Trudeau & Shephard, 2010; Wilson et al., 2015).

In contrast, students that spend long periods of time in classrooms for academic instruction are more fidgety and struggle to concentrate (Goh et al., 2016; Ma et al., 2014; Mahar et al., 2006; Trudeau & Shephard, 2010). Therefore, a student that is more active during the school day is more likely to be on-task and thereby have a higher probability for academic success.

2.4.7 Cognitive Skills and Attitudes

Several traits separate a successful student from an unsuccessful one. Too often, a student's success has been decided or understood by simply reviewing GPAs and test scores because they are considered "formal" assessment tools (CDC, 2010; Rasberry et al., 2011). However, the qualities that truly set one student apart from another are unique to them and can be categorized as cognitive skills and attitudes.

Cognition is a broad term that represents several mental processes including executive function, control processing, visuospatial processing, and speed processing (Rasberry et al., 2011; Tomporowski et al., 2008; Watson et al., 2017). Executive function includes skills such as memory and planning and the other three processing systems include reaction time, perceptual learning, and automatization of response (Rasberry et al., 2011; Tomporowski et al., 2008). Most would agree that a student that lacks any number of these qualities would be at a disadvantage in school-based learning activities.

Recent studies in cognition and mental processing have found that healthier children, as well as those receiving acute bouts of exercise as an intervention, perform better on cognitive assessments than their peers, supporting the findings from adult assessments (Castelli et al., 2007; Castelli et al., 2011; Davis & Cooper, 2011; Donnelly & Lambourne, 2011; Fedewa & Ahn, 2011; Fedewa et al., 2015; Lees & Hopkins, 2013; Tomporowski et al., 2008;). This finding

means that students, who are more sedentary, will tend to perform slower and not as well on cognitive assessments (Davis & Cooper, 2011).

Since cognitive skills and abilities are integral to academic performance, one can assume that students that are more sedentary will tend to have a poorer performance on standardized assessments. However, more information is needed on this topic because there is clearly a connection between exercise and cognition, but much is still unknown (; Fedewa & Ahn, 2011; Rasbery et al., 2011; Sibley, Etnier & Masurier, 2006; Tomporowski et al., 2008; Wilson et al., 2015).

Further investigation is needed to determine a proper time and type of exercise needed to experience a positive outcome for cognitive skills (Castelli et al., 2011; Fedewa et al., 2015; Hillman et al., 2008; Rasberry et al., 2011; Watson et al., 2017). The connection has been found, but the specifics of the dose-response relationship as it relates to exercise and cognition is still unknown. Several investigations have provided evidence that children experience an improvement in executive function when involved in an exercise program (Ardoy et al., 2014; Davis, Tomporowski, McDowell, Austin, Miller, Yanasak, Allison & Naglieri, 2011; Ma et al., 2014; Sibley & Etnier, 2003).

One study sought to investigate this relationship more specifically by examining the effects of intensity of physical activity on executive functions. Their results suggest that simply adding time spent in physical activity is not enough to make a difference on a student's executive function; the intensity must be increased as well (Ardoy et al., 2014; Davis et al., 2011; Ma et al., 2015). This theory might be further supported through a meta-analysis that indicated short bouts of classroom activity did not have a clear effect on cognitive functioning (Davis et al., 2011; Watson et al., 2017).

However, other studies found that increasing activity was enough to improve executive function, but not overall academic achievement (Castelli et al., 2011; Haapala, 2012; Hill, Williams, Aucott, Thomson & Mon-Williams, 2011). While classroom-based activity is a great way to help students achieve the daily recommendation for physical activity, more intense bouts are necessary to have a positive and significant impact on cognitive skills and abilities.

2.4.8 Variables Impacting Student Attitude

Academic behavior is a strong component of the total picture of academic performance. Often, student and academic behavior are used interchangeably. However, there are several variables

acting with student attitude that create the outcome of one's overall academic behavior. A student's demographics, family background, peer influence, and fitness are only the tip of the iceberg of factors that play a role in how a student carries themselves during the school day, or student disposition.

One study identified a "learning ecosystem" claiming that productive learning and teaching is synonymous with productive behaviors (Sullivan et al., 2014). Productive behaviors are integral to student learning and overall academic performance.

A student's demographics are most certainly out of their control; nevertheless, they play a role in behavior and academic success. For example, "male dominant" behaviors are more common in school-aged boys while avoidance and withdrawal behaviors are more common in girls (McDermott & Schaefer, 1996). Preadolescent children are also more prone to Attention-Deficit/Hyperactivity Disorder (ADHD) than adolescent children who are more prone to Avoidant Syndrome where students display aloof behaviors (McDermott & Schaefer, 1996). This finding affirms that age is a factor in the method and type of misbehaviors displayed by school-aged children.

Delinquent and avoidant-type behaviors are also more common in less educated parents (McDermott & Schaefer, 1996). This suggests that socioeconomic status or social class through level of education completed is an additional reason for poor behavior, including anger outbursts associated with externalizing problems (Pitzer et al., 2009). A student's ethnicity might also influence behavior, but there is not a great deal of research that investigates this aspect of a student's demographic (McDermott & Schaefer, 1996).

Some studies note that both low socioeconomic status and ethnic minorities are unreasonably inactive by age (Bartholomew & Jowers, 2011; Davis et al., 2011). Many uncontrollable variables do play a role in student behavior that educators and investigators alike need to keep in mind moving forward. Another large factor in student behavior is the development of one's personality. Studies have demonstrated that there are several variables that impact personality development including the mother-child relationship, temperament, and stress (Bates, Maslin & Frankel, 1985).

Within the constructs of the mother-child relationship, warmness, involvement, control, and educative behaviors the mother displays to her children early in their life could impact their behavior in the future (Bates et al., 1985; Caspi, Henry, McGee, Moffitt & Silva, 1995). A

child's temperament is mostly biological and unique to them including traits such as sociability or extraversion but is also impacted by their activity levels (Bates et al., 1985; Pekdogan & Kanak, 2016). The stress that a child experiences is typically attributed to their family environment, including divorce or marital discord (Bates et al., 1985).

A child's personality could be one of the single most valid predictors for behavior that is somewhat uncontrollable. Impulse control is an additional factor that impacts student behavior through internalizing and externalizing problems (Eisenberg, Sadovsky, Spinrad, Fabes, Losoya, Valiente, Reiser, Cumberland & Shepard, 2005). When a student externalizes their problems, one might act out through anger or hostility, but when problems are internalized depression and anxiety might be observed (Eisenberg et al., 2005; Pitzer, Esser, Schmidt & Laucht, 2009).

Children that internalize their problems are likely to experience social issues because they tend to be more withdrawn, creating more anxiety for the child (Eisenberg et al., 2005). However, children that externalize their problems through anger, also identified as the difficult child concept, are more likely to have issues with academic work and struggle with friendships that can result in physical outbursts such as hitting (Eisenberg et al., 2005; Pitzer et al., 2009).

If teachers are unable to discover the root of the child's off-task or negative behaviors, their reaction might have an even greater negative impact on the child, resulting in more negative behaviors in school. Each student's situation is unique and often it is unknown what they experience outside the walls of the school building. An increasing number of children are growing up in single-parent families due to divorce and unwed mothers, especially in economically disadvantaged families (Ackerman, D'Eramo, Umylny, Schultz & Izard, 2001).

Typically, students from single-parent households experience a variety of problem behaviors and difficulty in school (Ackerman et al., 2001). There is conjecture on why this association exists, but many researchers claim that the added stress of a single income, economic job demands, and the lack of an adult male role model plays a major role in their child's behavior issues (Ackerman et al., 2001). Interestingly, the lack of an adult male role model is more likely to have a negative impact on boys than girls (Ackerman et al., 2001). This seems like a logical conclusion to be found because with the absence of an adult male, the boy has no one to admire or aspire to be as they mature. Additionally, poor parenting practices or overall family dysfunction have a different effect on girls than boys (Pitzer et al., 2009).

The same issues are found in families that cohabitate because it brings a level of uncertainty to the children in the home, another trait that is more prevalent in economically disadvantaged families (Ackerman et al., 2001). The untraditional structure of a child's home plays a major role in problematic behavior patterns. There are several factors influencing student behavior that are both within and outside a student's control.

2.5 Benefits of Physical Activity

Many government agencies and national organizations have documented the benefits of physical activity for children. The Center for Disease Control and Prevention (CDC) reported participation in regular physical activity in childhood provided a number of benefits including helping to improve bone and muscle structure, weight control, reducing anxiety and stress, and improving self-esteem (CDC, 2010).According to Let's Move, physical activity during childhood coupled with healthy habits and lifestyle choices reduces the risk of the top three causes of chronic disease death in adults which are heart disease, cancer, and stroke (CDC, 2010).

The U.S. Department of Health and Human Services has outlined specific guidelines for recommended levels of physical activity in order to achieve the greatest benefits:

- ✓ Children should accumulate at least 60 minutes of moderate to vigorous physical activity every day.
- ✓ Children should participate in several bouts of physical activity lasting about 15 minutes or more each day.
- ✓ Children should participate in a variety of physical activities designed to help them achieve optimal health, wellness, fitness, and performance benefits.
- ✓ Extended periods (2 hours or more) of inactivity are discouraged for children, especially during daytime hours (U.S. Department of Health and Human Services, 2008)

Besides the physical benefits of increased activity, research has shown physical activity has the potential to improve academic achievement (American Institutes for Research, 2008; Basch, 2011; Kimbro, Bzostek, Goldman, & Rodriguez, 2008; Mahar, Murphy, Rowe, Golden, Shields, & Raedeke, 2006). Mahar, et al, (2006), found regular participation in physical activity was shown to increase on-task behavior in children and through regular physical activity and teachers reported less fidgeting and more focus (Mahar, et al., 2006).

2.6 Theoretical and conceptual frame work of the study

Many scholars and researchers underlined the use of social constructivism as a foundation for guiding effective teaching and learning processes both out and in the classroom context.

Social constructivists regard individual subjects and the social society as interconnected. Social Constructivists revealed that students come up with a prior knowledge what they know mainly through active involvement in the social practices of the local communities (Stage, Muller, Kinzie, & Simmons, 1998). Learning is considered as a social product yielded by the processes of conversation, discussion and negotiation (Confrey, 1995).

The main objective of this study was focused on investigating the effect of physical activities on high school students academic achievement, social constructivist learning theory guided the implementation of the designed physical activities during the intervention periods. Students' academic achievement is the only dependent variable and the designed physical activities were the independent variables of this study. Thus, the relationship between the two variables were indicated in figure 1 below.

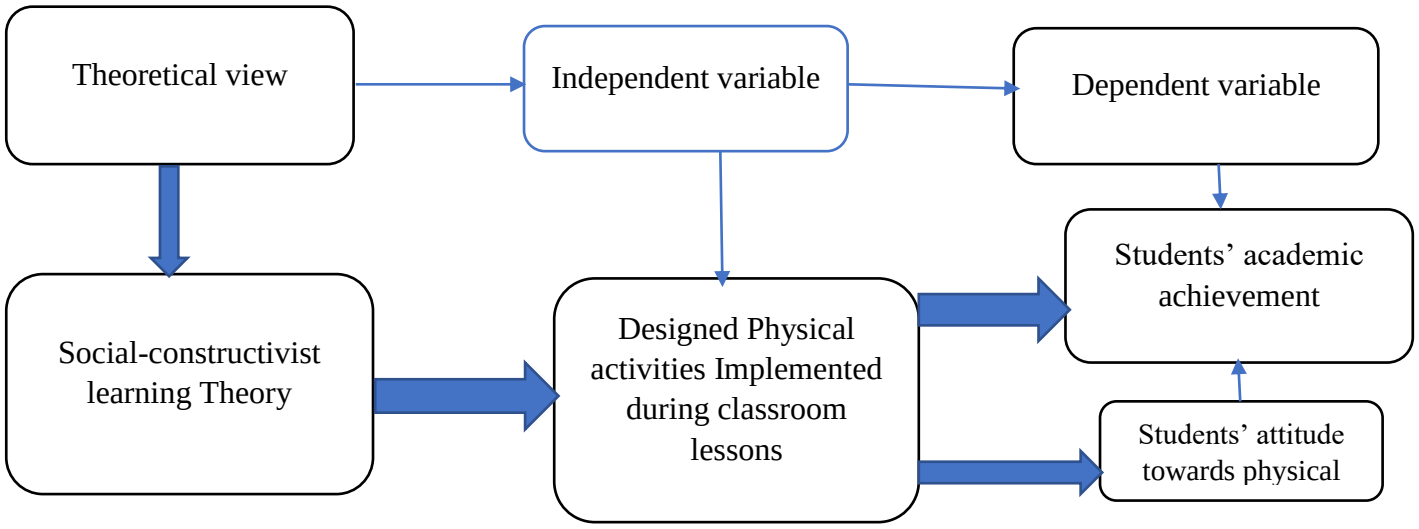


Figure 1 Conceptual framework of the study.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

This chapter deal with description of study area, source of data, research design, population of study, sample size and sampling techniques, data collection instrument, methods and procedures of data analysis, validity and reliability and ethical consideration were discussed in detail.

3.1. Research Method

The methods employed in this research were both quantitative and qualitative methods. it more emphasizes quantitative research approach. Using multiple approaches can capitalize on the strengths of each approach and offset their different weaknesses and provides a better understanding of research problems than either approach alone. It could also provide more comprehensive answers to research questions going beyond the limitations of a single approach. It is also practical in the sense that the researcher is free to use all methods possible to address a research problem (Creswell, 2003). Furthermore, to confirm, cross-validate or corroborate findings within a study better to use mixed method or both quantitative and qualitative approach.

3.2. Research design

The researcher was examining the effect of physical activity on students' academic achievement and attitude.

For this study the researcher was employ a non-equivalent pretest posttest quasi experimental design by taking the two selected governmental secondary schools, in Lemi Kura sub-city administration, Addis Ababa. The researcher preferred this type of quasi-experimental design because, the issue of the effect of physical activity on students' academic achievement, attitude and the relationship between students' attitude towards physical activities with their academic achievement were the only the concerns to be studied. So, this study conducts at Bori high school and Andode high school can serve as a sample study for other schools and being it is studied, we can refer or generalization for a large number of populations. Therefore, the two schools were selected randomly using a lottery method.

3.3 The Study Site and Population

The study was conducted in Lemi kura sub city Administration Addis Ababa, which is one of the eleventh sub city from Addis Ababa Administration. Lemi kura sub city has 6 (six) government secondary schools. These are Beshale, Andode, Bori, Edigetchora, Ababo, and Bole Addis Secondary Schools. Among these 6 Government secondary schools, 2 (two) of

them were selected by using simple random sampling method. Because, our intent was to investigate the effect of physical activities on students' academic achievement and hence students' background, the curriculum, school facilities and other things were equivalent among schools.

3.4 Sample and Sampling Techniques

In Lemi kura Sub City administration there were 6 government secondary schools out of these, 2 secondary schools were used as a sample of the study. In this study, 2(33.3%) government secondary schools was select by using simple random sampling techniques.

The school selected to be parts of the study were Bori, and Andode government secondary schools. However, the total populations of the study were 2 principals, 32 teachers (English, Mathematics and Biology), 715 students and 5 sub city supervisors as they were direct relationship in the effect of physical activity on students' academic achievement. From the above total numbers of population 754 the researcher would select 232 sample for the target of the study which comprised of 2 principals, 10 teachers (English, Mathematics and Biology), 215 students and 5 sub city supervisors.

The reason to select 2(33.3%) government secondary schools was that the first one is from a total of 6 (100%) government secondary schools taking 6(33.3%) schools as a sample is important to get pertinent information for the study, the second reason is taking as a sample, of 33.3% schools from the total population was necessary to assure the information that getting from the respondents represents all teachers and principals that belongs to Lemi kura sub city, according to the researcher's observation and experience the problems of the study similar in the context of the whole Lemi kura sub city's government secondary schools, and all selected government secondary schools thought by the same teachers who were employed in Lemi kura sub city education office and they follow the same principle and procedure.

On the other hand the researchers was employee Slovin's formula (Jeffry & Juyce Raymond-2012 p.129) to take sample size of the total population in the particular area. In these schools the total number of the students is 715and 32 teachers (English, Mathematics and Biology) from grade 10. From these, 215students and 10 (English,

Mathematics and Biology) teachers were choose to investigate the effect of physical activity on student's academic achievement. On the one hand, the researcher was used the availability sampling technique and two (2) principals and 5 supervisors takes from selective government secondary schools to get the purposive data about this single study.

From Andode two intact grade 10^{th} students with a total number of 106 were selected as experimental group and 109 10^{th} grader students from Bori high school as two intact classes were assigned as comparison group using a random sampling techniques.

Table 3.1: Target Population and Sample Size

R/no	Type of respondent	Total population	Sample size	**%**	**Sampling techniques**
1	Principals	2	2	100%	Purposive
2	Supervisors	5	5	100%	Purposive
3	Teachers	32	10	30%	simple random sampling
4	Students	715	215	30%	simple random sampling
Total		754	232		

3.5 Sources of Data

For this study the researcher used primarily and secondary data sources and conduct the study with the reference to selected high schools in the Addis Ababa Lemi Kura sub-city government Secondary Schools.

I. Primary Sources

In getting primary data there were several approaches available to gathering data. In order to collect reliable and valid information, the researcher was contacted Government Secondary Schools teachers, students, school principals and supervisors. The methods was used in collecting the primary data will be questionnaires and interviews.

II. Secondary Sources

The study also was made use of secondary data in collecting information. The sources of the secondary data were documents included books, internet, articles, and journals among others. This was helped to identify how others was defined and measured key concepts, the data sources others will use and this will be helped to discover how this research related to other studies.

3.6. Data collection instrument

The researcher used both quantitative and qualitative instruments of data collection (questionnaire, interview, document analysis and observation) for the study. Therefore, employing multiple data collection instruments helped the researcher to combine, strengthen and amend some of the inadequacies of the data and for triangulating, (Cresswell, 2003)

In order to obtain adequate information for the study, four types of data collecting instrument were employed. These were tests, questionnaire, Interview and observation.

3.6.1. Standardized test

By collecting and adopting standardized English, mathematics, and biology from the National Examination, Assessment and Evaluation Agency (NEAEA) which was administered between the year 2005 E.C to 2009 E.C. Each test item consisted of 10 multiple choice items which were selected based on the objective and coverage of the intervention periods by each group by the researcher.

3.6.2 Questionnaire

Questionnaires were prepared by the researcher by adopting other previous researches. The questionnaires are containing open ended and close ended items which were administered to students. The respondents were responded different items concerning the effect of physical activity on students' academic achievement.

3.6.3. Observation check Lists

Classroom observation check list items were also adopted from previously made researches with slight modifications (Gay & Airasian 2000:213).The class observations were focus on the following areas: (a) what teachers and students do at the start, during and at the end of a lesson? The researcher was sat in the participants' class in their regular time and was use an observation check list to record what he saw, heard, and experienced during a teaching session.

3.6.4 Interview

Semi-structured interviews was used to collect data from two principals and five supervisors . In this research, interviews were used for collecting thick information regarding the nature of the teaching–learning process in line with the effect of physical activity on students' academic achievement.

3.7. Pilot Study

Pilot study of instruments was made prior to the implementation stages to check its validity and reliabilities. 30 students from other high school called Beshale were participated in piloting the instruments. This pilot-test was conducted on Bshale Secondary School students not supposed to be included in the actual study. The researcher selected one section randomly and conducted the pilot test. The pilot test for questionnaires was conducted on 30 students (20 male and 10 female). Two teachers, one principal and one supervisor were involved in the piloting of the instruments.

3.8. Validity and Reliability

The validity of the instruments were made by a panel of education experts and teachers. The face and content validities of the instruments were checked by these experts and teachers based on the objectives and content coverage of the study. The English version questionnaires and the test items were checked and corrected by English, mathematics and biology subject specialist teachers from Bori secondary school. Based on respondents' response very few modifications were undertaken. After pilot testing, reliability of the instruments was mad to check its internal consistencies.

The results of KR-20 for test items and Cronbach's coefficient alpha of the questionnaire was found to be at about 0.72 and 0.76 respectively, which was found in the acceptable range (Tech-Hong&Waheed, 2011).

3.9 Methods of Data Analysis

The quantitative data was collected using the test instruments and questionnaires were analyzed using t-test and Pearson correlations to see the mean difference between group achievement, students' attitude of physical activities and correlations between their attitudes of physical activities with academic achievement by the help of SPSS version 23.0. Whereas, the qualitative data were obtained through observation checklist and interviews with the teachers,

supervisors and principals of the school were analyzed by developing a theme manually. Triangulations of the quantitative data and qualitative data were made on the discussion part of the study.

3.10 Ethical Consideration

All the research participants included in this study was appropriately informed about the purpose of the research and their willingness and consent was secure before the commencement of distributing questionnaire and asking interview questions. Regarding the right to privacy of the respondents, the study maintained the confidentiality of the identity of each participant. In all cases, names were kept confidential thus collective names like ‘respondents’ were used.

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND INTERPRETATION

This Chapter deals with presentation, analysis and interpretation of data obtained from sample respondents (high school teachers, students, principals and cluster supervisors).

In order to gather relevant information on the effect of physical activity on students' academic achievement in secondary schools under study, a questionnaire with close ended and few open-ended types was prepared and distributed to samples of 215 students, 10 teachers 2 principals and 5 cluster supervisors. The response rate was 93% because the students (200) filled the questionnaires and returned. The remaining 7 % of students (15) was not filled the questionnaires and returned. In addition, information on the issue under study was gathered using interview from 10 teachers (100%) 2 principals (100%) and 5 cluster supervisors (100%).

4.1. Quantitative Data Presentation and Analysis

4.1.1. Background Information of the Respondents

Three demographic variables of the respondents were gathered as background information. These are: age, sex and education summarized in the following table below. Descriptive statics cross tabulation of each variables in each high school were manipulated as follows

Table 4.1: Personal Profile of Students by Sex, Age, and Grade Level

No	Items		Schools				Total	
			Andode		Bori			
			N	%	N	%	N	%
1	Sex	M	49	45.8	42	45.2	91	45.5
		F	58	54.2	51	54.8	109	54.5
		Total	107	100	93	100	200	100
2	Age	13-15	44	22	40	20	84	42
		16-18	63	31.5	53	26.5	116	58
		Total	107	53.5	93	46.5	200	100
3	Grade Level	10^{th}	107	100	93	100	200	100

Item 1 of table 4.1 shows that of the respondents, 45.5 percent of the students were males and 54.5 percent of the respondents were females. The above information indicates that females, compared with males, their participation in learning at secondary school level are significant. Regarding item 2 of the same table, 42 percent of the students were in between the age of 13-15 years and the other 58 per cent of the students were in the age group of 16-18 years. The figures show that most of the students were above the age of 16 years (late teenager stage). This information indicates that all of the students were in their adolescent stage. Thus, most of the students were matured and fit to take responsibility.

4.1. 2 Analysis and Results of Pretest Data for attitude and tests

Before the start of intervening the experimental groups by performing different physical activities at different sessions of classroom lessons, both groups were administered to attitude questionnaire that has a five pint Likert scales and multiple test items which consisted of English, mathematics and biology exams. Thus, the participant students in both groups filled it accordingly. The descriptive statistics of the pre questionnaire result was shown below.

Table 4.2: Descriptive Statistics of pretest score by groups.

Learning Group	N	Pretest		Post test	
		Mean	Standard Deviation	Mean	Standard Deviation
Experimental Group (EG)	98	1.71	2.96	3.98	.77
Comparison Group (CG)	102	1.78	2.76	3.13	.66
Pretest item results					
Learning Group	N	M	SD	M	SD
EG	98	8.43	3.22	19.4	5.32
CG	102	8.51	3.19	11.2	1.83

The descriptive statistics shown above in table 4.2 indicated that there is a slight mean difference on students' attitude towards physical activities between the two groups. Therefore, to see this mean difference is statistically significant or not, an appropriate test statistics was used after checking the following assumptions.

Evaluation of assumptions

The first assumption was checking normality of data using skewness and kurtosis values.

Table 4.3: Skewness and Kurtosis results of pretest data by groups.

Learning Group	Attitude questions		Subjects test items	
	Skewness	Kurtosis	Skewness	Kurtosis
EG	-.75	.37	-.60	.55
CG	-.38	.28	-.81	.43

The skewness and kurtosis results of pretest data for each group were found to be in the range of ±1. Therefore, the pretest score data for each group can be taken as approximately normally distributed. In addition the visual inspection of histograms of the pretest data for each group seems a bell shaped (appendix I). Thus, the assumption of normality of pretest data for attitude questions was not markedly violated.

Similarly, the analysis result of the skewness and kurtosis values for composed of English, math and biology multiple test items, the values were found between on the acceptable ranges. This indicates that the pretest result of the test items were roughly approximately normally distributed. Therefore, the normality assumptions for this case was not also violated.

The second assumption was checking homogeneity of variance of pretest score using Levene's test.

Table 4.4: Levene's Test of pretest data of attitude and pretest items by groups.

Variable		Levene's test of equality of variance		
		F	*df*	*p*
Pre attitude Mean score	Equal Variance assumed	.78	198	.38
Pretest mean score of items	Equal Variance assumed	.89	198	.64

The analysis of Levene's test result in table 4.4 showed that the variance of pretest score mean difference of attitude questions was the same ($F(198)=.78$, $p>.05$). Therefore, the assumption of homogeneity of variance was not also violated.

Accordingly, the analysis of Levene's test in table 4.4 also indicated that the variance of students' pretest items mean score was also the same ($F(198)=.89$, $p>.05$). This confirmed that the assumption of homogeneity of variance was not violated.

Now since all the assumptions are satisfied and we need to compare the significant of mean score difference between two groups, an independent sample t-test was the preferred statistical analysis method for these particular cases. The independent sample t-test result was presented below.

Table 4.5: Independent sample t-test for pre-mean score data of attitude questions by groups.

Variable	t-test for equality of means						
						95% confidence Interval	
	t	*Df*	*P*	MD	SE	Lower	Upper
Pre attitude Mean score	-1.81	198	.07	-.073	.04	-.15	.01
Pretest Mean Score	-2.76	198	.84	-.045	.07	-.23	.02

The analysis of an independent sample t-test showed that there was no significant mean score difference on students' pretest with attitudes towards physical activities between the two groups ($t(198)=-1.81$, $p>.05$). The result revealed that the two groups were found on the same level attitude towards doing physical activities either before, during or after classroom lesson. Therefore the difference observed between the two groups on students' attitude difference was assumed to be the effectiveness of the interventions used by the group.

Similarly, the analysis of results in table 4.5 showed that there was no significant mean score difference on students' pretest items between experimental and comparison groups ($t(198)=.-2.76$, $p>.05$). The result indicated that the two groups were also found on the same level of academic achievement of the selected contents of English, math and biology exams.

The next stage was implementing the physical activities designed by the researcher to be implemented before the start of a class which is early in the morning for 10 minutes for three days /week, 1 minute before the lesson, 1min during the lesson and 1 minute after the lesson for three days in English, Biology and mathematics classes. The implementation was performed for a couple of four weeks. After four week later and the end of intervention the same questionnaire was administered as a post test for each group.

4.1.3 **Analysis of post test results**

The descriptive statistics in table 3 indicated that there is a mean difference on students attitude towards physical activities between the experimental group (M=3.98) and comparison group (M=3.13) in their post test score. Similarly, the same table also indicated that there was also a difference on the mean score of posttest items of the subjects between the experimental (M=19.4) and comparison (M=11.2) groups.

To check these mean differences statistically significant or not the following assumptions were evaluated.

The first important assumption was test of normality of data. This assumption was checked by using skewness and kurtosis values. The results were displayed in table 7 below.

Table 4.6: Skewness and Kurtosis value of posttest mean scores by groups.

Learning Group	Post attitude scores		Posttest of subject items	
	Skewness	Kurtosis	Skewness	Kurtosis
EG	-.84	.57	-.71	.42
CG	.51	.39	.66	.35

The skewness and kurtosis results of both posttest data for each group were found to be in the range of ±1. Therefore, the posttest score data for each group can be taken as approximately normally distributed. In addition the visual inspection of histograms of the posttest of attitude questions data for each group seems a bell shaped (appendix II). Thus, the assumption of normality of posttest data obtained using the two instruments was not markedly violated.

The second assumption was checking homogeneity of variance of posttest score using Levene's test.

Table 4.7: Levene's Test of posttest data by groups.

Variable		Levene's test of equality of variance		
		F	*df*	*p*
Post attitude Mean score	Equal Variance assumed	3.45	198	.065
Posttest Mean score of subject test items	Equal Variance assumed	6.99	198	.32

The analysis of Levene's test result in table 4.7 showed that the variance of post attitude questions mean score difference was the same ($F(198)=3.45$, $p>.05$). Therefore, the assumption of homogeneity of variance was not also violated. Similarly, the analysis of posttest mean score of subjects test items variance difference was not significant ($F(198)=6.99$, $p>.05$). This claims that the assumptions of homogeneity of variance was not violated for this test data as well.

Now since all the assumptions are satisfied and we need to compare the significant of mean score difference between two groups, an independent sample t-test was also the preferred statistical analysis method to answer the first and second research questions respectively.

The frist research question was: is there a significant mean score difference on students' attitude towards physical activities between the experimental and control groups?

Since all the necessary assumptions for independent sample t-test were evaluated and all were satisfied, the statistics results were reported as shown below.

Table 4.8: Independent sample t-test for posttest mean score of attitude data by groups.

Variable	t-test for equality of means						
						95% confidence Interval	
	T	*Df*	*p*	MD	SE	Lower	Upper
Post attitude Mean score	8.41	198	.000	.85	.10	.65	1.05

The analysis of independent sample t-test result in table 4.8 indicated that there was significant difference on students' post attitude mean score between the experimental and comparison group ($t(198)=8.41$, $p<.05$). The result showed that students who had carried out different physical activities before, during and after their English, math and biology lessons performed larger attitude mean ($M=3.98$) than the comparison group ($M=3.13$).

Therefore, from the analysis of the posttest result, we have found that performing different physical activities by students before, during and after the lesson with some extent had improved their attitude than making them to learn the whole classroom session without any physical activities and movements.

The second research question was: Is there a significant mean difference on students' post academic achievement between experimental and comparison groups?

Both normality and homogeneity of variances assumptions were not violated to use independent sample test to compare mean difference between two groups. The statistical analysis and results were presented as shown below.

Table 4.9: Independent sample t-test for posttest mean score of subjects by groups.

Variable	t-test for equality of means						
						95% confidence Interval	
	T	*Df*	*p*	MD	SE	Lower	Upper
Posttest of subjects Mean score	14.26	198	.000	.4.33	.24	1.72	8.15

The analysis of independent sample t-test result in table 4.9 indicated that there was significant difference on students' posttest of subjects mean score between the experimental and comparison group ($t(198)=14.26$, $p<.05$). The result showed that students who had carried out different physical activities before, during and after their English, math and biology lessons performed larger test mean score ($M=19.4$) than the comparison group ($M=11.2$).

Therefore, from the analysis of the posttest result, we have found that performing different physical activities by students before, during and after the lesson had improved their academic achievement than other groups who learned their subject lessons without carried out physical activities.

The third research question was: what is the association between students' attitude towards physical activities with their academic achievement by the experimental group only?

To answer this research questions, besides the assumptions of normality and homogeneity of variance as indicated in table 4.6 and 4.7, addition assumptions such as the presence of outliers using box plots and existence or relations using scatter plot (appendix III) were checked. The visual inspections of both the box plots and scatter plots showed that there was no outlier on both post test data of attitude scores and achievement scores. Therefore, this assumption was also violated to run Pearson Correlation.

Table 4.10: Pearson Correlation of attitude and achievement post test scores by Experimental group.

Variable	Attitude score	Achievement score
Attitude score	1	.54***
Achievement score	.54***	1

*** Correlation is significant at the level of .001 (2-tailed).

The analysis Pearson correlation coefficient result showed that there was a positive moderate and significant correlation between students' attitude towards performing different physical activities with their overall academic performance ($r=.54$, $p<.001$). The strength of association between the two variables was moderate as compared to the typical values (Cohen, 1988).

From the result, we have found that when students are carrying out multiple physical activities before lesson starts, during lesson presentation as warming stage, and after lesson as recapping stage, they feel good in giving attention and concentrated in their classroom lesson. As a result, their academic achievement improved with a good amount.

The last research question was related to: How students' view the use of physical activities by the experimental groups?

Students view about the use of physical activities in the classroom lesson were explained by analyzing data collected through the following questionnaires.

Table 4.11: Students' Views on Effect of physical activity on students' academic achievement

No	**I. Effect of physical activity on students' academic achievement**	**Frequency**	SA	A	UN	D	SD
1.1	physical activity has advantage on academic achievement	N	45	35	6	7	5
		%	46	36	6.1	7.1	5.1
1.2	physical activity can motivate to learn other subjects	N	74	22	3	0	0
		%	75.6	22.4	2	0	0
1.3	The lower priority given to physical activity	N	4	81	0	10	5
		%	3	83	0	10	4
1.4	Students have low level of interest in physical activity	N	9	17	22	27	33
		%	4.5	8.5	21	39	47
1.5	Students have Negative attitude for physical activity	N	50	42	0	4	2
		%	49	46	0	3	2
1.6	Students perform physical activity skills effectively in a variety of settings	N	15	80	4	0	0
		%	12	81	2	0	0
1.7	Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.	N	0	0	18	5	75
		%	0	0	15	4	72
1.8	Students demonstrate positive growth in self-concept through appropriate tasks or projects.	N	41	33	11	7	6
		%	41	35	10	7	5
1.9	Students individually demonstrate consistent, responsive and caring behavior	N	18	10	2	78	0
		%	9	10	2	78	

NB: SA= Strongly Agree, A=Agree, UN= Undecided D=Disagree, SD= Strongly Disagree

As it depicted on the above table 4.11, 45(46%) and 35(34.5%) of respondents strongly agreed and agreed respectively with the idea of physical activity has advantage on academic achievement on the other hand 6(3%) of respondent replied undecided and 6(3%) disagree as well as 5(2.5%) strongly disagree with the same idea.

As 80.5% of the respondent was agreed it indicted the physical activity has advantage on academic achievement.

In item two indicated that 74(72.5%) and 22(22.5%) of respondents agreed and strongly agreed with the idea of physical activity can motivate to learn other subjects. On the country,9(4.5%) and 11(5.5%) of the respondents disagreed and strongly disagreed with the idea of physical activity can motivate to learn other subjects whereas 4(2%) of them replied undecided respectively. As most of the respondents agreed it indicated that the physical activity can motivate to learn other subjects.

On the other way, from the open-ended question understand that most of the students have clear understanding about the effect of physical activity on their academic achievement.

As item three, portrayed that 4(3%) and 81(80%) of respondents agreed and strongly agreed with the idea of the lower priority given to physical activity. On the country, 27(25.5%) and 11(5.5%) of the respondents disagreed and strongly disagreed with the idea of the lower priority given to physical activity whereas 7(3.5%) of them replied undecided respectively. As most of the respondents agreed it indicated that the lower priority given to physical activity.

More over the related item four has shown,17(8.5%) and 9 (4.5%) of the respondents agreed and strongly agreed with idea of Students have low level of interest in physical activity, on the contrary 79(39.5%) and 95(47.3%) of them replied disagree and strongly disagree respectively. As most of the respondents disagreed it indicated that Students have high level of interest in physical activity.

Likewise, item five has portrayed, 9 (7%) and 17 (15%) of the respondents agreed and strongly agreed with the idea of Students have negative attitude for physical activity whereas 49(24.5%) and 56(28%) of them are replied disagree and strongly disagree respectively with idea. As most of the respondents disagreed it indicated that Students have positive attitude for physical activity.

Item six portrayed, 15(14%) and 80(79%) of the respondents agreed and strongly agreed with the idea of Students perform physical activity skills effectively in a variety of settings. As most of the respondents agreed it indicated that Students perform physical activity skills effectively in a variety of settings.

Item seven has shown,5 (4%) of the respondents undecided idea of Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives, on the contrary 60(59.5%) and 33 (39.5%) of them replied disagree and strongly disagree respectively. As most of the respondents disagreed it indicated that Students were not demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.

Item eight had shown,41(39.5%) and 33(32.5%) of the respondents agreed and strongly agreed with idea of, Students demonstrate positive growth in self-concept through appropriate tasks or projects. On the contrary 7(7%) and 6(5%) of them replied disagree and strongly disagree respectively and 11(5%) undecided. As most of the respondents disagreed it indicated that Students were not demonstrate positive growth in self-concept through appropriate tasks or projects.

Item nine had shown, 18 (17%) and 10(9%) of the respondents strongly agreed and agreed with idea of Students individually demonstrate consistent, responsive and caring behavior. On the contrary 2(1.5%) and 78(75%) of them replied disagree and strongly disagree respectively. As most of the respondents disagreed it indicated that Students were not individually demonstrate consistent, responsive and caring behavior.

On the other way from the open-ended question most of the students have clear understanding about the effect of physical activity on academic achievement.

The last and fourth research question was: How students could viewed the use of physical activity to support their academic achievement?

To answer this research question, qualitative data were collected using the following questionnaire and analyzed using simple descriptive statistics and the reports were displayed as follows.

Table 4.12: Students' Views on Physical activity support students in their academic achievement

	II. **How could Physical activity support students in their academic achievement?**	**Frequency**	SA	A	UN	D	SD
3.1	Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.	N	5	6	11	70	7
		%	4	5	10	75	6
3.2	Students effectively use interpersonal skills.	N	43	42	0	8	3
		%	42	41	0	14	3
3.3	Lack of Peer support	N	15	82	1	0	0
		%	15	81	3.5	0	0
3.4	Negative attitudes of the student on physical activity.	N	2	3	6	78	9
		%	1	2	5	83	9

NB: SA= Strongly Agree, A=Agree, UN= Undecided, D=Disagree, SD= Strongly Disagree

Accordingly, the responses for item 3.1, 4% and 5% of the respondents replied as strongly agree and agree respectively. In the same way 75% and 7% of the respondents replied as strongly disagree and disagree respectively. Based on the majority of responses, one can conclude that Students do not have demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.

On the same table item 3.2, 42 % and 41% of the respondents replied as strongly agree and agree respectively. The 8 % and 3% of the respondents replied as disagree and strongly disagree respectively. Based on the majority of responses, one can conclude that Students effectively use interpersonal skills.

for item 3.3, students were asked to give their level of agreement on lack of peer support, for this, 15 % and 82% of the respondents strongly agree and agreed respectively, The remaining 1% of the respondents replied as undecided. Thus, most of 41% the respondents agree that lack of peer support in the effect of physical activity on students' academic achievement.

Accordingly, the responses for item 3.4 (about negative attitudes of the student on physical activity session), 2% and 3% of the respondents replied as strongly agree and agree respectively but the 78 % and 9% of them replied as disagree and strongly disagree. Based on the majority of responses, one can conclude that have positive attitudes of the student on practical activity in the selected secondary schools.

4.2 Qualitative Data Analysis

4.2.1 Presentation of Data Obtained from teachers Through Interview

The interview with ten teachers aimed at examine the effect of physical activity on students' academic achievement in the secondary schools. The interview questions were designed in line with answering the three research questions. The analysis falls under five items as follows.

4.2.1.1 Regarding to the advantages of physical activity on academic achievement for other subjects.

The ten selected teachers from the two high schools were asked about the advantages of physical activity on academic achievement for other subjects; All participants responded that:

Physical activity has great advantage for other subjects by motivating the students, creating good relationship between them.

For the same interview question, respondents said that:

Performing physical activities give us many advantages like facilitating collaborative work, Made enhancing our participant in class attendance , For student's develop our mental status, make us to show the desired behavioral change and helps form some students to weight loss and avoids some diseases.

All the teachers said that from these points of view the school communities should have awareness about the advantage of physical activity for other subjects.

4.2.1.2 Regarding to kinds of measurements to be taken to improve the relationship between physical activity and academic achievement.

Most teachers respond that:

The measurements to be taken to improve the relationship between physical activity and academic achievement through creation of awareness and given short training, experience sharing between schools and before starting the class, students should practice physical activity.

According to the teacher's point of view different measurements should be taken to be strengthening the relation between the physical activity and students' academic achievement.

4.2.1.3 Regarding to the teachers and students relating the effect of physical activity on students' academic achievement.

As the teachers answered by listing the relating effect of physical activity on students' academic achievement as:

I. Teacher related effect were poor planning of the lesson for physical activity and hence doesn't accommodate all students in activities related with academic achievements.

II. Student related effects were lack of self-confidence, lack of awareness about the benefits of physical activity and academic achievement.

In general, most teachers respond that the attention given to the relation between the physical activity and academic achievements as well as lack of awareness had great contribution to the effects of physical activity on students' academic achievement.

4.2.1.4 Regarding to how could Physical activity support students in their academic achievement?

Most teachers respond that:

Physical activity support students in their academic achievement by transforming knowledge and skills they need to remain physically healthy, make them to accept responsibility for their own physical well-being and making them effective to use interpersonal skills.

According to the teacher's point of view physical activity support students in their academic achievement.

4.2.2. Interview Report from School Principals and cluster supervisor

The interview with two school principals and five cluster supervisors aimed at examine the effect of physical activity on students' academic achievement in the secondary schools. The interview questions were designed in line with answering the three research questions. The two school principals from each high school and five cluster supervisors were interviewed. The analysis falls under five items as follows.

4.2.2.1. Regarding the Institution, Teacher and Student-related the effect of physical activity on students' academic achievement

Most of principals and cluster supervisors respond based on the questions Institution, Teacher and student-related the effect of physical activity on students' academic achievement.
Have poor relationship between Institution, teachers and students on effect of physical activity on students' academic achievement. This is why the reasons due to lack of self-confidence and lack of awareness about the effect of physical activity and academic achievement.

In addition to this most respondent that the attention given to the relation between the physical activity and academic achievements had great contribution to the effects of physical activity on students' academic achievement.

4.2.2.2 Regarding the rolls as school principals and cluster supervisors the effect of physical activity on students' academic achievement

The two principals and five cluster supervisors replied that facilitate the teaching learning process by supervising all classes. But this supervision is two times per a year which is insignificant. The two principals and five cluster supervisors also respond as:

- ✓ They advise for teachers not to order high intensity physical activities.
- ✓ They give advice for teachers to participate all the students beside that we have nothing to support them.
- ✓ We tried to adjust the physical activity class but the teachers complain as the period allotment is not enough to cover the text book.

4.2.2.3. Regarding to how could Physical activity support students in their academic achievement?

Most of the school principals and cluster supervisors respond that:

Physical activity support students in their academic achievement by developing their knowledge and skills which is needed for them to be effective in their learning, makes them responsible for their own learning and helps them to develop collaboration skills while they are doing things in a team.

According to the school principals and cluster supervisors' point of view physical activity support students in their academic achievement.

4.3 Analysis of data gathered from Observation

Key Guide

1= Excellent 2 = Good 3 = Need attention 4 = Not present

Table 4.13: Observation Guide (Check list) after Physical activity session

	Classroom Behavior	**1**	**2**	**3**	**4**
1	Pay attention in class			X	
2	Cooperate with peers, ability to work with others				X
3	Have a positive, cheerful attitude				X
4	Produce work and assignments that are high quality		X		
5	Are defiant or noncompliant			X	
6	Lack effort or motivation or give up easily			X	
7	Have excessive movement or are out of seat often			X	
8	Are off task or inattentive during class time		X		
9	Are unable to change activities or make transitions smoothly			X	
10	Are unhappy, sad or depressed	X			
11	Need to be talked to about problem behaviors			X	
12	Students interest to participate in other subjects				X

In order to supplement the information obtained through interview, the researcher made observation after physical activity, in the class room, the attention and participation of students the observation takes place in each high school while the physical activity teacher teaches practically at school and teaching and learning other subject. As it can be seen from my check list, students after physical activity: -

Have good participation; they were interested to work together; they were motivated; they were happy and have good interest to participate in other subjects. Generally according to the observation after physical activity they were attend another subject attentively and emotively.

4.4. Discussion of the Major Findings

In this part, the findings of the study are discussed in relation to previous relevant literature to give references. The study was aimed to examine the effect of physical activity on students' academic achievement in Andode and Bori secondary schools in Lemi kura sub-city administration, Addis Ababa. In this section, results of the data are going to be discussed in the light of previous research done in the area, and the research questions tried to be answered
The study tried to answer four research questions:

1. Is there a significant mean score difference on students' attitude towards physical activities between experimental and comparison groups?
2. Is there a significant mean score difference on students' academic achievement between experimental and comparison group?
3. What are the relationship between student's attitude towards physical activity and their academic achievement?
4. How students could viewed the use of physical activity to support their academic achievement?

To answer these four leading questions, multiple choice test items, questionnaire, interview, and classroom observation were used. The questionnaires were designed only for students with three parts in line with the first four research questions. The questionnaire survey was followed by teachers, school principals' and cluster supervisors' interview and classroom observation.

The discussion of the major findings was presented in the order in which to answer the four basic research questions. For each section the related results obtained from all of the instruments used to answer each research question was blended together.

4.4.1 The effect of physical activity on students' attitude towards it.

The positive effect of physical activities in fostering students' attitude towards it was in line with other previous research findings (Biddle, Fox & Boutcher, 2001, Biddle & Mutrie,2008). That is when students were exposed to several types of physical activities, they became more conscious, active and collaborative in the learning process. Due to this reasons, when teachers are using

physical activities in their lesson presentation, students' attitude become improved due to the result of its act in energizing and helps them to feel happy in the lesson.

Other similar research findings also revealed that frequent use of physical activities by students made them to alert for every moment they made and hence their altitude become improved (Gao et al., 2018; Haapala, 2012). The finding of our study also supported this result that students who was carried out more physical activities become more careful in doing things and hence their attitude towards the activities they made become positive.

On the contrary, other research finding showed that students had a low attitude towards physical activities (Hillman et al., 2008; Roig, Skriver, Lundbye-Jensen, Kiens & Nielsen, 2012). These studies boldly indicated that students considered the physical activities as a bored task. But, in opposite to this, our research finding showed that students were more interested in doing simple physical activities as a warmining and recapping of their lesson which ultimately enhanced their attitude towards it.

4.4.2 The Effect of physical activities on students' academic achievement

Several studies were come up with a controversial research findings in relation to the effect of physical activities on students' academic achievement. Previous research findings showed that students who was carried out different indoor and outdoor physical activities positively affect their academic achievement (Gao, Chen, Sun, Wen, & Xiang, 2018; Zeng, Ayyub, Sun, Wen, Xiang & Gao, 2017). In line with these studies, our research finding also showed that students who used physical activates as a motivation of their lesson achieved a significant academic achievement.

Similarly, Eveland-Sayers, B.M., Farley, R.S., Fuller, D.K., Morgan, D.W., & Caputo, J.L. (2009) found that physical activities and fitness have a positive effect on improving students' achievement. In line with this, our study finding showed that students who did multiple physical activities per day performed out a high academic achievement. Therefore, the study finding

assured that when students carried out physical activities with larger frequencies they become ready for their classroom learning and as a result achieved better.

Other studies showed that physical activities did had a positive effect on students' academic achievement (Hillman, C.H., Castelli, D.M., & Buck, S.M.,2005). This study indicated that the physical activity was important to have individual to have a good body shape but as the frequency increased it creates mental tiredness. On the contrary to this, our research finding indicated that students who carried out physical activities did not have a sleep during classroom lesson, became energetic both mentally and physically so that their academic achievement improved.

4.4.3 Correlations between students' attitude towards physical activity and their academic achievement.

Previous research findings showed that students' academic attitude is related with their academic achievement with a different strength of associations (Carlson SA, Fulton JE, Lee SM, Maynard LM, Brown DR, Kohl HW, et al.,2008;Tremblay MS, Inman JW, Willms JD., 2000). In line with these studies, our research finding indicated that students' attitude towards performing physical activities had a positive and medium significant relation with their academic achievement. The finding showed that students who showed a high attitude of performing different physical activities within the classroom lesson achieved a good academic achievement.

Multiple studies reported that students' attitude towards physical activities have a weak correlation with their academic achievement (Ahamed Y, MacDonald H, Reed K, Naylor PJ, Liu-Ambrose T, Mckay H., 2007; Trudeau F, Shephard RJ.,2008). In contrary to these studies, the finding of our research indicated that students' attitude towards physical activities have a positive, significant and moderate association with their academic achievement. In our study, the finding showed that students with higher attitude in carrying out physical activities performed greater academic achievement.

4.4.4 View of Physical activities

Different research findings showed that students views physical activities as an important energizer and making them to be effective in their overall life career (Dwyer T, Sallis JF, Blizzard L, Lazarus R, Dean K., 2011; Puehse U, Gerber M.,2005). The presented study also claimed that students viewed physical activities a motivational approach for preparing themselves for learning, making them active participants, collaborative in them works through their classroom lesson and doing assignments out of classroom situations.

The qualitative data result showed that students who carried out physical activities prior to their classroom lessons, during the classroom lesson presentations and other situations feel that they became more effective in accomplishing several educational activities and become more cognizant in the school communities. This study finding was consistent with other previous research findings (Grissom, J.B., 2005;Parfitt, G., & Eston, R.G., 2005). Therefore, the study finding showed that when students were exposed to different physical activities with multiple frequencies within a short time before, during and after classroom lessons by their teachers, they become happy with it and eventually develop a positive attitude and effective in their academic career.

.

.

CHAPTER 5

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the summary, conclusions and recommendations. The first part deals with the summary of what have already been treated in the previous chapters followed by the conclusions of the fundamental findings of the study. Finally, based on the findings and conclusions drawn, some possible recommendations would be forwarded.

5.1. Summary

The purpose of this study was to examine the effect of physical activity on students' attitude towards it and academic achievement and attitude in Andode and Bori secondary schools in Lemi kura sub-city administration, Addis Ababa. To this end, the study was expected to give answers for the following basic questions.

1. What is the effect of physical activities on students' attitude towards it between experimental and comparison groups?
2. What is the effect of physical activity on students' academic achievement between experimental and comparison groups?
3. What are the relationship between students' attitude towards physical activity and their academic achievement?
4. How could students view physical activity to support in their academic achievement?

To achieve the objectives of the study, test items from three subjects, questionnaires, interviews and classroom observation check lists were prepared and distributed to samples of 215 students. An interview was prepared for10 teachers, 2 school principals and 5 Cluster supervisors. Finally, observation was conducted by the researcher. Based on the frequency count, the raw data were tallied, tabulated, analyzed and the major findings were summarized as follows: Most of the teachers, principals and cluster supervisors were males; whereas only one cluster supervisors and five teachers were females. This information gives clue that females, compared with males, let alone occupy managerial position; their participation in teaching in secondary school level is insignificant.

Most of the principals and teachers were above the age of 35 years (late adulthood stage). Thus, most of the principals and teachers were matured and fit to take responsibility. Most of the principals and the teachers served long years.

In general; the effect of physical activity on students' academic achievement indicated that teacher related effect were poor planning of the lesson for physical activity and hence doesn't accommodate all students in activities related with academic achievements. In addition, student related effects were lack of self-confidence, lack of awareness about the effect of physical activity and academic achievement.

Many research fining reported that the relationship between students' attitude towards physical activity and academic achievement were low. But others said that the relation become positive while it presented with learners ability and interest. In general there were research finding controversies in this regard.

After selecting two different high school grade 10^{th} students as experimental and comparison groups using the random sampling method, the researcher developed a material that includes multiple physical activities to be implemented by teachers before, during and after lessons by the experimental groups. Training was given for the participant teachers on the material.

Prior to the intervention, pretest was made for groups to determine students' base level of academic achievement and their attitude towards physical activities. Then after the end of implementation, an identical instruments were used as a posttest to examine the effect of the intervention. Concurrently, qualitative data were collected using classroom observation and interview. After filtering and organizing both qualitative and quantitative data, both inferential and descriptive statistics were used to analyze the data.

5.2. Conclusions

From the main findings of this study, the following conclusions were made. First, students' attitude towards physical activities had improved when it was presented with learners' abilities, interest and large frequencies during lesson presentations by every subject teachers. That is when teachers used physical activities as an energizer for a few minutes in the classroom lesson, students become more engaged in the lesson as a result their attitude become improved.

Second, the finding of this study asserted that students who preferred to carryout different physical activities become more interactive, responsible for self-learning and out performed a

better academic achievement than others who simply sit on the chair for a time of 45 minutes. That is physical activities performed during lesson time helps learners not sleep in teaching learning time, more focused in the lesson and work tasks in collaboration with their peers and teachers which ultimately improves their academic achievements

Third, the findings of this study revealed that students attitude towards physical activities associated positively with their academic achievement. That is students with high attitude in performing physical activities achieved a larger mean. Therefore, it can be concluded that teachers must consider in fostering students' attitude towards doing multiple physical activities during their lesson to improve their learners academic achievement.

5.3 Recommendations

Based on the summary and conclusions of major findings and conclusions drawn, the following recommendations were forwarded.

Students can be benefitted from the finding of this study by increasing the number of physical activities to be carried out during lesson presentations to improve their attitude and achievement of other subjects.

Teachers should be aware about the use of physical activities to foster their students' attitude and achievement with a sufficient amount. So, teachers could plan and use physical activities in their lesson presentations so as to capture the attention and focus of students during lesson and make it more interactive.

Other education experts and curriculum developers should consider the use of physical activities to be integrated within other subjects. There must be a room for teacher to be informed to use physical activities as implicated in text books.

References

Abreham Belay (1993). Factors which influence reaching effectiveness. Addies Ababa: AAU (unpeblisehd master thesis).

ACSM (2009). Position statement on the recommended quantity and quality of exercise for developing and maintaining fitness in healthy adults. *Med Sci Sports* 10(3).8.

Ahamed Y, MacDonald H, Reed K, Naylor PJ, Liu-Ambrose T, Mckay H. (2007). *School-based physical activity does not compromise children's academic performance. Med Sci-Sports Exerc;*39:371-6.

Ardoy, D. N., Fernández-Rodríguez, J. M., Jiménez-Pavón, D., Castillo, R., Ruiz, J. R., & Ortega, F. B. (2014). A Physical Education trial improves adolescents' cognitive performance and academic achievement: the EDUFIT study. *Scandinavian Journal of Medicine & Science in Sports*, 24(1), e52-e61.

Auxter, D., Pyfer, T., & Huetting, C. (2005). Federal Legislation That Has Had an Impacted on Physical Education for the Disabled. *Principals and Methods of Adapted Physical Education and Recreation.* (1) 3, 12-13.

Bailey C.G. & DiPerna J.C. (2015). Effects of classroom-based energizers on primary grade Students' physical activity levels. Physical Educator. 72(3):480–95.

Biddle,S.J.H., Fox, K.R. & Boutcher, S.H, (2000). Physical activity and Psychological well being: Routledge, London: Routledge

Biddle, S.J.H., Fox, K.R., & Boutcher, S. (2001). Physical Activity and Psychological Wellbeing.
London & New York: Routledge.

Biddle, S.J.H., & Mutrie, N. (2008). Psychology of physical activity: determinants, well-being, and interventions (2nd ed.). London: Routledge.

Borko, Bucher et al. (1984) "The prediction of teacher performance: Emphatic potential study.

Bucher, A.C. (2008). Foundation of physical education, exercise, science, and sport

Caroline Corredor · October 18, 2015 · Post a comment

Carlson J.A., Engelberg, J.K., Cain K.L., Conway T.L., Mignano A.M., Bonilla, E.A., Geremia, C. & Sallis, J.F. (2015). Implementing classroom physical activity breaks: Associations with student physical activity and classroom behavior. Preventative Medicine. 81:67–72.

CATERINO, M. C., and E. D. POLAK (1999). *Effects of two types of activity on the performance of second-, third-, and fourth-grade students on a test of concentration*. Percept. Mot. Skills 89:245–248.

Carlson SA, Fulton JE, Lee SM, Maynard LM, Brown DR, Kohl HW, et al. (2008). *Physical education and academic achievement in elementary school*: data from the early childhood longitudinal study. Am J Public Health , 98:721-7.

Creswell, J.W. 2009. Research design: *A qualitative, quantitative, and mixed method approaches .Third Edition.* Sage Publications

Cohen, L., Marion, L. & Morrison, K. 2003. *Research methods in education*.5th Edition. London: Rutledge.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences {Ind cd. *Hillsdale. NJ: Erihaum*.

Coster, W., & Parush, S. (2005). Participation and activity performance of students with cerebral palsy within the school environment. Disability and Rehabilitation, 27, 539-552.

Coe, D.P., Pivarnik, J.M., Womack, C.J., Reeves, M.J., & Malina, R.M. (2006). Effects of physical education and activity levels on academic achievement in children. Medicine & Science in Sports & Exercise, 38(8), 1515_1520. Davis, C.L., Tomporowski, P.D., Boyle, C.A., Waller.

Confrey, J. (1995). *How compatible are radical constructivism, sociocultural approach, and social constructivism*. In L. P. Steffe and, & J. Gale (Eds.), Constructivism in education (pp. 185−228). Hillsdale, NJ: Erlbaum.

Davis C.L., Tomporowski P.D., McDowell J.E. (2011). Exercise improves executive function and achievement and alters brain activation in overweight children: a randomized, controlled trial. Health Psychology 30(1):91-98.

Dwyer T, Sallis JF, Blizzard L, Lazarus R, Dean K. (2011). Relation of academic performance to physical activity and fitness in children. Pediatr Exerc Sci. 13:225-38.

Eriksson, L., Welander, J., & Granlund, M. (2007). Participation in everyday school activities for children with and without disabilities. Journal of Development and Physical Disabilities, 19 485.

Ewing ME, Seefeldt V (2002) Patterns of participation in American agency- sponsored youth sports. 2nd (Edn.), In: Smoll FL, Smith RE (Eds.).

Eveland-Sayers, B.M., Farley, R.S., Fuller, D.K., Morgan, D.W., & Caputo, J.L. (2009). Physical fitness and academic achievement in elementary school. Journal of Physical Activity and Health, 6(1), 99_104.

Fraser-Thomas JL, Côté J, Deakin J (2005) Youth sport programs: An avenue to foster positive youth development. Physical Education and Sport Pedagogy 10(1): 19-40.6.

Gerber SB (1996) Extracurricular activities and academic achievement. Journal of Research & Developmental Education 30(1): 42-50.2

Grissom, J.B. (2005). Physical fitness and academic achievement. Journal of Exercise Physiology online, 8(1), 11_25.

Heilman C (2012) A mixed methods approach examining alpine ski racing as a context for positive youth development. Dissertation Abstracts International 72.7.

Hillman, C.H., Castelli, D.M., & Buck, S.M. (2005). Aerobic fitness and neurocognitive function in healthy preadolescent children. Medicine & Science in Sports & Exercise, 37(11), 1967_1975.

Lauren Michelle Willis (2019). The Effect of Increased Physical Activity on Academic Performance .

Minstry of Education, M. (2010). *Education Sector Development Program IV (ESDP IV)*.

Muhammad HS and Pratiwi A (2021) The Effect of Physical Activity on Academic Performance.

Naul, R. (2002). Physical education in schools. In: R. Naul (Eds.) Sport and Physical Education in Germany (pp.87-98). London: Routledge. New York: Jersey Pencil Hall. Inc Schenker, R.,

Naylor, P.J., Nettlefold, L., Race, D., Hoy, C., Ashe, M.C., Wharf, H.J. & McKay, H.A. (2015). Implementation of school based physical activity interventions: a systematic review. Preventive Medicine. 72:95–115.

Parfitt, G., & Eston, R.G. (2005). The relationship between children's habitual activity level and psychological well being. Acta Peadiatrica, 94, 1791_1797.

Physical Activity Guidelines Advisory Committee (2008) Physical Activity Guidelines Advisory Committee Report 2008. Washington, DC: U.S: Department of Health and Human Services.

Puehse U, Gerber M. (2005). International Comparison of Physical Education Concepts, problems, prospects. Aachen: Meyer and Meyer.

Yore, M.M., Ham, S.A., Ainsworth, B.E., Kruger, J., Reis, J.P., Kohl III, H.W., and Macera, C.A. (2007) Reliability and validity of the instrument used in BRFSS to assess physical. Medicine and Science in Sports and Exercise. 39: 1267- 1274.

Schaban LA (2002) The effect of inter scholastic sports participation on academic achievement of middle school students, NASSP Bulletin 86: 34-31.4.

Stage, F. K., Muller, P. A., Kinzie, J., & Simmons, A. (1998). *Creating learning centered classrooms: What does learning theory have to say?* ASHEERIC Higher Education Reports, vol. 26(4). Washington, DC: The George Washington University, Graduate School of Education and Human Development.

Stegman, Stephens LJ (2000) Athletics and academics: Are they compatible? The High School Magazine 7(6): 36-39.3. Stephens LJ,

Trudeau F, Shephard RJ.(2008). *Physical education, school physical activity, school sports and academic achievement*. Int J Behav Nutr Phys Act;5: 10.

Tomporowski, P.D., Davis, C.L., Miller, P.H. & Naglieri, J.A. (2008). Exercise and children's intelligence, cognition, and academic achievement. Educational Psychology Review. 20(2):111-131.

Tremblay MS, Inman JW, Willms JD.(2000). *The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children*. Pediatr Exerc Sci, 12:312-23.

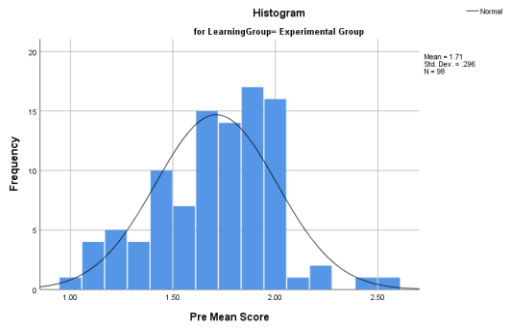
US Department of Health and Human Service (1996) Physical Activity and Health: A report of the Surgeon General. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion: Atlanta, GA.

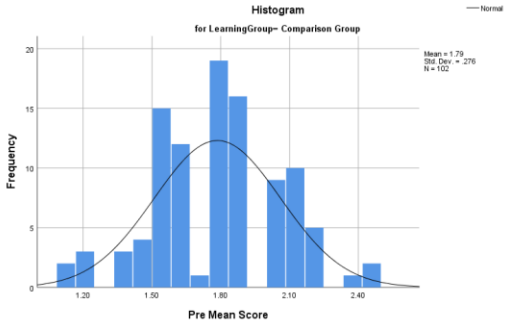
United States Department of Health and Human Services. (2008). 2008 Physical activity guidelines for Americans. Retrieved February 20, 2018, Retrieved from https://health.gov/paguidelines/pdf/paguide.pdf.

WHO (2010a). *Global Status Report on Non-communicable Diseases. Geneva*; Switzerland: WHO No.9.

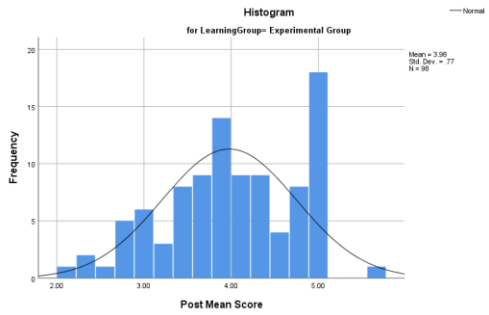
APPENDICES

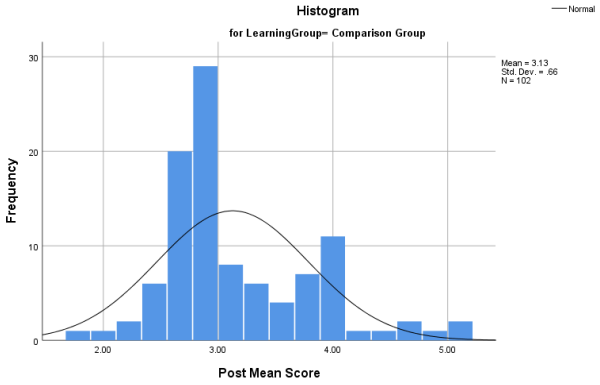
Appendix I: Histograms for Normality of pretest data.



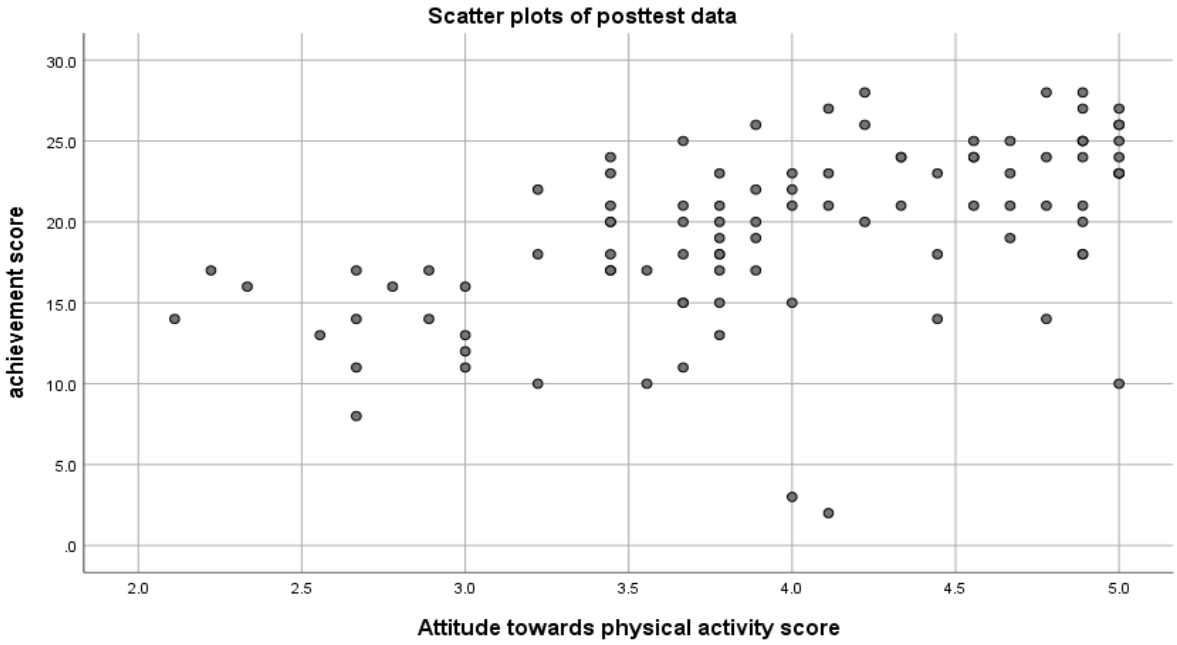


Appendix II: Histograms for normality of posttest data.





Appendix III: Scatter plots of post test data.



Appendix- IV: Questionnaire for Students

Addis Ababa University College of Education and Behavioral Studies Department of Science and Mathematics Education

Dear respondents:

The researcher is conducting a study for the fulfillment of the degree of Masters of education in teaching physical education on the effect of physical activity on students' academic achievement in Andode and Bori secondary schools in Lemi kura sub-city administration, Addis Ababa.

The purpose of this study is to examine the effect of physical activity on students' academic achievement .To achieve this purpose, I would like to ask you a number of questions. It will only take a few minutes to complete and your responses will be kept strictly private and confidential. The success of this study, however, depends on your kind cooperate and genuine response. Therefore, you are kindly requested to answer all items provided in the questionnaire.

.

Thank you in Advance for your cooperation!

1. No need of writing your name
2. Give response by putting (√) in the appropriate box against each closed ended items and by giving brief descriptions of your opinion for open ended questions. Every response has to be based on your school context

Part One: - Demographic Characteristics of the Respondent

1. Name of school……Sub City…….
2. Sex: Male ☐ Female ☐
3. Age: 13-15year ☐ 16-18year ☐
4. Grade A) 9th ☐ B) 10th ☐

Part Two:- Closed Ended Question

I. Effect of physical activity on students' academic achievement

Please rate the factors listed below that are assumed to be effect of physical activity on students' academic achievement (put "X" mark in the box under the scale against each statement)

Key: SA= Strongly Agree, A=Agree, UN=Uncertain, D=Disagree, SD= Strongly Disagree

No	**I. Effect of physical activity on students' academic achievement**	Scale				
		SA	A	UN	D	SD
1.1	physical activity has advantage on academic achievement					
1.2	physical activity can motivate to learn other subjects					
1.3	The lower priority given to physical activity					
1.4	Students have low level of interest in physical activity					
1.5	Students have Negative attitude for physical activity					
1.6	Students perform physical activity skills effectively in a variety of settings					
1.7	Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.					
1.8	Students demonstrate positive growth in self-concept through appropriate tasks or projects.					
1.9	Students individually demonstrate consistent, responsive and caring behavior					

II. Relationship between physical activity and students' academic achievement

Please rate the factors listed below that are assumed to be Relationship between physical activity and students' academic achievement (put "X" mark in the box under the scale against each statement)

Key: SA= Strongly Agree, A=Agree, UN=Uncertain, D=Disagree, SD= Strongly Disagree

	II. **Relationship between physical activity and students' academic achievement**	SA	A	UN	D	SD
2.1	Physical activity has direct relation with academic achievement					
2.2	Physical activity can increase students achievement					
2.3	Students use productive team membership skills.					
2.4	Students demonstrate the ability to accept the rights and responsibilities for self and others.					
2.5	The session is no attractive and flexible.					

III. Physical activity support students in their academic achievement

Please rate the factors listed below that are assumed to be effect of physical activity on students' academic achievement (put "X" mark in the box under the scale against each statement)

Key: SA= Strongly Agree, A=Agree, UN=Uncertain, D=Disagree, SD= Strongly Disagree

	III. **Physical activity support students in their academic achievement**	SA	A	UN	D	SD
3.1	Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.					
3.2	Students effectively use interpersonal skills.					
3.3	Lack of Peer support					
3.4	Negative attitudes of the student on physical activity.					

Part Three: - Open ended question

1. What are your understanding about the effect of physical activity on their academic achievement----------
---
---

2. What is your opinion about physical activity on the other subjects? ----------
---

3. Do you think that physical activity can support academic achievement?

A. Yes B. No

For the above question , If your answer is no put your suggestion below ----------
---

---

4. Do you think that physical activity and academic achievement has relation?

A. Yes B. No

For the above question , If your answer is no put your suggestion below ----------
---

Appendix V: Leading Questions of Interview for Teachers

Addis Ababa University College of Education and Behavioral Studies Department of Science and Mathematics Education

This interview Guide is designed for teachers in selected secondary schools of Lemi kura sub-city administration, Addis Ababa.

Dear respondents, the main purpose of this interview is to obtain information about the effect of physical activity on students' academic achievement in Andode and Bori secondary schools in lemi kura sub-city administration, Addis Ababa.

Hence, you are kindly requested to provide genuine information for the questions which is of paramount importance for the quality of the research, as well as to bring solutions to the issues under study. Thus, I would like to thank you in advance for your cooperation.

Thank you in Advance for your cooperation!

1. No need of writing your name
2. Give response by putting (√) in the appropriate box against each closed ended items and by giving brief descriptions of your opinion for open ended questions. Every response has to be based on your school context

Section One: - Demographic Characteristics of the Respondent

1. Name of school……Sub City…….
2. Sex: Male ☐ Female ☐
3. Age: 20-25year ☐ 26-30year ☐ 31-35year ☐ 36-40 year ☐ above 41 ☐
4. Level of education: Degree ☐ Master ☐
5. Experience: under5 year ☐ 6-10 year ☐ 11-15 year ☐ 16-20 year ☐ above21 ☐
6. Additional responsibility If any…….....

Section Two: - Effect of physical activity on students' academic achievement

1. What are the advantages of physical activity on academic achievement for other subjects?
2. What kinds of measurements to be taken to improve the relationship between physical activity and academic achievement?
3. What is the Teachers and Students relating the effect of physical activity on students' academic achievement?
4. How could Physical activity support students in their academic achievement?

Thank you once again for your Cooperation!

Appendix- VI: Questions of Interview Guide for School Principals and cluster supervisors

Addis Ababa University College of Education and Behavioral Studies Department of Science and Mathematics Education

This interview Guide is designed for Principals in selected secondary schools of Lemi kura sub-city administration, Addis Ababa.

Dear respondents, the main purpose of this interview is to obtain information about the effect of physical activity on students' academic achievement in Andode and Bori secondary schools in Lemi kura sub-city administration, Addis Ababa.

Hence, you are kindly requested to provide genuine information for the questions which is of paramount importance for the quality of the research, as well as to bring practical solutions to the issues under study. Thus, I would like to thank you in advance for your cooperation.

Section One: - Demographic Characteristics of the Respondent

1. Name of school……Sub City…….
2. Sex: Male ☐ Female ☐
3. Age: 20-25year ☐ 26-30year ☐ 31-35year ☐ 36-40 year ☐ above 40 ☐
4. Level of education: Degree ☐ Master ☐
5. Experience: under5 year ☐ 6-10 year ☐ 11-15 year ☐ 16-20 year ☐ above21 ☐

Section Two: Effect of physical activity on students' academic achievement

1. What is the Institution, Teachers and Students relating the effect of physical activity on students' academic achievement?
2. What are the rolls as school principals and cluster supervisors in facilitating the teaching learning process of physical activity?
3. What are the advantages of physical activity on academic achievement for other subjects?
4. What kinds of measurements to be taken to improve the relationship between physical activity and academic achievement?
5. How could Physical activity support students in their academic achievement?

Thank you once again for your Cooperation!

Appendix-VII: Observation Guide (Check list)

Addis Ababa University College of Education and Behavioral Studies Department of Science and Mathematics Education

School _____ Date _____ Grade _____

Key Guide:

1 – Never 2 – Seldom 3 – Sometimes 4 - Often

	Classroom Behavior	1	2	3	4
1	Pay attention in class				
2	Cooperate with peers, ability to work with others				
3	Have a positive, cheerful attitude				
4	Produce work and assignments that are high quality				
5	Are defiant or noncompliant				
6	Lack effort or motivation or give up easily				
7	Have excessive movement or are out of seat often				
8	Are off task or inattentive during class time				
9	Are unable to change activities or make transitions smoothly				
10	Are unhappy, sad or depressed				
11	Need to be talked to about problem behaviors				
12	Students interest to participate in other subjects				

Cohen, J. (1988). Statistical power analysis for the behavioral sciences {Ind cd. *Hillsdale. NJ: Erihaum*.
Minstry of Education, M. (2010). *Education Sector Development Program IV (ESDP IV)*.

National Educational Assessment and Examination Agency (NEAEA)

Ethiopian General Secondary Education Certificate English Examination from the administered between the year 2005 E.C to 2009 E.C.

Name ----------Grade and section ---------- School ----------

DIRECTIONS: For items 1-10, out of the choices A, B, C, D, only one is correct. Choose the one best completes each sentence.

1.The writer ……. Book became the bestseller of the year is my grandfather.

A. Who is B. where C. whose D. whom

2.We----------aromatic flowers during spring for pleasure.

A. are smelling B. we're smelling C. smell D. have smelled

3. I am very tired because _____ more of the day has been taken up by practical classes.

A. Few B. Little C. Less D. Much

4. There was a very severe accident there last week. A car hit a big tree and ……. driver was seriously injured.

A. this B. that C. the D. a

5. It was ……. beautiful day that we all decided to go out for a picnic.

A. such B. such as C. so D. so a

6. Is there ……. milk in the fridge?

A. any B. none C. make D. do

7. It is clear that rural areas in Ethiopia have ……access to clean water……. urban areas.

A. most …than B. more…from C. less… than D. least…from

8. I entirely ……the suggestions he forwarded earlier.

A. agree wise B. agree by C. agree of D. agree about

9. Early warnings prevented many people from a major **disaster.**

A. surrender B. surprise C. catastrophe D. disturbance

10. …the weather was very bad, the match between the two teams continued up to the end.

A. Although B. However C. In spite of D. Because

National Educational Assessment and Examination Agency (NEAEA)

Ethiopian General Secondary Education Certificate Biology Examination from the administered between the year 2005 E.C to 2009 E.C.

Name ----------Grade and section ---------- School ----------

DIRECTIONS: Choose the correct answer from the given alternatives.

1. Which of the following blood component transport waste products to the kidneys?
   A. Red blood cell B. Plasma C. white blood cells D. platelet
2. Which of the following methods helps to keep the hygiene of breathing of structures?
   A. Smoking B. Drinking alcohol C. cleaning teeth D. Breathing deeply
3. Which of the following animals is found in Nechisar National Park?
   A. Galada Baboo B. walia ibex C. crocodile D. Mountain Nyala
4. The control of the water and electrolyte balance in the body is
   A. Osmoregulation B. Thermoregulation C. photoregulation D. chemoregulation
5. Which of the following breathing structures separates human thorax and abdomen?
   A. Ribs B. bronchus C. Diaphrame D. Ttachea
6. What cause goiter?
   A. Excessive salt intake B. Iodine deficiency
   C. Vitamin deficiency D. Execessive protein intake
7. Which one of the following molecules is made up of amino acids?
   A. Sucrose B vitamins C. protein D. sweeting
8. Why do we need a balanced diet? To
   A. Prevent infection by HIV.
   B. Become very tall
   C. Gain excessive weight
   D. Support healthy growth
9. What is the role of chlorophyll in photosynthesis? To absorb
   A. Oxygen gas B. Water molecules C. carbon dioxide D. light energy
10. Production of biogas is an application of biotechnology in the area of
    A. Medicine B. food C. energy D. water

National Educational Assessment and Examination Agency (NEAEA)

Ethiopian General Secondary Education Certificate Mathematics Examination from the administered between the year 2005 E.C to 2009 E.C.

Name ----------Grade and section ---------- School ----------

DIRECTIONS: Choose the correct answer from the given alternatives.

1.Which of the following is a polynomial function?

A..f(x) = x 2 3 −2x+1 B.f(x) = p (x + 4)2 C.f(x) = x 2+1 x2−1 D.f(x) = p (x 2 + 1)2

2.When f(x) = x 115 + 1 is divided by x + 1. what is the remainder?

A. 2 B. 1 C. -2 D.0

3.What is the value of x if log121 (x+7) = 2?

A. 11 B. 5 C.4 D. 7

4.Which of the following is not a real number?

A. √ 81 B. √5 243 C.√3 −27 D. √6 −243

5.Which of the following is not true?

A. 2log3 2 = 3 B. log4 8 = 2 C. log1 10 = 0 D. ln e = 1

6. Which of the following is not true about the polynomial function f(x) = x 3+4x 5+3x−6 5?

A. Its leading coefficient is 4 5. C. Its constant term is -6.

B. It is a polynomial over rational number. D. The coefficient of x 4 is 0.

7.The simplest form of log64 2 ÷ log128 2 is .....

A. 12 49 B. 6 7 C. 2 7 D. −12 49

8.If x + 2 is a factor of cx4 − 2x 3 + 4x 2 − 8x − 8, then the value of c is .....

A. −5 2 B. 3 2 C. -2 D.-4

9.Let f(x) = −x 2 (x 2 − 3)3 (1 − x), then which of the following is true about f(x)?

A. The leading coefficient is negative. C.The degree of f(x) is 9.

B. The graph of f(x) is cross the x-axis at 0. D. 3 is a zero of multiplicity 3 of f(x).

10.The characteristics of the number 1672 is ———.

A.2 B. 3 C. -2 D.-3


195
192


292
295


366
368


276
263