GENDER BASED RELATIONSHIPS BETWEEN STUDENTS ACADEMIC ACHIEVEMENT AND THEIR PHYSICAL EDUCATION SKILL TESTS IN SECONDARY SCHOOLS OF ARSI ZONE OROMIA IN ETHIOPIA

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This is to certify that this thesis prepared by Kebebe Beyene, entitle: gender based Relationship between students academic achievement and their physical Education skill performance in secondary schools of Arsi Zone, Oromia region in Ethiopia and submitted in partial fulfillment of the requirements for the degree of Degree of Master of Education (Physical Education) complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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ABSTRACT

Gender based Relationship between student's academic achievement and their Physical Education skill performance in secondary schools of Arsi zone Oromia region in Ethiopia

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Good performance on skills of physical education taking part in daily physical activities and active movements help students to mature in cognition and improve, their learning and success on academic areas, and the vice versa. This implies that there is strong relationship between student's academic performance and results of physical education skill results in education setting. However this association was not tested and determined among secondary schools students at the specific study setting. The main objective of the study was to find out relationship between academic performance and physical education skills based on test results among grade nine students in secondary schools of Arsi zone, Oromia regional state during first semester in 2008E.C.cross-sectional descriptive survey study was conducted on 451 students from six secondary schools using multistage stratified sampling techniques and cluster and convenience sampling techniques respectively. Grade nine students, physical education teachers and rosters sheet were sources of required data. Collected data was analyzed using SPSS version- 20. On four systematically selected subjects, similarly, their results on physical education skill test results found to be consistent with their academic achievement on the four subjects. Statistically significant relationship was found between their academic achievement on the four subjects and their results on physical education skill tests using Mean, standard division, t-value, p-value and Pearson product moment correlation. Better results on physical education skill tests have strong relationship with classroom success for better results on academic areas. Thus it could be inferred that active participation and vigorously taking part in physical education skill boost student's levels of cognition and academic performance. Keywords: academic achievement, gender, physical education skill, performance, achievement, secondary school, academic performance.

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LIST OF ABBREVIATIONS AND ACRONYMS

AAC	Academic Achievement
ADHD	Attention Deficit Hyperactivity Disorder
BMI	Body Mass Index
CDC	Center for Disease Control and Prevention
CDE	the California Department of Education
GPA	Great Points Average
HPE	Health and Physical Education
MHR	Maximum Heart Rate
PAAC	Physical Activity across the Curriculum
SPARK	Sports, Play and Active Recreation for Kids
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

This chapter was presents the introduction part of the research problem. It included: background of the study, statement of the problem, objective of the study, the research questions, significant of the study, delimitation of the study, limitation of the study, organization of the study and operational definition of the study.

1.1 Background of the Study

Physical education plays an important role in the physical growth and development of students. Through Physical Education, students acquire the knowledge, skills, right attitudes and values towards the pursuit of lifelong physically active and life style.

In Ethiopia during the past three and half decade's Physical education and sport has increasingly become an academic discipline. In the past Physical education and sport was closely allied to the larger area of education, of which its attention has focused in the development of students in different schools. Today the attention given for the role of physical exercise and sport which has now become part of activities in schools, colleges and universities, organizational setting, sport and health clubs has been increasing than ever before. The demand of the society in the area of Physical activities for maintaining and developing total health and well-being was forced professional in the area to revise the past approaches (sport Academy Bare Dare University). .

Exercise directly has impact the behavior and development of the brain. It is likely that the effect of Physical Activity on cognition would be particularly important in the highly plastic developing brain of youth (Ьacsh, 2010).

Physical education is an opportunity for all children to be physically active and improve aerobic fitness. Given the demonstrated academic and health benefits, providing PE 150 minutes for elementary school children and at least 225 minutes for secondary school children among all grade levels as a part of the 60 minutes of daily moderate to vigorous PA recommended by the physical activity guide line for Americans is a justifiable use of

valuable school time. Developing policies or regulations relating to Physical education is a logical first step to make this requirement a reality. However, the policies must be implemented and enforced consistently to ensure students experience the benefits of PE. One study suggested that the greatest cognitive benefits from PE resulted when PE classes were scheduled during the early or middle part of the day, not at the end of the day. Making PE the center piece of the school day may improve physical health and in turn maximize child's potential to be academically successful. Active Living Research (January, 2015).

Davis, Tomporowski, McDowell, et al, (2011) analyzed results from forty-five studies and found positive results in academic performance when exercise was implemented. The researchers used the information as a plat form for educators to incorporate Vigorous PA. Taras (2005) posited that exercise over long period of time that produces gains in fitness levels would be more likely to increase cognitive abilities and likely more success in the classroom.

Dwyer et al (2001) also revealed a significant relationship between PA and academic success. The researcher determined a low correlation, similar to the study. He proposed that regular exercise would make modest improvement in the classroom, nothing that there is not just one factor that leads to academic success.

Some recent research shows that PA of the student is one of the most significant influences impacting learning and academic achievement. Grisson (2005) investigated the link between fitness levels of the students and their stand for achievement test scores and presented evidence of positive correlation between students' fitness scores and their academic achievement.

The Trois Rivers study (Qubebec Canada) indicate that the students who received an hour of PE per day in addition to the standard Physical education class (1.d.wk-1 for min) showed better academic performance compared with control subjects who only had the standard PE class. The authors assessed academic achievement using average grades for French, English, Mathematics, Natural Science, and conduct. These subjects were similar to the core classes used to assess academic achievement in the present study. The Trois

Rivers findings suggest that if students in PE receive an adequate amount of PA during class sessions they may perform better academically.

In a recent study "PA was positive related to school contentment and academic achievement" (Kristiansson, Sigfusdottir, Allegrante, and Helgason P. 69, 2009). Physical activity can also increase academic performance indirectly by improving emotional health, self-esteem, and alertness all of which are related to improved academic performance (Tremblay, Inman, and Willms, 1998). Date from social survey indicate that youths who engage in moderate to high levels of PA tend to perform better in school (Dwyer, Sallis, Blizzard, Lazarus, and Dean, 2001: Field, Diego, and Sanders, 2001; Pate, Heath, Dowda, and Trost, 1996). These studies provided evidence that schools which endeavor to amplify academic instructional time at the cost of PE time will experience reductions in student learning and academic performance.

Several reviews on PA, cognition and academic achievement were published in 2011. Ahnand Fedewa reviewed studies on PA and several mental health outcomes, including cognitive impairment and conducts problems, and found positive association with cognitive functions in randomized the studies.

Fedewa and Ahn also conducted a thorough meta-analysis of 59 studies that examined the effect of PA on academic achievement of cognitive functions.

1.2 Statement of the Problem

Active involvement and practicing of physical activities and development of better physical education skills and good performance on physical education have been posited that they could help students become mature in cognition, become healthier and better achiever in other subjects (academic areas).

In most secondary schools in Ethiopia students hardly practice physical activities, engage actively in physical education and demonstrate weaker physical education skills and performance. Moreover, significant proportion of students achieved below average levels of academic performance on other subjects as well. However, patterns of relationship

between levels of engagement in physical education, acquired physical education skills performance and academic results of students on other subjects are not clearly determined. Finding of previously conducted researches indicate that there is no consensus among researchers and scholars concerning patterns of relationship among the stated issues. For instance, Shephard (1996) reported that physical activity exerts positive effect on students academic performance. However, the finding of Tremblay (Inman, cited in Man and Willams, 2000) reveal contrary or antagonistic pattern of relationship.

Academic achievement was not related to enrolment in physical education, but interestingly it was associated with the total amount of vigorous activity performed by the students subsequent analysis of 55 minute PE class revealed that only 19 minutes of this time was spent in moderated to vigorous activity and it was suggested that this was not sufficient vigorous activity to impact on academic achievement (Coe et al, 2006). It could be that a threshold activity level is required to positively influence academic achievement. Students who take part in daily PE show better academic performance and attitudes toward school versus students who do not participate in daily PE (Dwyer et al, 2001) "when students receive daily quality PE, the rate of learning per unit of time appears to increase" Smith and Lounsbery (2009).

The link between physical activity and academic performance, remain less established. The relationship has recently been studied more but there is still a limited amount of research on the topic and studies, findings have been mixed; some have found a positive effect of physical activity on academic performance (E.g. Shephard, 1996) and some have found a negative effect (e.g. Tremblay, in man, and Willms, 2000).

Coe et al (2006) proposed that "threshold" of physical activity must be passed before effects are noticeable in the classroom. The intensity of the exercise must be assessed and somewhat vigorous in order for there to be an increase in academic performance. These results might explain why our differences in group GPA were low and there was not a stronger correlation between GPA and the exercise variables.

Dwyer et al (2001) revealed a significant relationship between PA and academic success. The researcher determined a low correlation, similar to this study. The researcher

proposed that regular exercise would make a modest improvement in the classroom; nothings that there is not just one factors that lead to academic success. The researchers found that all of the following contributes to success in the classroom; cardio respiratory endurance, muscular strength, and regular PA. Although types of PA were not examined in the current study Dwyer et al (2001) should all types were beneficial.

According to Hanna Ford, (2005) movement is vital on how individuals embody and express their learning, their understanding, and themselves. Movement integrates and anchors new information and experience in to the brain: therefore, it activates one's mental capacity (Field et al, 2001).

As far as the know principal investigator is concerned, there is no published empirical study on the thematic issues of the study in Ethiopia in general, and at the specific study settings, in particular. Therefore the study aimed to assess the relationship between students academic and their results on physical education skill tests in secondary schools in Arsi zone.

1.3 Objectives of the Study

General objective of the study

The general objective of the study was to find out the relationship between student's academic performance and their results on physical education skill tests among secondary schools of Arsi Zone, Oromia region, in Ethiopia

Specific objectives of the study

In addition to the above point the study was also soughed the following points:

- To classify students in to academic ability groups based on their scores or examination results in four selected academic subjects (i.e. English, Math, Biology and History)

- To asses presence of differences between male and female students inters of relationship between academic performance and levels of physical education activities. .
- To categorize grade nine students physical education skill performance in to distinct performance groups.
- To examine relationship between academic and physical education performance among grade nine students. .

1.4 Research Questions

In line with the above objectives of the study the following research questions were formulated.

1. In to how many academic ability groups do the scores or examination results of grade nine students on academic subjects could be classified?
2. Was there difference between students in terms of the relationship between their academic performance and levels of physical education activities or scores on physical education subject?
3. In to how many groups could grade nine students be categorized based on their physical education skill distinct performance?
4. Was there a significant relationship between grade nine student's academic performance and their scores on Physical Education skill tests?

1.5 Significance of the Study

The result of the study was helpful in the following way: physical education teachers of the secondary school particularly who have been teaching at school where this study taking place may use of the finding of the study as resource. Based on this problem, the researcher was believed that the study have the following significances.

- Finding of the study generate baseline data for researchers who want to explore thematic issues of the study in depth and broader aspects.

- They enrich existing empirical liter hire and broaden the body of knowledge on the field of study.
- They serve as evidence for policy makers to design and implement, appropriate strategies.
- The study indicate or promote the relation and difference between academic performance and physical education skill tests of male and female students of grade nine. .

1.6 Delimitation of the Study

This study was conducted in Oromia regional state of Arsi Zone secondary schools. So, it was delimited in the selected secondary schools focusing on relationship between students' academic achievement and physical education skill performance in those schools due to self sponsor. So the finding and recommendation of the study could not be generalized for other high schools outside the schools covered in the study.

1.7 Limitation of the Study

Obtained real responses from the participants were very challenging. Because physical education skill tests, the participants were not interested that to take skill tests. It was realized to affect the study negatively. To overcome this problem the researcher tried to inform the participants about the purpose of the study. The other problem that the researcher was faced was related to the instrument of data collection. Mostly, the instrument that the researcher used to collect data to measure/evaluate Physical Education skill performance was field tests that might not indicated the exact performance of Physical Education skill performance of the students.

The other problem that faced the researcher was academic achievement results because all of them were not followed by standardized test. Therefore, to overcome these problems, tactful and systematical approaches were applied.

1.8 Organization of the Study

The study was divided in to five chapters. The first chapter covered introduction which include: background of the study, statement of the problems, objectives of the study (general and specific), and research questions, significant of the study, delimitation and limitation of the study, organization of the study and operational terms of the study. Chapter two deal with review of related literature to the topic of the study. . Chapter three describes the materials and method of the study. It includes source of data, data collection instrument, sampling techniques and sample size, population, and data collection and analysis procedures. Chapter four explains the results of the study. The final chapter discusses the results in more detail along with implications for future research and practice. Finally references cited and annexes are treated,

1.9 Operational Definitions of Terms

The following terms were used throughout the study for clarity of their meaning and usages of the terms are defined as follow:-

Academic achievement: test scores in subject areas such reading, mathematics, language arts and world studies.

Physical education: is education through physical activity for the development of total personality of students and fulfillment and perfection in the body, mind and spirit.

Academic performance: describes different factors that may influence student success.

Gender: male and female students that participate in research study.

Skills: the ability to performed academic score tests and physical education activities.

Physical activity: activity that can be performed by using body components.

Cognitive functions: functions of human brain that includes executive function, attention, memory and intelligence Quotient.

Performance: is application of activities to facilitate peak physical education and academic performance of the students.

CHAPTER TWO

THE REVIEW OF RELATED LITERATURE

Introduction

The review of related literature involves the systematic identification, location and analysis of documents containing information related to the research problem. Written component of a research plan or report that discusses the reviewed document. These documents included articles, abstracts, reviews, monographs, dissertation, books, other research report and electronic media efforts.

2.1 Conceptual Definitions

The research on this topics suggests that PA can be related to many different aspects of academic performance (e.g. attention, on task behavior, grade point average (GPA)), and as a result, the existing literature examines a wide range of variables. In this report, those variable are organized in to three categories.

1) Cognitive skills and attitudes
2) Academic behaviors and
3) Academic achievement

Academic performance: it is used broadly to describe different factors that may influence student success in school. These factors are grouped in to three primary areas.

1) **Cognitive skills and attitudes:** It include both basic cognitive abilities, such as executive functioning, attention, memory, verbal comprehension and information processing, as well as attitudes and beliefs that influence academic performance such as, motivation, self-concepts, satisfaction, and school connectedness.
2) **Academic behaviors:** It included a range of behaviors that may have an impact on student's academic performance. Common indicators include on task behavior, organization, planning, attendance, scheduling and impulse control.

3) **Academic achievement:** It includes standardized test scores in subject areas such as reading, math, and language arts, GPAs, classroom test scores and other formal assessment. Center for disease control and prevention (CDC, 2010, P. 10).
4) **Physical Education (PE):** a curricular area offered in K-12 physical education play an important role in the physical growth and development of students. Through PE, students acquire the knowledge, skills, right attitudes and values towards the pursuit of lifelong PA and life style. It also provides an avenue for students to express themselves through movement and PA is the corner stone of PE programmed. The PE programmed is schools should be enjoyable and provide opportunities for students to develop a positive association with PA. Through PE students are given the opportunity to participate in a variety of physical activities such as sports and games and acquire the concepts and skills that will enable them to participate in these sports and games both for leisure and completion.

In addition, PE provides a natural plat forma and valuable opportunities to develop self-management skills, social and co-operative skills, and build character. It serves to complement other educational areas in promoting the desired outcome of education. In particular PE helps to cultivate health habits, teamwork, resilience and resolve, Curriculum planning and development division Singapore (2006).

2.2 Concepts of Physical Education

Forman there is nothing more beautiful and valuable than his physique. Education given in respect of physical well being of man is physical education. Modern thinkers in education emphasize that the best individual is one who physical fit, mentally sound, intellectual sharp, emotional balance and socially well adjusted. Therefore, in the modern curriculum physical education finds its due place.

Physical education is not health education. They are two different subjects. Education for health is health education, whereas education of physique is physical education. But health education and physical education are interrelated. Both of them aim at physical well being of a person. Health education programmed includes physical education and physical education aim at the development of health of a person. Hence both these

subjects have a common goal. In the world of J.B. Nash "Health and recreation are results, while PE activities are means" Health and Physical Education (P. 176).

Physical Education

Throughout the history, PE has been misunderstood and misconstrued. The term has been confused with physical training, physical culture, games, and health education. Physical education refers to more than athletics for physically gifted boys and girls. It refers to an instructional programmed build around basic motor activities which helps achieve the goal of physical, emotional and mental well-being for every student.

Academic achievement refers to the progress a child makes in school as measured by his scores on achievement tests, his grade point averages, and his promotion from grade to grade, and the development of proper attitudes. Health and physical education programmers are related to academic achievement in at least four ways.

a) Through emphasis of the development of motor skill
b) By promoting physical fitness
c) By importing knowledge and modifying behavior in regard to good health practices and
d) By aiding in the process of social and emotional development which leads to a more positive self-concept

(Health and physical education p. 177)

Views of Some Authorities on PE

Edward Hitch Cock think that: "physical education as understood is such as a cultivation of power and capacities of students as will enable him to maintain his bodily condition in the best working order providing at the same time for the greatest efficiency of his intellectual and spiritual life". **Voltmer and Esslinger:** In 1949 Voltmer and Esslinger suggested that "physical education is education through physical activity." But later on the modified this definition by saying PE is the process by which changes in the individual are brought about through his movement experiences."

J.F. Williams: Commends that "physical education is the sum of man's physical activities selected as to the kind and conducted as to outcomes." **J.B. Nash**: For him, "physical education is that phase of the whole field of education that deals with big muscle activities and their related responses." **Brown Hill and Hagman:** Placing more stress on the growth and development regarded PE as "accumulation of whole some experience through participation in large muscle activities that promote optimum growth and development." **Butcher:** Considers PE as "an integral part of total education process which has its aim the development of physically, mentally, emotionally and socially fit citizen through the medium of physical activities which have been selected with a view of realizing these outcomes." **Dudley Sargent:** "Physical education should aim to improve the mass of students and to give them as much health, strength and stamina as possible to enable them to perform the duties that await them after they leave the college." **R. Cassidy:** said "PE is the sum of changes in the individual caused by experience centered in motor activity." **D. Oberteuffer:** "Physical education is the sum of these experiences which come to the individual through movement." **J.P. Thomas**: says that "PE is education through physical activities for the development of total personality of the child and its fulfillment and perfection in body, mind and spirit." Source: Health and physical education book (P. 179-180).

2.3 Objectives of Physical Education

The school PE programmed should seek to develop in each student the ability to:

1) Perform and enjoy a variety of physical activities with understanding

Developing proficiency in PA helps students to channels their desire for play in to constructive outcomes.

Their interest will be extended as they attain a broader range of movement skills and concepts from which they can be derive greater satisfaction.

2) **Developing and maintain physical health and fitness through regular participation in physical activities**

- Physical health and fitness enable students to carry out their daily tasks with vigor, and still leave them with sufficient energy to pursue and enjoy leisure activities.

3) **Demonstrate positive self-esteem through body awareness and control**

- Body awareness and control are developed through movement activities when students used their bodies to express their ideas, attitudes and emotions. Through these movement experiences, they learn about their abilities and limitations. This knowledge is vital in the motor skill acquisition and the development of positive self-esteem.

4) **Understand and apply thinking skills to physical education**

- The PE programmers provide students with opportunities to engage in decision making and problem solving situations. Such opportunities help students to develop thinking skills such as organizing and evaluating, focusing and remembering, generating and integrating, interring and analyzing decision making and creative problem solving.

5) **Demonstrate the spirit of fair play, team work and sport man ship**

- Opportunities for interaction during PE lesson serve to develop in students social qualities such as courtesy, sport man ship, co-operation, team work, loyalty and consideration for others. Some competitive sports and games may create emotionally charged situations.

6) **Acquire safe-practices during physical activities**

- Safe practices are fundamental to the participation and enjoyment of PA. Students should also be made aware of the common sense, safety rules and consideration to reduce potentially dangerous or threading situations. This will enable students to play safely and acquire an awareness of safety with respect to themselves and others. Curriculum planning and development Singapore (2006, P. 2).

2.4 Need of Physical Education and its Importance

The modern age is the age of science and technology. Man gets all his comforts, in life from machines. At this stage of development it is not only difficult to do away with machines but also impossible to keep man a live without them. For this dependence, there has been deterioration in human physical efficiency. Modern man, in comparison to his primitive counterpart is poorer and inferior with regard to physical power and skill. Therefore, in the centers of learning, emphasis is now given on physical activities, Source Health and physical education (P. 181).

Importance of Physical Education

Rhyme once said "A sound mind resides in a sound body." It is the sound constitution of the body that makes the operation of mind easy and certain. Out health body is the base for all the structure of good work, including education. Our body is the means even to achieve our Dharma meaning religion or duty in a sense, as we take it. We all agree that no duty can be performed without a sound or health constitution. In ancient days a lot of physical work was done by one and all, in the family, including women, children, and even the old. Therefore, they possessed a sound body and a sound mind .But, in this industrialized society love for leisure developed as a habit among citizens. The complex life situations, tensions, set-backs, competitions, hurry and worry, make out a case for physical fitness and its education. Therefore, in the field of education much importance is given to physical education. Thus PE is an integral part of a sound system of education. It trains up the whole man. It results in health, happiness, and character. Therefore, the secondary education commission states "The physical welfare of youth of the country should be the main concerns of the state and any departure from the normal standard of well-being at this period of haze may have some serious consequences" Health and physical education (P. 181-182).

2.5 Benefits and Outcomes of PE in School Program

Physical Development

Physical education in school is the main societal institution for the development of physical skills and the provision of PA in children and young people (Sallis, 1997). For many children, the school is the main environment for being physically active, through either PE programs or after school activities. The physical health benefits of regular PA are well established. Regular participation in such activities is associated with a longer and better quality of life; reduce risk of a variety of disease and many psychological and emotional benefits. There is also a large body of literature showing that in activity is one of the most significant causes of death, disability and reduced quality of life across the development world (US DHHS, 1996).

Basic movement skills, like those developed in PE, form the foundation of almost all later sporting and physical activities. There is evidence that those who have developed a strong foundation in fundamental movement skills are more likely to be active, both during childhood and later in life President's council on physical fitness and sport (1997).

Social Development

These ideas that Physical Education positively affects young people's social development and pro social behavior goes back many years (Weiss, 1990). PE settings are considered an appealing context because both naturally occurring and contrived social interactions frequently emerge and because the public nature of participation usually makes both socially appropriate and in appropriate behavior evident. The research literature on the relationship between PE and social development is equivocal. There is evidence that in some circumstances behavior actually worsens. However, numerous studies have demonstrated that appropriately structured and presented activities can make a contribution to the development of pro social behavior and can even combat antisocial behaviors in youth (Morris et al, 2003).

Affective Development

There is now fairly consistent evidence that regular activity can have a positive effect up on the psychosocial well being of children and young people, although the underlying mechanisms for explaining these effects are still un clear. The evidence is particularly strong with regards of children's self-esteem. For (2000) other associations with regular activity that have been reported included stress, anxiety, and depression. All of these lend support to the claim that well planned and presented PE can contribute to the improvement of psychological health in your people. One especially relevant set of findings, in this regard, relates to the development of perceived physical competence. It has been suggested that self-esteem is the influenced by an individual's perceptions of competence or adequacy to achieve, and that it is also worth considering the growing interest in the relationship between PE and students' general attitudes toward school, Marsh (2003).

Cognitive Development

There is a long tradition claiming that a "health body leads to health mind," and that PA can support intellectual development in children. However, there is also an increasing concern by some parents that while PE has its place, it should not interfere with the real business of schooling, which many believe to be academic achievement and examination results. Researchers have suggested that PE can enhance academic performance by increasing the flow of blood to the brain, enhancing mood, increasing mental alertness, and improving self-esteem. The evidence base of such claims in varied and more research is still required (Lau et al, 2004).

Some of these positive effects of mental health have also been shown in children and adolescents, although the evidence base is limited. Few studies have investigated the preventive or treatment effects of exercise on mental illness within this population, partly because incidence is low. However, reviews have indicated that exercise and/or sport involvement can have beneficial effects of psychological well-being.

For example exercise has been shown to improve physical self-perceptions and to a lesser extent self-esteem in children (Fox, 2001) although the effects are inconsistent.

In addition to the effects of psychological health, there has been substantial interest in the potential impact of improved fitness and exercise on cognitive function and learning in children. The notion that higher levels of activity or fitness may enhance thinking, concentrations and subsequently academic performance is attractive to educators. Not only could it benefit children, it could improve the school's added value for academic achievement. For physical educators and sport coordinators, it could justify greater provision of PA in the school curriculum.

2.6 Physical Education and Academic Achievement

More studies have examined the relationship between physical activity and academic achievement. This may be partly due to the fact that PA can occur in a variety of context and may be studied in variety of ways. For example PA can occurs before, during or after school in contexts such as recess, PE, intramurals, interscholastic sport, club sport, active transport, and community programs.

Four literature reviews have been published on the links between PA and cognitive functions or academic performance since 2003. In review of 44 studies Sibley and Etnier (2003) examined the evidence for the influence of PA on cognition in students. 28 cross sectional associational and 16 intervention studies.

Four studies in this review examined the relationship between academic achievement and time spent on PA. Tremblay et al (2000) studied the relationship between PA levels and the standardized test results of students in New Bruns Wick, Canada and found that PA levels were negatively related to academic achievement. Dollmay, Boshoff, and Dodd (2006) asked whether curriculum time committed to PE predicated standardized reading and Maths scores for South.

2.7 Schools Focus on Tests Scores, Not Activity

One of the reasons the Dutch authors decided to conduct their research review was concern over schools' emphasis on test scores. "There is a focus on test scores and academic accomplishments, and there's a belief that schools need to cram all available time into academic", said Dr. David Geier, directors of sports medicine at the medical university of South Carolina in Charleston.

Dr. Geier was not involved in the Dutch research "The other problem," Geier said, "Is that it becomes a funding issue for many schools."

If intellectual activities are incorporated with physical activities Geier sadi, "children will benefit both ways."

Dr. David Geier colleagues at the medical university of South Carolina and a group of educators recently tried that combination at an elementary school. They incorporated 40 minutes of PE everyday that included a learning component for different grade level. As an example young children rode's scooters while tracing shapes at the same time. When the students took their spring standardized tests, more children achieved their score goal after the new PE program than before it was implemented. But even if there are no academic gains, PA in schools is still very important.

"There is an even greater need for PE now, because the vast majority of children's leisure activities are sedentary and involve technology", said Keith Ayoob, associated professor of pediatrics at the Albert Einstein College of medicine in the Bronx, N.Y. "The problem is our bodies were not designed with technology in mind. They were designed for PA, and both children and adults should use this ability or we risk losing it."

"PE is health, and kids who are more physically fit are better able to focus on academic," Ayoob said, "There is also good evidence that in school districts where these are regular recess periods, there are fewer diagnoses of ADHD (Attention-Deficit Hyper activity disorder)."

2.8 Physical Activity and Academic Achievement

More studies have examined the relationship between PA and academic achievement. This may be partly due to the fact that PA can occur in a variety of context and may be studied in variety of ways. For example, PA can occurs before, during or after school in contexts such as recess, PE, intramurals, inter scholastic sports, active transport, and community programs.

A meta-analysis conducted on 16 experimental designs reported positive relationship between physical activity and cognitive function in school aged children (Sibely and Etnier, 2003). This study demonstrated that PA was positively related to various components of cognitive function such as perceptual academic achievement, verbal skills, mathematics skills, memory, and academic readiness. This study demonstrates that PA improves general cognitive function which has greater universal application than improvement in one specific skill such as mathematic performance.

Physical activity increases student's capacity for teach (Kong, 1999). Learning through movement is vital for successful experience in school "exercise besides shaping bones, muscles, heart and lungs also activates major growth of neurons and nerve nets in the basal ganglion, cerebellum and corpus call sum of the brain. Aerobic exercise increases the supply of blood and oxygen to the brain" (Hannaford, 2005).

Physical activity helps students concentration and focus (Young, 2001), being PA in school has positive impact on learning in the classroom. There are many advances brain research, through which we are now aware that most of the brain is activated during some sort of PA, much more than when sitting behind a desk (Major, 2001).

According to Hannaford (2005) movement is vital on how individuals embody and express their learning, their understanding and themselves. Movement integrates and anchors new information and experience into the brain, therefore, it activities one's mental capacities (Field et al, 2001). Movement assists brain growth and health for life time, and exercise may improve the functioning of the brain (Jarret et al, 1998). .

Most recently, a comprehensive review by (Tomporowski et al, 2008) was conducted regarding PA and cognition in youth, finding that systematic exercise programmes may

enhance the development of specific types of mental processing which are considered important for both academic achievement and for cognitive function across an individual's entire life span.

Despite such large scale reviews, few intervention studies have been conducted where PA programme is integrated into the school day, and its effect on cognition is monitored. As highlighted by Trudeau and Shephard (2010), a common assumption made in review a paper is that different PA from provide similar stimuli for the learning process through realistically this seems unlikely.

The debate over time spent on PA during school hours has shifted from students' health to students' academic achievement (Ravitch, 2010). Educators and administrators may justify the use of school time for PA by providing evidence that such activity improves student performance in those core subjects. Likewise, if PA has a negative effect on student's competence in those areas, the use of school time for such activities must be questioned.

According to Smith and Lounsbery (2009) there are both physical as well as social benefits of participation in PA. The physical benefits include improved physical fitness, decrease risk of chronic disease, and improve health status. Improved relationship with parents, improved mood, increased involvement in extracurricular activities, decreased drug use, and increase self-esteem which may account for higher grade point averages are among the social benefits found by field, Diego, and Sanders (2001).

Professional in health and educational field have intuitively believes that physically active and fit students perform better in school. Some studies have proven that there is a positive relationship between physical fitness and academic achievement (CDE, 2002), (Castelli, Hillman, Buck and Erwin, 2007).

On criticism of the study conducted by Davis et al (2007), was that since PA program was conducted after school, the PA program did not reduce the academic education programs devoted to traditional academic discipline (i.e. history, mathematics, English and science). A study by Carlson et al (2008) demonstrated that when a PE class was incorporated into the academic curriculum there was not a reduction in academic

performance in traditional academic programs even though class time devoted to these areas was taken away because of the introduction of the PE class.

Davis, Miller, and Naglier (2008), of studies of the effect of physical exercise on cognition and academic achievement. The conclusion reached by these authors is, that exercise may be an important method of enhancing aspects of mental functioning that are central to the cognitive development.

The potential for physical activity and physical fitness to improve cognitive function, learning and academic achievement in children has received attention by researchers and policy makers. This paper reports a systematic approach to identification, analysis and review of published studies up to early 2009.

Four literature reviews have been published on the links between PA and cognitive function or academic performance since 2003. In a review of 44 studies Sibley and Etnier (2003) examined the evidence for the influence of PA on cognition in children 28. Cross sectional associational and 16 intervention studies with children between the age of 4 and 18 years were included. Eight different categories of cognitive assessment were identified and associations or effects of single bouts and regular participation in various forms of aerobic training, resistance training and PE curriculum were summarized, Ahamed et al (2007).

In this study 50 minutes of additional PA per week (i.e. 10 minutes per school day) was administered to children in grades 4 and 5 at intervention schools. After 16 months the result of standard academic test did not significantly differ between intervention and control schools, despite the intervention group losing academic lesson time ($P<0.05$).

The mind and body require movement in order to alert and focused Daily PA can help promote a sound mind and body. According to Active Living Research (2007) "Fourteen published studies analyzing data from approximately 58,000 students between 1967 and 2006 have investigated the link between overall participation in PA and academic performance. Eleven of those studies found that regular participation in PA is associated with improved academic performance Ahamed et al (2007, P. 2).

As stated by active living research (2007) eight health surveys involving population-representative samples of youth from, the United States, United Kingdom, Hong Kong, and Australian noted statically note worthy affirmative correlations between academic performance and physical activity. Nevertheless, none of these studies assessed academic performance with standardized educational tests.

According to the finding of the Nelson and Gordon Larsen study, "Adolescents who reported either participating in school activities such as PE and team sports or playing sports, were 20 percent (20%) more likely than their sedentary peers to earn an "A" in math or English.

Two other smaller studies also reported a positive correlation between PA and academic performance. In 2002-2003 study, using data collect from 214 six grade students concerning the effect of PA class enrollment and PA on academic achievement, academic achievement was not significantly related to PE enrollment, but higher grades were associated with vigorous PA (Coe, Pivarnik, Womback, Reeves, and Malina, 2006). Research also indicates that students who take part in daily PE show better academic performance and attitudes toward school versus students who do not participate in daily PE (Dwyer et al, 2001).

The mind/body connection holds fascinating implications for the educational community. In a recent study, PA was positively related to school contentment and academic achievement (Kristijansson, sigfusduttier, Allegrante and Helgason, 2009, P. 69). The physical activity can also increased academic performance indirectly by improving emotional health, self-esteem, and alertness all of which are related to improved academic performance (Tremblay, Inman, and Willms, 1998).

Evidence suggests that students in elementary school through high school achieve better academically when they are physically active. Studies have demonstrated that PA is connected to physiological aspect of cognitive functioning (Sallis et al, 1999, Shephard, 1997).

Linder (1999) used a questionnaire together data on both PA and academic performance of 4,690, 9-18 years old students in Hong Kong. Both tests were administered by trained data collectors to classrooms of students. Each student personally completed his/her

questionnaires by rating their own PA and academic performance. After data analysis through the state view computer program, results showed a significant but low correlation (more for the girls than for the boys) indicating that students who perceive themselves to have high academic performance generally participate in more PA (Linder, 1999). It is obvious that no direct correlations or causations can be assumed from this study, however a positive relationship between PA and perceived academic performance was found.

According to the science now "while the number and quality of studies have increased in the past years, it is still difficult to draw definitive conclusions regarding the relationship between PA and academic achievement." The overall findings continue to be positive, as PA increases, cognitive function and academic achievement generally increases. Almost all studies in the past ten years have had at least one positive finding, but findings continue to be inconsistent. The most consistent positive finding, and most commonly measured outcome, has been with executive functions, particularly in habitation and working memory.

Executive functions have shown to be highly predictive of academic achievement with early assessment of executive functions predicting later academic success, working memory, a component of executive functions, is a predictor of vocabulary and mathematical reasoning tasks.

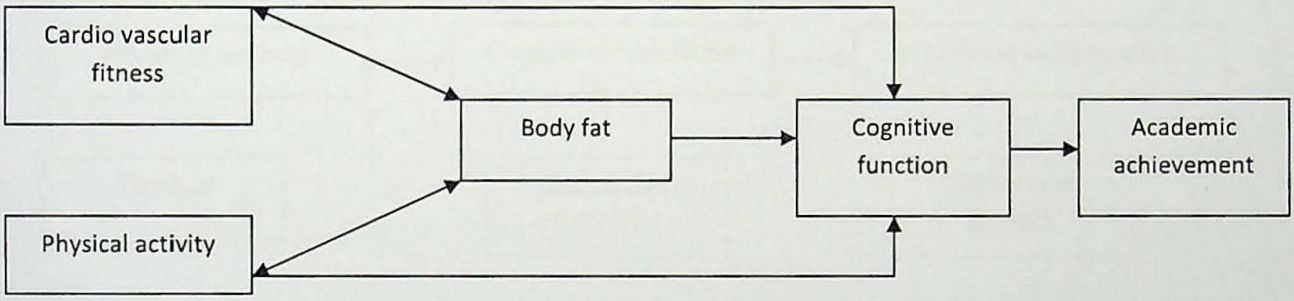
Dwyer et al (2001) revealed a significant relationship between PA and academic success. The researchers determined a low correlation, similarly to this study. The researcher proposed that regular exercise would make a modest improvement in the classroom, nothing that there is not just one factor that leads to academic success. The researchers found that all of the following contribute to success in the classroom cardio vascular endurance, muscular strength, and regular physical activity. Although types of PA were not examined in the current study.

Three meta-analysis statistical analysis of several earlier studies have previously been conducted on PA and its influence on cognitive process in youth (Etnier et al, 1997) investigated the effect of long term and acute exercise on cognition, resulting in an overall effect size of 0.25 when reviewing 134 studies (in this case effect size refers to

the impact of PA on cognition with 0.2, 0.5 and 0.8 respectively referring to low, medium and high impact of cognition).

Most recently, a comprehensive review by Tomporowski et al (2008) was conducted regarding exercise and cognition in youth, finding that systematic exercise programme may enhance the development of specific types of mental processing which are considered important for both academic achievement and for cognitive function across an individual entire life span.

Hillman et al (2009) this study examined the impact of 20 minutes of treat mill walking at 60% maximum heart rate (MHR), followed by cognitive testing, on 20 preadolescent children. The result showed that an improvement in response accuracy and academic achievement on the exercise trial relative to a resting control trail. The finding indicates that single acute boats of moderately intense aerobic exercise (i.e. walking) may improve the cognitive control of attention in preadolescent children, and further supports the use of moderate acute exercise as contributing factors for increasing attention and academic performance.



Model of factors associated with improved AAC by J.F Donnelly, K. Lambourrne (2009)

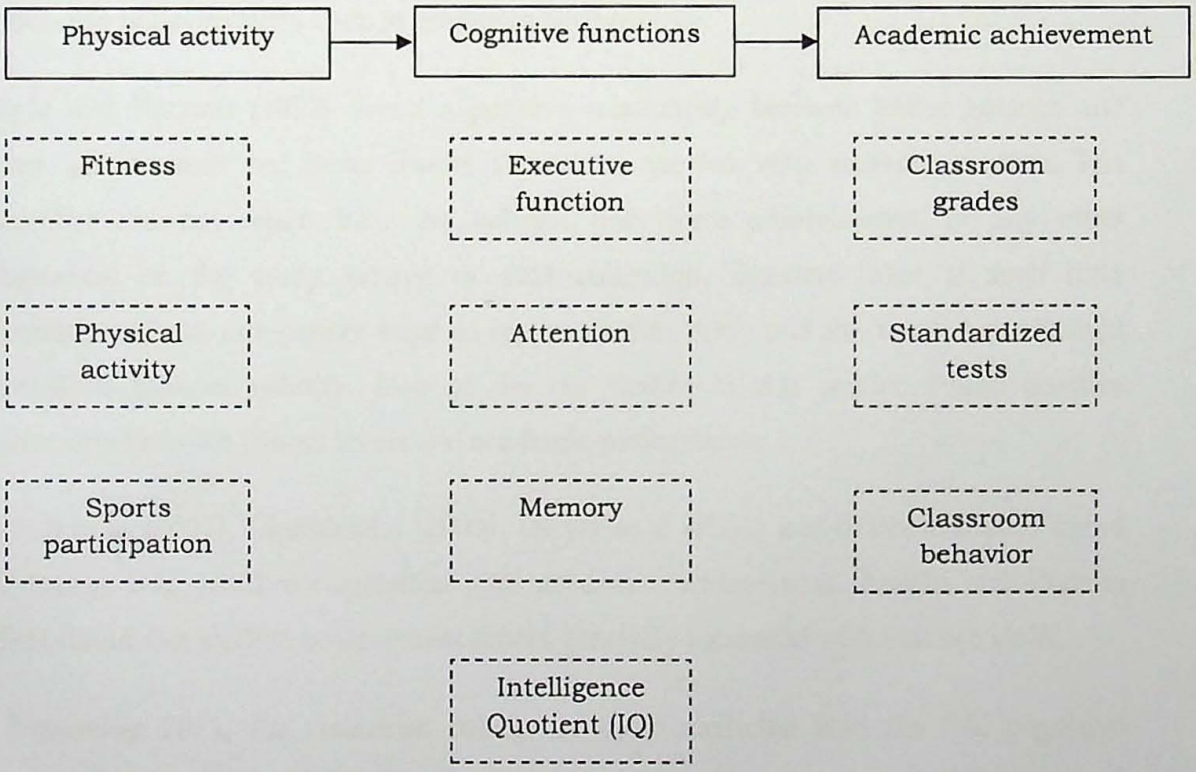
Classroom based PA generally takes the form of short break from academic instruction where some type of PA occurs. Classroom PA is either linked to an established curriculum (Stewart et al. 2004) or PA is coupled with the teachers existing lesson (Donnelly et al, 2009).

Evidence suggests that PA break improve classroom behavior such as increased time on task (Gabbard and Barton, 1979; Jarrett et al, 1998). Exercise can remodel the brain by promoting the creation of new brain cells and inducing other changes. Now it appears

that inactivity too can remodel the brain according to a notable new report by Geretchen Reynold (January 22, 2014).

The Marche, Robinson, and Graham (2007) compared standardized test scores in mathematics and English (Language arts) Massachusetts comprehensive assessment system among fourth-grade students receiving 56 hours per year of school of PE exhibited significantly higher test scores in English (Language arts) than students receiving 28 hours per school year of PE. There were no significant differences on Mathematics test scores.

Sigtusdottir, Kristiansson, and Allegrante (2007) evaluated the association between PA and academic performance in a nationally representative sample of Icelandic ninth and tenth grade students (=5,810). Physical activity was measured via four self-report questions related to frequency of PA outside of school, participation in sports clubs or teams, participation in non organized physical activities, and frequency of vigorous-intensity activities self reported grades in Icelandic, mathematics, English and Danish were used as indicators of academic performance.



Journal of sport and health science (December, 2012)

The notion that it might is supported by emerging research showing that PA sparks biological changes that encourage brain cells to bind to one another. For the brain to learn these connections must be made they reflect the brain's fundamental ability to adapt to challenge.

The more neuroscientists discover about this process, the clear it becomes that exercise provide an unparalleled stimulus, creating an environment in which the brain is ready, willing, and able to learn. Aerobic activity has a dramatic effect on adaptation, regulating system that might be out of balance and optimizing those that are not it's an indispensable tool for anyone who wants to reach his/her full potential; Source the New PE (2016).

Lawer recalled that his own transformation toward a "New PE" model did not begin in earnest "...until really started working with Dr. John Ratey, and when we found that PA affected the brain and the learning process. And PA would also affect student's behavior". Lawer saw these behavioral components as central tent that can be used to rally necessary support from administrators and funding sources to effect positive change. "...because behavior rates back to academic performance."

Knight and Rizzuto (1993) found a positive relationship between better balance and higher achievement but these results should be viewed with extreme caution. The researcher did not report how the balance tests were administered, or any other information on the study sample or data collection. Because there is such little information given, one cannot hope to replicates this study and the result have limited external or internal validity. Five of the six studies in this section found positive relationship between fitness levels and academic performance.

Castelli et al (2007), Chomitzetal (2009), Dwyer et al (2001) and Grissom (2005) found that fitness was positive correlation with academic achievement. Knight and Rizzuto (1993) found that student achievement scores generally increased with balance skills.

In November 2011, the American college of sport medicine held the PA, cognitive function and academic achievement conference, leading researchers, educators, and

policy makers presented and discuss the most recent evidence, much of which has accumulated in the past 5 years.

In order t develop a research and policy advocacy agenda for the future, it is important to consider previous work on this topic and the contemporary state of the science. The purpose of this review is to inclusively examine the literature about the connection between PA and academic performance in children in order to identify gaps for future research.

In American middle school children (Coe et al, 2006) found that academic achievement was not related to enrolment in PE, but interestingly it was associated with the total amount of vigorous activity performed by the children. Subsequent analysis of a 55 minute PE class reveled that only 19 minutes of this time was spent in moderate to vigorous activity and it was suggested that this was not sufficient vigorous activity to impact on academic achievement. It could be that a threshold activity level is required to positive influence academic achievement (Shephard, 1996). From analyzing these longitudinal PE interventions, it has been suggested that as a result, academic performance matches or exceeds that of controls. Students receiving additional PE appear to show accelerated psychomotor development, which could provide a mechanism for accelerated learning of academic skills.

In the Trios Rivieres study (Shephard and Lavallee, 1994) primary school students in an experimental group were subjected to an additional hours of PE each day compared to a control group, who received a signal period of 40 munities non-specialist education. The additional PE in the experimental group received 14% Less academic instruction than control group.

Physical activity and academic achievement correlation studies by different authorities

Author	Location	Subjects	Physical activity assessment	Academic assessment	Primary finding
Carlson et al (2008)	USA	5316 students follow from Kg to 5th grade	Teacher reported frequency and duration of PE lesson, textile formed	Mathematics and reading tests	Third textile girls (70-300 minutes of PE per week) achieved slightly high academic score in Kg, first grade mathematic compared to first tertile girls (0-35 minutes of PE per week)
Sigfusdottir et al (2006)	Iceland	5810 nine and tenth grade students	Self-reported PA	Self-reported average grade for Icelandic math, English and Danish	Average week positive (r=0.091) and significant (P<0.01) correlation between self-reported PA and self reported grades
Yu et al (2006)	Hong Kong China	333 students aged 8-12 years	PA questionnaire for older children	Examination or test results and teacher reported conduct grades	PA is not associated with academic achievement in either boys (r=-0.067) or girls (r=0.068) on sig. PA negative associated with school conducted in girls (r=-0.124, P<0.01)
Dwyer et al (2001)	Australia	7691 students aged 7-15 years	Experimenter administered questionnaire, assessing, frequency duration and intensity of previous week PA and usual activity	School representative rates each student's academic ability	Weekly PA associated with scholastic rating 9, 10 and 11 years old girls and 9, 10, and 11 years old boys
Tremblay et al (2000)	New Brunswick Canada	6923 sixth grade students	Four questions assessing participation in PA	Math and reading tests score	A weak negative relationship between PA and academic achievement

Davis, Miller, and Naglieri (2008), of studies of the effect of physical exercise on cognition and academic achievement. The conclusion reached by these authors is that exercise may be an important method of enhancing aspects of mental functioning that are central to the cognitive development

2.9 Historical Background of Physical Education in Ethiopia

In Ethiopia during the past three and half decades PE and sport has increasingly become an academic discipline. In the past PE and sport was closely allied to the larger area of education, of which its attention has focused in the development of students in different schools. Today the alternation given for the role of physical exercise and sport which has now become part of activities in schools, colleges and universities, organizational setting, sport and health clubs has been increasing than ever before. The demand of the society in the area of physical activities for maintaining and developing total health and well-being will force professional in the area to revise the past approaches.

2.9.1 Volunteer Teaching Physical Education in Ethiopia

Volunteer teaching PE in Ethiopia began in Addis Ababa. The age of students between 11-16, class size 45, requirement anyone who aged 16 and older can join. Ethiopia is a country famous for its world class athletes, is an ideal destination for projects abroad volunteers who want to coach sports to children. By taking partygoer PE project volunteer will not only be involved learning new skills and improving their own fitness, but will also be able to pass on their own sports knowledge to local children.

In Ethiopia a volunteer can choose to focus of teaching PE to children in schools or choose to combine working at a school with training at track and field club. As volunteer teaching PE in schools, you will teach a variety of sports to children aged 11 to 16 at local middle, and high school. The sports that are normally thought at school in Ethiopia were aerobics, track and field, basketball, soccer and volleyball. Each class has two PE lesson per week, so your day will be spent teaching a variety of age group. The project is not available during the school vocation from July to September, Source, wwww.proejct-abraod.org.com.

Earlier studies have demonstrated that PA is connected to physiological aspect of cognitive functioning (Sallis et al, 1999; Shephard, 1997) and suggest that learning complex movements stimulates the part of brain used in problem solving and learning (Sallis et al, 1999).

Other research suggests that physical exercise increases neural connections and cerebral blood flow (Jensen, 1988). Research in this area of expertise has blossomed during the last ten years, unlocking mysteries hidden deep inside the brain. Recent brain research has shown that the brain benefits from exercise, specifically aerobic exercise due to increase blood flow to the brain, which has several effects. The brain energy and oxygen increase due to the blood vessels being stimulated to grow. Memory formation is aided because of this increased blood flow.

Exercise also heightens production of the chemical brain derived neurotrophic factors (BDNF) which is found in the hippocampus, an area which is directly used during the learning process.

2.10 How Physical Activity Affects the Brain

Cognitive skills and motor skills appear to develop through a dynamic interaction. Research has shown that physical movement can affect the brain's physiology by increasing

- Cerebral capillary growth
- Blood flow
- Oxygenation
- Production of neuron trophies
- Growth of nerve cells in the hippocampus (central for learning and memory)
- Neurotransmitter levels
- Development of nerve connections
- Density of neural network
- Brain tissue volume

These physiological changes may be associated with

- Improved attention
- Improved information processing, storage and retrieval
- Enhanced coping

- Enhanced positive affect
- Reduced sensations of craving and pain

Center for disease control and prevention (CDC) July (2010)

Exercised directly impacts the behavior and development of the brain "it is likely that the effect of PA on cognition would be particularly important in the highly plastic developing brain of youth" according to a 2010 essay penned by Charles Basch of Columbia university. He summarized how exercise may affect executive functioning.

- Increased oxygen now to the brain
- Increased brain neurotransmitters
- (Increased) brain-derived neuron trophies' that support neuronal in areas responsible for learning, memory, and higher thinking.

In a recent study published in the journal of sports medicine and physical fitness, researchers at Michigan state university reported that the fittest middle school students in grade 6-8 received better grades and higher scores on standardized tests than their less fit counter parts. The study examined fitness and academic results of more than 300 students at a west Michigan school. The data indicated that cardio respiratory fitness and muscular strength and endurance were the health related components strongly associated with academic achievement Dr. James Pivarnik (May 24, 2013).

Davis et al (2007) investigated the influence of PA in the form of aerobic exercise on cognitive function. Examples of physical activities performed during PA sessions included activities such running games, tag games, jump rope and modified basketball and soccer (football).

5) association with PA. Through PE students are given the opportunity to participate in a variety of physical activities such as sports and games and acquire the concepts and skills that will enable them to participate in these sports and games both for leisure and completion.

2.10.1 Academic Achievement

It was based on individual grades for each student in the core classes (Mathematics, science, English and world studies) and standardized test score. For analytic purposes, individual letter grades were converted to numerical data A=5, B=4, C=3, D=2, F=1. Grades for the four courses were summed over two marking periods to calculate a grade score for each semester First semester grades were reported in November and January, and second semester grades were reported in April and June. Numerical grade scores could range from 8 to 40 (all as).

Terra Nova standardized test scores were also used as a measure of academic achievement. Terra Nova scores are derived from a national standardized test, which consists of multiple assessment of reading, or language arts, mathematics, science, and social studies. The test is administered in April (second semester) and scores (percentiles) can range from 1 to 99 (CDC, 2010).

Tips for increasing PA during the school day:

School-based PE: Schools and PE teachers can increase the amount of time students spend in PE or add components to increase the quality of PE class.

Recess: school boas, superintendents, principals, and teachers can provide recess to students on a regular basis. This can benefit academic behaviors, and social development.

Classroom based PA: teachers can incorporate active learning and PA breaks into the classroom setting to improve student performance and the classroom environment.

Extracurricular physical activities: super intendments, principals, and athletic directors can develop or sustain school based sports programs. School administrators and teachers also can encourage after school organizations, clubs, student groups, and parent groups to incorporate physical activities in their programs and events (Active living research, February, 2010).

2.11 Benefit of PA and PE to Student Academic Achievement

- Studies show a positive correlation between PA and academic performance
- Student test scores improve after engaging in PA
- Students who are physically active and fit are more likely to perform well in school than their sedentary peers
- Studies show an increased in academic achievement when additional time is provide for PA, even when time is removed from academic instruction
- Activity break help students on task behavior
- Active transportation enhances academic performance, Robert Wood Johnson (2010).

Youth receiving additional PA tend to show improved attitudes such as increased brain function and nourishment higher energy concentration levels, changes in body build, affecting self-esteem, increased self-esteem and better behavior which may all support cognitive learning (Cocke, 2002). (Tremblay, in man, and Willms, 2002) (Dwyer, Connan, Leitch, Hetzel, and Baghurst, 1983, Shephard, 1997).

Improved brain attributes associated with regular PA consist of increased cerebral blood flow, changes in hormone levels, enhanced nutrient intake, and greater arousal (Shephard, 1997). Cocke (2002) states "a trio of studies presented at the 2001 society for Neuro science conference suggest that regular exercise can improve cognitive function and increase level of substances in the responsible for maintaining the health of neurons." Brain function may also indirectly benefits from PA due to increased energy generation as well as from time outside of the classroom /away from studying. The increased energy levels and time outside of the class room may give relief from boredom resulting in higher attention levels during classroom instruction (Linder, 1999).

Physical activity can have both immediate and long-term benefits of academic performance. Almost immediately after engaging in PA, children are better able to concentrate on classroom tasks, which can enhance learning. Overtime, as children engage in developmentally appropriate PA, their improved physical fitness can have

additional positive effects on academic performance in mathematics, reading and writing. Recent evidence shows how PA effects on the brain may create this positive outcome, CDE (2002).

A research project conducted with 24 elementary schools called PAAC showed that adding sessions of PA to school curriculum could have long term benefits, such as improved academic performance. When comparing improvement in standardized test scores over three years, schools were stratified and randomly assigned to receive physically active lesson did 6 percent (6%) better than their peers who had received the same lesson in a seated, inactive manner. Although academic achievement test scores were not directly related to enrollment in high school PE, female students who both enrolled PE and participated in vigorous PA lesson had significantly higher grades than students who were not engaged in PE lessons, Active Living Research (January, 20150.

Across sectional study completed by the California Department of Education (CDE) (2002), included a sample of 954,000 students who were in grade five (353,000), seven (322,000) and nine (279,000). The study individually matched stand for achievement test ninth edition (SAT-9) standardized test scores with results of the state mandate, teacher administered, physical fitness test, known as fitness gram. The six fitness standards included in the fitness gram are cardiovascular endurance, body composition, abdominal strength and endurance, trunk strength and flexibility, upper body and endurance, and overall flexibility.

Results of the CDE (2002), study included "a statistical analysis indicating a distinct and linear correlations between student's academic achievement and fitness scores" all in the three grades higher academic performance was positively related to higher levels of fitness with the greatest academic gains in students who met three or more physical fitness standards. This association was greater in mathematics than in reading. Additionally, females demonstrated higher academic achievement at higher fitness levels than the males.

In a separated study eight nine high school seniors were administered a questionnaire that gathered information on their exercise habits, relationships with parents and peers,

depressive tendencies, sports involvement, drug use, and academic performance. "Students with a high level of exercise had better relationships with their parents (including greater intimacy and more frequent touching), were less depress, spent more time involved in sports, use drugs less frequently, and had higher grade point averages than did students with low level of exercise" (Field, Diego, and Sanders, 2001, P. 105).

Providing further evidence linking the mind and body. According to Sallis et al (1999) "PA enhance academic performance by triggering physical changes in the brain. It is not too far of a stretch to say that PA stimulates the brain there by promoting academic achievement. Not only does exercise boost blood flow to the brain, it also causes the discharge of certain hormones that could bet learning." In a study performed by Davis et al (2007), the researcher performed brain scans and found that the children who were exercising seemed to have more neural activity in the frontal areas of their brains, an important area for planning and organizing, problem solving, concentration, resisting impulses, and using strategies to achieve goals.

A limited number of studies have examined the effects of quality PE on academic achievement. This may be because the process of determining the effect of PE on academic achievement is complex and requires control over many extraneous variables. For example, there is great variability in the curriculum that is taught and in consistent student enrollment due to minimal requirements (NASPE and AHA 2006). In addition academic achievement can be measurd in numerous ways. (E.g. grades, standardized achievement tests, concentration tests, exam scores by subject) and is influenced by many factors. (E.g. teachers, curriculum, previous learning). Despite these limitations, a literature review identified a few studies that examined PE and academic achievement.

Davis et al (2011) analyzed results from forth-five different studies and found positive results in academic performance when exercise was implemented. The researchers used the information as a plat form for education to incorporate vigorous PA. Taras (2005) posited that exercise overlong period of time that produces gains in the fitness levels would be more likely to increase cognitive abilities and likely more success in the class room. This propositional aligned with the current study because a strong correlation

existed between length of work out and number of month one had been exercising. Those who had been regularly exercise for an extended period of time were more likely to be regular gym goes and spend more time on their work outs.

The idea of the mind and the body working together to achieve success is an essential part of life. Aristotle (as cited in Brijgemanna and Greds Ploeger 2013, P. 427). Once said "life is movement" both Plato and Aristotle recognized the relationship between PA and the mind. The examination of the connection between PA and cognitive function is a more recent topic of research (Koch and Hasbrouck, 2013). Connection between the brain and the bodily movement comprise a popular topic of the study. New brain growth and development, referred to as neurogensis is a product of recent studies as researchers find commonalities between brain growth efficiency of function and increased levels of exercise.

Benefits of exercise do not stop at the muscular level but integrate connections within the brain to stimulate new path ways, which inevitably speed up learning process (Ratey, 2008).

A recent article by Burton and Vanheest (2007) stressed the important role that PA may play in the health and academic achievement of minority children. The article highlighted the disparities in academic achievement and health status among children of color. Burton and Vanheest espoused that PA may be even more important for children of color, who are at increased risk of poor health and low academic achievement (JOPERD, Volume 80 No.1 January, 2009).

Health people 2010 goals advocate requiring schools to mandate daily PE. However, legislative programs such as "No child left behind act of 2001" have placed pressure on school systems to increase academic performance. The majority of the school systems have responded to this apparently conflicting pressure by reducing school time devoted to PE. Currently only about 3.8% of schools require daily PE classes in early childhood education programs, (Lee, Burgeson, Fulton, an Spain, 2007).

As school every where strive to improve the academic performance of their students, may have cut PE and recess periods to leave more time for sedentary classroom instruction. A sensible new report from the institution of medicine titled "educating the student's body: taking PA and PE to school." Show how short sighted this trend can be. It found that exercise can significantly improve children's cognitive abilities and their academic performance as well as their health" (SPARK, May 24, 2013).

A national longitudinal study analyzed data collected from 11,957 adolescents across the United States to examine the relationship between PA and sedentary behaviors patterns (Nelson and Larsen, 2006). According to the finding of the Nelson and Larsen study, adolescent who report either participating in school activities such as PE and team sport or playing sports were 20 percent more likely than their sedentary peers to earn an "A" in math or English.

SPARK strongly supports academic learning and health students through quality, daily physical education (PE) for grade prek-12. And SPARK realizes that in many schools PE and PA time are in adequate totaling for below the recommended 60 minutes a day.

2.11.1 Physical Activity Positive on academy

According to Rajjc et al (1997) regular exercise can improve academic performance and an effort to participate in frequent physical activity should be made by students. The physically active student is more likely to be academically motivated, alert and successful (Dwyer, Sallis, 2001).

Physical educator are continually trying to justify the value of their work to avoid cuts or elimination of requirements and funding one long term strategy has been to clime that quality PE will contribute to the academic and intellectual development of students.

"Physical educators were grasping for ways to justify exercise and PE Programs. If it could be shown that activity program contributed to intellectual development, and then they would gain credibility and be justified" (Kire Kendall, 1985, P.59).

It is found that exercise can significantly improve student's cognitive abilities and their academic performance as well as their health. Students who exercise have low body fat, greater muscular strength, and better cardio vascular and mental health.

Academic performance influenced by factors like parental involvement and socio economic status, but the panel reported that active students tended to have stronger performance, especially in reading and mathematics. It believes that the benefits of exercise during school day out weight, the benefits from increasing class time. The report recommends that all students get at least 60 minutes a day of vigorous or moderate PA, equivalent to a brisk walk.

Few teachers, administrators and parents would argue with the assumption that PA is likely to help the student's performance better in school. Physical activity improves general circulation, increase blood flow to the brain and raises level of no repine prime and endorphins all of which may reduce stress, improve mood, induce calming effect after exercise, and perhaps as result improve achievement. The structure of PA in school also provides social benefits that would result in academic outcomes. Students who learn to cooperate; share and a bid by rules of group physical activities and those who learn to discover and test their physical activities even in individual activities are likely to feel more connected to their school and community and want to challenge themselves. Physically active adolescents are less likely to attempt suicide adopt risk taking behaviors and become pregnant all of which may be associated with better academic outcomes, Howard Taras (Augus 2005, P. 2).

Regular exercise can improve academic performance and an effort to participate in frequent PA should be made by students. The physically active student's more likely to be academically motivated, alert, and successful, (Dwyer, Sallis, Blizzards, Lazarus and Dean 2001).

2.11.2 Factors that Affects Physical Education and Academic Achievement

A. **Health of the student**: when our children are unhealthy, they are not ready to learn. Million of our KG-12 students are out of shape. Many are overweight and starvation. And there are many reasons why consumption of high fat, high- calorie foods and drinks, consumption of soda, lack of exercise and too much time playing video or computer games and watching TV. We can change this and we must. President Bush has directed that our schools work to make our children heather through a new initiative. The "schools for a healthier us challenge", we can educate our children and keep them healthy. And it only take the right incentives, some common sense and are solute will to make this happen (Paige, 2004, p.4). Through various studies, educators have learned that academic performance and physical education skills can improve if children healthy are keep and if they are physically fit. Health eating patterns in children and adolescent promote optimal children health, growth and intellectual development.

B. **students attention**: Budde, Voelcker- Rehage, Pitrabry- Kendziorra, and Ribeiro and Tidow (2008) studied the performance of two groups of high schools students on attests of attention and concentration and found the group that took the test immediately follow 10 minutes of coordinated exercise showed significantly higher improvement on the test compared with the group that engaged in 10 minutes of regular, non- coordinated exercise. Raviv and Low (1990) examined whether the concentration of 11- 12 years old students was higher or lower following a physical education classes and found that mean concentration scores were elevated towards the end of classes.

C. **Teachers performance and scoring**: academic achievement was measured by a third party using training psychologists blinded to condition. The wechseler individual achievement test -2nd edition (WIAT11; The psychological corporation,200) was individually administered during a 30 minutes period, and assessed reading, writing, mathematics, spelling, oral language skills and

provided individual test scores and an overall composite score. Significant improvement in academic achievement from base line to 3 years were shown in the PAAC compared to the control schools for the composite, reading, mathematics and spelling scores. Teachers reports of the number of minutes of PA performance each week ranged from average of 45 minute to 75 minute per week. Nine of 14 PAAC schools average greater than or equale to 75 min per week.

The average number of min for PA were lowest at the beginning of each semester and increased significantly within each year, and across years from base line to the end of year 3 (p is less than 0.0001) .teacher participation in class room PA was directly related to children's PA levels measured using SOFIT, an instrument designed to during the PE. SOFIT involves recording students PA level, curriculum context variables and teacher behavior during direct observation (Mckenzie etal'; 1992). Teachers who themselves were more physically active had students who were also more physically active. From the above information teacher performance and scoring is important to achieve both academic and physical.

D. **Equipment and facilities**: a study can be made of the space needs, special equipment, courses, court, special marking and supplies. The proper use of space, equipment, and materials reduces the amount of time need for conducting tests. Proper space planning also reduces around stations or along the flow of traffic. From the above information equipments and facilities are among the factors that affect physical education results and academic achievement.

E. **The nature of tests**: there are two broad classifications tests of measurement instruments that are referred to as norm- referenced and criterion referenced.

Norm-referenced tests: are designed by the test developer to measured individual difference so one persons score on such a test can be compared to the scores of other similar persons who have taken the same test. These scores are known as norms. From tables of norms, ones score is interpreted in terms of how it compare to the scores of

other similar persons scores. The standardized tests that you have taken through your years of schooling were norm- referenced tests.

The criterion behavior:-in this type of testing test scours are compared, not to each other ;but to a standard that is referenced to a criterion behavior. Performers whose scores meet or exceed the standard are claimed to be masters and those-whose scores fall below the standard are non masters. There are no limits to the number of persons who may achieve mastery on the test.

2.12 The Impact of PE, PA on Psychological and Social Benefits which may Impact on Academic Achievement

Mental health including self-esteem and confidence

The US National longitudinal study of adolescent health reported positive association between PA and several components of mental health including self-esteem, emotional well being, spirituality, and future expectation (Trudeau and Shephard, 2010).

Similarly it has been stated that positive impacts of PA on anxiety, depression, mood and well-being are not disputed (Tom Porowsk, 2003). There is a wealth of literature to suggest that PA is significantly related to increase self-esteem and speculated knock-on effects of this are benefits in all aspects of school life, including improved classroom behavior and academic performance (Shephard, 1996).

The influence of PA on self-esteem may be influenced by the activity mode undertaken, although positive cognitive behavioral modifications have been observed across aerobics, strength and flexibility activities (Strong et al, 2005).

Anti-Social Behaviors

A report by the world health organization (Jones-Palm and Palm, 2004) found that young individuals who participate in organized PA demonstrate lower rate of anti-social behavior and teen age pregnancy. Furthermore they are less likely to smoke cigarettes or use drugs than non physical activity participants. Similar in oxidation findings emerged

from a behavioral investigation survey of 1000 German adolescents, which found a strong association between PA participation and resistance to drug and alcohol addiction (Kirk Caldy et al, 2002). Lower rate of anti-social behavior are likely to result is lower disaffection from school and thus enhanced academic performance.

2.13 Effect of PE, PA and Sport Activity Levels on Academic Achievement

Daily PE class may provide the opportunity for children to meet health people 2010 guidelines for PA. Many school districts, however, are reducing PE requirements, and some are eliminating programs. The percentage of schools requiring PE in each grade decrease from approximately 50% in grades 1-5 to 25% in grade 8 to only 5% in grade 12. Daily participation in PE among high school youth at the national level is 29.1% and participation declines as students progress through grade 9(42.1%), 10(30.4%), 11(20.0%) and 12(20.1%).

PE classes are being replaced with other classes in an effort to increase the students' academic achievement as measured by standardized tests. Despite this trend, no clear evidence indicates that academic achievement will improve if PE classes are cut.

Numerous studies have shown positive relationship between academic achievement and both PA and sport participation, where as a few have shown no correlation or an inverse relationship.

The mechanisms by which students may improve academic achievement as a result of increased PA through PE include increased arousal and reduce boredom, which may lead to increased attention span and concentration. Increased activity levels might also be related to increased self-esteem, which could be expected to improve classroom behaviors as well as academic performance. Most previous studies are cross-sectional, longitudinal evaluation of PE classes, PA, participation and academic achievement may provide more complete information of their true relationship. This investigation was conducted to determine the effect of PE class's enrollment and overall PA on academic

achievement in middle school children over the courses of an academic year, Medicine and science in sport and exercise (March, 2006, Pp. 1515-1519).

The world health organization (Who, 2010) suggest that PA participation assists social development of young people by promoting self-expression social interaction, and social integration. They further suggest that physically active young people more readily adopt other health behaviors such as avoidance of drugs and cigarettes. This section of the report examines the extent to which PE, PA and sport can impact on:

- The extent to which young people feel connection to their school
- The aspirations of young people
- The extent to which positive social behaviors exist within school
- Volunteering and the development of leadership and citizenship skills

2.14 Relationship of PE with General Education

Physical education has long been recognized as an integral part of the total process of education. Man is an indivisible integration of body, mind and soul, and education must attempt to strength then this integration. The whole man should have a whole education. Any narrow interpretation of term education so as to mean curriculum followed in school, extent of schooling or development of intellectual aspect alone would defeat the very purpose of education. No individual, no community, no nation can depend up on one aspect of life for the whole of living. Man is a psycho-physical organism and mind and body should not be conceived as two separate entities. It has been very appropriately summed up by Montaigne. "It is not soul, it is not body that we are training up; it is a man, and we ought not to divide him into two parts" John Lock he also expressed similar thought by staging "a sound mind in a sound body is a short but full description of a happy state in this world".

There has been a significant shift in the definition of education from the 3Rs (Reading, writing, arithmetic) to 3ms (man, material, methods) i.e. all-round development of personality. It is clearly established that physical education is an integral part of general education. Bucher a Bucher is also of the same view. He defined "physical Education

(PE) as an integral part of the total education process", It is by now well settled that growth and development of an individual is the real essence of education.

According to Swami Vive Kanada "The end result of all education, all training should be man making modern education has recognized it responsibility of man making by under taking the development of all aspect of personality i.e. mental, physical, emotional, intellectual and social, the end result of being all round development of the personality. Physical education also strives to achieve the same end result.

"Physical education is education through physical activities for the development of total personality of the child and its fulfillment and perfection in the body, mind and spirit". J.P. Thomas.

Physical education is a process through which whole someone develops of the child is ensured. The first lesson of education that child learn is through body movement. D. Oberteuffer endorsed similar view and said "physical education is the sum of those experiences which come to the individual through movement". This initial body movement of the child is followed by play.

- **Froebel**

"The discovery of the educational possibilities of the play side of life may be counted one of the greatest discoveries of the present day. It marks, Cam convinced, the dawn of a new era in human education... all over the civilized world today, education for Leisure is challenging the attention of through full men... The liberal education of the body is the education of the mind as well" L.P. Jacks.

"The aim of physical education is the optimum development of physically socially and mentally integrated and adjusted individuals..."

CHAPTER THREE

MATERIAL AND METHODS

This part of the thesis focuses on the research design and methods that were employed during the course of the study. It includes research designed, source of data, and participants of the study, sample and sampling techniques, data collection instrument, like Physical Education skill performance tests academic achievement results, sample size, method of data analysis and ethical consideration of the study.

3.1 Research Design

A cross sectional descriptive survey study design was employed to adders the issue of the study because the focus of the study was to find out relationship between student's academic achievement and physical education skill tests. .

3.2 Research Site

Arsi zone is found in the central part of Oromia regional state in Ethiopia. Arsi zone is sub –divided in to 24 rural and three city districts. Asela is the capital town of the zone. The zone is one of the bases of top international. Athletes like Haile G/silase, Kenenesa Bekele, Darartu Tulu, Tirunesh Didaba.

Education institution such as KG ,341 complete primary schools [1-8] 1092 secondary schools first cycle [9-10],79 preparatory schools [11-12] second cycle 24, one teacher training college of education and one university .These educational institutions are both governmental and non –governmental .Additionally0ther institutions like two nursing colleges ,one agricultural development agents training college ,six technical and vocational education training college and one Athletics training college .Moreover ,there are also non –governmental training institution like Rift valley university college ,open 2020 college And other distance education training institution like Alpha and s t .Merry college located in Arsi zone.

3.3 Population

Source of population: all grade nine students attending their secondary schools education in six systematically selected secondary schools were the sources of data or source of population.

Study population: All grade nine students who were available during data collection period were the study population. The total number of population grade nine from six selected secondary schools for the study was 451 participants. The participants were selected from different family back ground and heterogeneous in their academic ability from both sexes. The age group for the participants was 15-18 years old. The reason behind taking grade nine age 15-18 at this age and levels the participants were give pay more attention to physical education class and also they start to use their potential to fulfill their need and compete with others, also more volunteer than other secondary schools students like grade ten who were prepares for grade 10 national examinations.

Sources of data: Roster sheets kept by the schools for the four selected academic subjects in addition to physical education skill tests were used as data sources for academic performance of students. Physical education skills of students on physical education were assessed and collected by physical education teachers in collaborated the principal researchers. Thus students and physical education teachers were other sources of data.

3.4 Data Collection Instrument of the Study

Since the methods of the study were quantitative survey the instrument that used to collocate data were physical Education skill performance tests and academic achievement results of the students.

3.5 Physical Education Tests to be Conducts of the Participants Results

3.5.1 Nine Minute Running Test

This test would be measured the cardio vascular endurance of the participants' performance. All test performance practice distance running for nine minutes and cover the greater distance around the marked out area and registered how far each participant (he/she) cover in a set time of nine minutes. The performers should understand the advantage of maintain a constancy pace before attempting the test.

The researcher designed the rating scale of nine minute run based on the distance covered. As the distance covered within nine minutes is increase the cardiovascular of the participants were high.

3.5.2 Pushup

It is the test to measured muscular strength of the participants. The men students should use the standard "military style" pushup position with only the hand and the toes touching the floor. Girl's students have the additional option of using the "bent knee" position. To do this, kneel on the floor, hand on either side of the chest and keep your back straight. According to Golding et al (1986), the average number of pushup for boys is 15-20 for age 11-14. For girls also the average number should be 12-15 for age 11-14 per minute Golding et al, (1986).

3.5.3 Trunk Lift and Neck Extension

This exercise/test used to measure/ improves the strength of upper body. For this test performing position of the performer will be a prone position on a mat and placing both hands on the lower back with a parent holding hip against the mat, the performer raises the trunk is slow and controlled manner as high as possible for the mat. The test will measured the distance from the tip of nose to the mat is measured. The average height trunk lift for age 11-14 for boys and girls is 9-12 inch (Johnson and Nelson, 1986).

3.5.4 Tests for Flexibility

The sit and reach test is a common measure of flexibility and specifically measures the flexibility of lower back and hamstring muscles. This test is important as because tightness in this area is implicated in Lumbarlordosis, forward Pelvic tilt and Lower back pain. This test was described by wells and Dillon (2006) and is now widely used as a general test of flexibility. It is suggested by wells and Dillo that the average rate for trunk and lower body sit and reach flexibility test is 0 to 5 cm for men and +1 to +10cm for women (Wells and Dillon, 2006).

3.5.5 Sit-up

It is one of the field tests that the researcher used to measure the performance of physical education skill of the participants for the problem. This field test was important to measure the strength of stomach and abdomen of the participant. Based on the number of repetition participants the researcher used to measure this test to measure participants PE skill performance.

3.5.6 Rope skipping

It is one of the field tests that the researcher used to measure cardiovascular endurance. Based on the number of heart beat the researcher used to measure the participants PE skill performance.

3.6 Measurement of Academic Achievement

Academic achievement data was collected from first semester score point averages. Grade point averages were used to determine academic achievement of the participants and it average of the four academic subjects (i.e. English, Mathematics, Biology, and History) was used for the study. The grade scores point averages were taken from the first semester examination results of the 2015/2016 (2008 E.C) school year from six selected high schools of Arsi zone (Oromia).

3.7 Sampling Techniques and Sample Size

3.7.1 Sampling Techniques

For the study to be truly study, the researcher total selected six high schools which were found in Arsi Zone (Oromia) for the study. The researcher was trying to select six high schools from different direction of Arsi Zone (Oromia). The reason beyond to selected only six schools from the zone was due to self sponsor.

These selected high schools for the study were Habe high school, Sedika high school, Huruta high school, Hamida Diksis high school, Kula high school and Jena high school. The participants of the study were grade 9 students. The researcher selected the participants by using simple random sampling technique. The reason why the researcher used simple random sampling technique was in simple random sampling technique every school and student found in the zone has an equal and independent chance of being selected for the study.

The participants of the study were selected by using stratified multistage. Stratified systematic random sampling technique. Judgmental sampling technique was applied in determine grade level of students that take rate in the study.

3.7.2 Sample Sizes

Sample size of secondary schools was determined using the principles of quota sampling technique where as sample size of the students was computed using sample size determination formula for single proportion population.

$n = \frac{z^2 XP(1-P)}{d^2}$, where

n=the required sample size

z=value of normal distribution at95% confidence level i.e. 1.96.

p=the probability of randomly selecting the student i.e. p=0.05 since it is random.

d=the probability of committing sampling error which selecting the students.

Thus n=1.96*0.5*0.5/0.05*0.05=384

In order to minimize non-response rate and to increase the representativeness of the sample, about 17.5 % of the calculated sample size was added to it to determine the final sample size of students so nf=n+17.5 %n which is 384+0.175*384=451

Thus the sample size of participant grade nine students was 451. The computed final sample size of students was proportionately distributed to the selected secondary schools below table 3.1. Again sample sizes of the students each secondary schools were proportionately distributed to each selections and also gender ratio was taken in to consideration while doing so.

Table 3.1: Sample Distribution by School

Schools	Population	Sections	Sample size
School-1	202	4	40
School-2	151	3	30
School-3	380	7	76
School-4	401	7	80
School-5	703	13	140
School-6	427	8	85
Total	2264	42	451

From the total participants [451] 269 [59.6 %] participants were male and 182 [40.4 %] were female students.

3.8 Method of Data Analysis

Data was analyze using computerized statistical package for social science (SPSS) for descriptive statistics means, standard deviation, Pearson coefficient of correlation, T-test, and p-values were the methods of data analyzed. Pearson correlation of data analyzed by using the coefficient of r- values. -1<r<1. That means it lies between -1ana 1. The p-values lie between .01 to .o5.if you increase when x increase; we say that there is positive or direct correlation between them. However, if y decrease when x increase or vice versa then we say that they are negatively or inversely correlated.

3.9 Ethical Consideration of the study

This study was dealt with the ethical issues related to the investigation making guarantees and confidentiality on the information that was be given to the study and risk of harm due to participation .All action based on the school rules, code of conduct and policy concerning to the research ethics. The protocol was approved by the school guidelines and written consent was given and informs the concerned bodies and participants Firs the letter was written to the schools principles than accepted after that permission asked to teachers and participant to help .The researcher promise them to keep their response confidentiality and free from risk or harm them after that the study was began.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

The chapter deals with the analysis of data collection from the samples under this study. The main purpose of this study was to find out the relationship between students academic achievement and PE skill performance of six selected high schools of Arsi Zone (Oromia, Ethiopia) based on their academic results of four subjects (i.e. English, Mathematics, Biology and History) and PE skill performance test results. For the study 269 subjects of male and 182 subjects of female with the age of 15-18 years old were selected randomly from six selected high schools grade 9.

The first semester academic achievement results and PE skill performance test results were an instrument that used to collect data for the study. In this study PE skill performance tests were given by experienced PE teachers with the researcher who were teaches and evaluated PE for many years.

4.1 The Age (Demographic) Distribution of the Study Subjects

Table 4.1: The participants sex distribution in percentage

Sex	Number of participants	Percent
Male participants	269	59.6%
Female participants	182	40.4%
Total	451	100 %

Table 4.1: Showed that the distribution of participants by age and sex. The distribution of participants by sex group was 59.6% were male participants and 40.4% were girls with the age of 15-18 years old.

4.2 Data Discussion based on Mean, Standard deviation, t-value and p-value

Table 4.2: Male and Female Physical Education Skill performance Test results

Variables	Mean	StD	t-value	p-value	N
Male participants PE skill performance test results	68.38	10.203	6.319	.000	269
Female participants PE skill performance test results	62.37	9.456			182

The above table introduced the performance of Male and female Physical Education skill based on the mean, standard deviation t- value and p-value of male and female participants test results.

The above table showed the values of mean, standard –deviation, T-value, and P-value of the two variables [i.e. male and female] in PE skill performance. The mean and standard deviation of male and female participants in PE skill performance was 68.38 $\pm$ 10.203 and 62.37 $\pm$ 9.456 respectively. This indicated that the two variables have relation to each other's. Even though there was relationship between male and female Physical Education skill performance male participants were more performed Physical Education skill than female participants because the mean and standard deviation of male participants was greater than female participant's .This indicate that there was gap between Physical Education skill performance male and female students. The T-value and P-value of the two variables was 6.319 and 0.000 respectively. If the value of T is greater than table –value and P-value less than 0.05 there is significant difference between two variables .from the above 6.379 is greater than 1.96 (table-value) and 0.000(p-value) is less than 0.o5 this indicated that there was a significant different between academic achievement and Physical Education skill performance of male and

female students. From the above result male students perform Physical Education skill than female students.

Table 4.3: Academic achievement results of male and female Students

Variables	Mean	StD	t-value	p-value	N
Academic achievement results of male students	67.58	9.783	7.398	.000	269
Academic achievement results of female students	61.12	7.987			182

The above table introduced the values of mean, standard deviation, T-value and P-value of academic achievement of Male and female students.

The mean and standard deviation of the two variables from the above table was 67.58 $\pm$ 9.783 and 61.12 $\pm$ 7.987 for male and female students respective. This indicate that there is statistically significant difference between Mean academic achievement of male students and that of female students .The T-value and P-value of the above table was 7.398 and 0.000 respectively. If T-value is greater than table value and P-value is less than 0.05 then there is significant difference between the two variables. From the above information the T-value (7.398) which was greater than table value (1.96) and P-value (.000) less than 0.05 (0.000<0.05). This indicates that there was significant difference between academic achievement of male and female students. From the above table result we can conclude that male students were performed academicals more than female students. Even though there was a relationship between the two variables male students were performed academicals then female students.

Table 4.4: Academic achievement and Physical Education skill performance results of male students

Variables	Mean	StD	t-value	P-value	N
Academic achievement results of male students	67.58	9.783	-.927	.354	269
PE skill performance test results of male students	68.38	10.203			269

The above table introduces the relationship between male academic achievement and Physical Education skill performance based on the result of mean, standard deviation, T-value and P-value.

The mean and standard deviation of academic achievement and Physical Education skill performance of male students from the above table was 67.58 ± 9.783 and 68.38 ± 10.203 respectively which was almost similar. This indicate that there is no statistically significant difference between Mean academic achievement of male students and their Mean results on physical education skills tests.

The T-value and P-value was -0.927 and .354 respectively. If the T-vaiue (-.927) is less than table value (1.96) and P-value (.354) is greater than 0.05. Then there was no significant difference between the variables From the above information $-0.927<1.96$ and $.354>0.05$ which this true. This indicated that there was no significant difference between academic achievement and Physical Education skill performance of male students. The result meant that academic achievement could be used to predict the PE skill performance to a reasonable extent.

The California department of education conducted across sectional study to see the relationship between academic achievement and vigorous physical activity. The results showed a linear correlation between academic achievement and physical fitness scores. They concluded the higher academic performers were having positive level of fitness with the greatest academic gains in student (CDE, 2002).

High levels of Physical activity have been associated with higher academic achievement (California Department of Education, 2001). Similar research conducted in a school setting, observed a positive relationship between vigorous Physical activity and higher academic achievement in the class room, based on grades (Coe et al, 2006).

Table 4.5: Academic achievement and Physical Education skill performance of female students

Variables	Mean	StD	t-value	p-value	N
Academic achievement results of female students	61.12	7.987	-1.365	.173	182
PE skill performance test results of female students	62.37	9.456			182

The above table introduced Academic achievement and Physical Education skill performance results of female students based on mean, standard deviation, T-value and P-value.

The mean and standard deviation values of the two variables (i.e. academic achievement and PE skill performance) of female students were 61.12 ± 7.987 and 62.37 ± 9.456 respectively which means that almost the values of the two variables were near to each others. This indicate that Mean academic achievement of female students is not significantly difference from their Mean score of results on physical education skill tests. The T-value and P-value was -1.365and .173 respectively. If T-value is (-1.365) less than table value (1.96), and P-value (.173) greater than 0.05 then there is no significant difference between the two variables. There for -1.365<1.96 and .173>0.05 which is true. This indicated there is no statistically significant difference between academic achievement and Physical Education skill performance of female students. The result meant that academic achievement could be used to predict the Physical Education skill performance to a reasonable extent of female students.

Fitness has been proven to improve class room behavior as well as increase academic achievement (Dwyer et al, 2001). Hal (2007) states "when the movement part of brain is stimulated, so is the learning part of the brain." Therefore physical fitness can be used as away to optimize learning.

The Toris Rivieres finding suggest that if students in PE receive an adequate amount of PA during the class sessions they may perform better academically.

Table 4.6: Male and Female academic achievement and physical Education skill performance results

Variables	Mean	StD	t-value	p-value	N
Academic achievement results of male and female students	64.98	9.630	-1.477	.140	451
PE skill test results of male female	65.96	10.96			451

The above table indicates the values of mean, standard deviation, T-value, and P-value of academic achievement and Physical Education skill performance results of male and female students.

From the above table the values of mean and standard deviation of academic achievement and Physical Education skill performance of male and female students was 64.98 $\pm$ 9.630 and 65.96 $\pm$ 10.96 respectively. As the values of mean and standard deviation were indicates there is no statistically significant difference between Mean academic achievement of male and female students on the four selected subjects and their Mean score on results on physical education skill tests. The T-value and P-value was -1.477 and .140 respectively. If the T-value is (-1.477) less than table value (1.96) and P-value (.140) is greater than 0.05 then the two variables was no statistically significance difference. From this information -1.477<1.96 and .140 >0.05which is true. This indicates that there is no statistically significant different between academic achievement and Physical Education skill performance of the students.

The high fit group performed the best on the intellectual tests while the low physical fitness group performed the poorest. A study by Ismail and Gruber (2002 attempted to experimentally main politer activity level. Two groups of elementary students were matched for intellectual capacity and were then randomly designated as experimental or control. Subjects in the experimental group received 30 more minutes of PE over an entire school year. Analysis of an achievement test revealed that the children who had received more physical fitness had higher achievement in academic achievement. A study conducted by Manitoba Department of Education in 1976 also found a positive correlation between academic achievement and physical fitness (Cosens, 2006).

Some recent research shows that PA of students is one of the most significant influences impacting learning and academic achievement. Grison (2005) investigated the link between fitness levels of students and their stand for achievement test score and presented evidence of positive correlation between student's fitness scores and their academic achievement.

4.3 Data Analysis Based on Pearson's Correlation Coefficient

Before I discussed my data based on Pearson correlation let informed some important information of data analysis based on Pearson correlation.

The Pearson's correlation coefficient is denoted by r.

The value of r always lies between -1 and 1 inclusive, that is,

$$-1 \leq r \leq 1$$

If you increase when x increases, we say that there is positive or direct correlation between them. However, if y decreases when x increases (or vice versa) then we say that they are negatively or inversely correlated.

r = -1 data lie on a perfect straight line with negative slope

r = 0 no linear relationship between the variables.

r = +1 data lie on a perfect line with a positive slope.

Positive correlation indicates that both variables increases or decreases together where as negative correlation indicate that as one variable increases, so the other decreases, and vice versa. The correlation significance different from zero .Source Pearson correlation coefficient data analysis Based on the above information I discussed/analyzed the data of the study.

Table 4.7: Data analysis of Physical Education skill performance of male and female students

Male and female PE skill performance data analysis (1-tailed)

		Male PE skill performance	Female PE skill performance
Male PE skill performance	Pearson correlation	1	-0.077
	Sig		.150
	N	269	182
Female PE skill performance	Pearson correlation	-0.077	1
	Sig	.150	
	N	182	182

Male and female students PE skill performance data analysis (2-tailed)

Variables		Male PE skill performance	Female PE skill performance
Male PE skill performance	Pearson correlation	1	-0.077
	Sig (2-tailed)		.300
	N	269	182
Female PE skill performance	Pearson correlation	-0.077	1
	Sig (2-tailed)	.300	
	N	182	182

From the above two tables (1-tailed) and (2-tailed) tables of data analysis the correlation coefficient of PE skill performance of male and female students was -0.077 .This indicates that the two variables (i.e. PE skill performance of male students and PE skill performance of female students has negative weak relationship. The negative sign indicates that the Physical education skill performance test results of male and female were in reverse correlation but have correlation. From the two tables (1-tailed) and (2-tailed) data analysis the correlation was significant at the .150 and .3 respectively.

Table 4.8: Data analysis of academic achievement of Male and Female students

Male and Female academic achievement data analysis (1-tailed)

Variables		**Male PE skill performance**	**Female PE skill performance**
Academic achievement of male students	Pearson correlation	1	-.150
	Sig (2-tailed)		.079
	N	269	182
Academic achievement of female students	Pearson correlation	-.105	1
	Sig (2-tailed)	.079	
	N	182	182

Male and female academic achievement correlation data analysis (2-tailed)

Variables		**Male PE skill performance**	**Female PE skill performance**
Academic achievement of male students	Pearson correlation	1	-.150
	Sig (2-tailed)		.158
	N	269	182
Academic achievement of female students	Pearson correlation	-.150	1
	Sig (2-tailed)	.158	
	N	182	182

From the above two tables (1-tailed) and (2-tailed) the correlation coefficients were not significant at alpha 0.05 level of significance results of male students on physical education skills has no statistically significant relationship. As indicate from the table academic achievement of male students has higher relationship with results in physical education skill tests than that of female students.

Table 4.9: Data analysis of academic achievement and Physical Education skill performance of male students

Academic achievement and PE skill performance of male students (1-tailed)

Variables		**Male PE skill performance**	**Female PE skill performance**
Academic	Pearson correlation	1	.602
achievement of male	Sig (2-tailed)		.000
students	N	269	269
Male PE skill	Pearson correlation	.602	1
performance	Sig (2-tailed)	.000	
	N	269	269

.. Correlation is significant at the 0.01 level (1-tailed)

Academic achievement and PE skill performance of male students (2-tailed)

Variables		**Male PE skill performance**	**Female PE skill performance**
Academic	Pearson correlation	1	.602
achievement of male	Sig (2-tailed)		.000
students	N	269	269
Male PE skill	Pearson correlation	.602	1
performance	Sig (2-tailed)	.000	
	N	269	269

... Correlation is significant at the 0.01 level (2-tailed)

From the above two tables (1-tailed) and (2-tailed) tables the correlation coefficient of the two variables (i.e. academic achievement and PE skill performance of male participants was 0.602. According to Pearson correlation coefficient the above data indicates that academic achievement and PE skill performance of male students was high or strong relationship between them. According to the Pearson correlation coefficient if the value lies on between ± 0.65 to ± 8.5 the correlation was high/strong. This indicate that academic achievement of female students has statistically significant relationship with their results on physical education skill tests (p- value less than 0.05 and r=.602) both for one-tailed and two-tailed Pearson correlation tests. The coefficient of determination, .602, revealed that academic achievement explained 60.2%of the variability in Physical Education skill performance. The result meant that academic achievement could be used to predict the Physical Education skill performance to reasonable extent. The p-value is (.000) that indicated correlation was existed between the two variables. .

The two tables indicates that the. .. Correlation is significant at the 0.01 level.

Table 4.10: Data analysis of academic achievement and Physical Education skill performance of female students (1-tailed)

Variables		Male PE skill performance	Female PE skill performance
Academic achievement of female students	Pearson correlation	1	.852
	Sig (2-tailed)		.000
	N	182	182
Female students PE skill performance	Pearson correlation	.852	1
	Sig (2-tailed)	.000	
	N	182	182

...correlation is significant at the 0.01 level (1-tailed)

Female academic achievement and Physical education skill performance data analysis (2-tailed)

Variables		Male PE skill performance	Female PE skill performance
Academic achievement of female students	Pearson correlation	1	.852
	Sig (2-tailed)		.000
	N	182	182
Female students PE skill performance	Pearson correlation	.852	1
	Sig (2-tailed)	.000	
	N	182	182

..Correlation is significant of the 0.01 level (2-tailed)

From the above two tables (1-tailed) table and (2-tailed) table of data analysis the correlation coefficient of academic achievement and PE skill performance of female students was .852 ,revealed that academic achievement explained 85.2% of the variability in PE skill performance . As the coefficient of correlation indicated that academic achievement of female students has statistically significant relationship with their results on physical education skill tests (p-value is less than 0.05 and r=o.852)both for one-tailed and two-tailed Pearson correlation tests. According to the Pearson correlation coefficient if the coefficient of correlation of two variables lies on between $\pm$ 0.85 to $\pm$ 1 the two variables were very strong or high relationship. From the above two tables the positive sign of two variables indicated that the two variable (i.e. academic achievement and PE skill performance) of female students were direct correlation .The p-value is (.000) that indicate the two variables have high /strong correlation

The correlation was significant at the 0.01 level from (.,1-tailed) and (2-tailed) tables of data analysis was indicated. This indicated that as the correlation was very strong it was significant to less number of significance value.

Table 4.11: Data analysis of academic achievement and PE skill performance of male and female students (1-tailed)

Variables		Male PE skill performance	Female PE skill performance
Academic achievement of male and female students	Pearson correlation	1	.714
	Sig (2-tailed)		.000
	N	451	451
PE skill performance of male and female students	Pearson correlation	.714	1
	Sig (2-tailed)	.000	
	N	451	451

..Correlation is significant at the 0.01 level (1-tailed)

Female and Male academic achievement and Physical Education skill performance of data analysis (2-tailed)

Variables		Male PE skill performance	Female PE skill performance
Academic achievement of male and female students	Pearson correlation	1	.714
	Sig (2-tailed)		.000
	N	451	451
PE skill performance of male and female students	Pearson correlation	.714	1
	Sig (2-tailed)	.000	
	N	451	451

..Correlation is significant at the 0.01 level (2-tailed)

At both one tailed and two tailed Pearson correlation tests, academic achievement of male and female students have

a/ statistically significant correlation with male students results on physical education skill tests (r=0.714 and p=0.000),

b/ statistically significant relationship with female students results on physical education skill tests (r=0.714 and p=0.000), and c/ statistically significant relationship with their results on physical education skill tests (r=0.714 and p=0.000)

This indicates that academic achievement of male and female student have equal relationships with both the results of female and male students on physical education skill tests (r=0.714 and p=0.000). According to Pearson's correlation coefficient values if it lie on between $\pm$ 0.65 to $\pm$ 0.85 the two variables have strong or high relationship. This indicates that the correlation of the variables was strong/high. The result meant that academic achievement could be used to predict the PE skill performance to a reasonable extent. .

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion and Summary

Based on scores results in four academic subjects it was possible to group the student in to five their academic ability groups such as excellent academic achievers (90+),very good academic achievers (80-89), good academic achiever 65-79), average academic achiever (50-64) and below average or low academic achievers (less than 50) of the average of English, Mathematics, Biology and History according to the finding of the study. It was also possible to group the individual student academic achievement based on Terra Nova standardized test scores. The Terra Nova scores are derived from national standardized test, which consists of multiple assessments of reading or language arts, Mathematics, science, and social studies. It can range from 1 to 99. Based on the above information classified students in to academic ability could be possible according to the finding.

As the finding of the study was indicate that the physical Education skill performance was measures by using physical Education skill tests and it was possible to classified the performance of physical Education skill of the students in to distinct performance group such as excellent performance, high performance, good performance, average performance and below average performance based on results of physical education tests.

There is statistically significant difference between Mean scores of male and female students on physical education skill tests (t-value =6.319 and p-value =0.000). There is statistically significant between Mean academic achievement of male students and that of female students (t-value=7.14 and p-value=0.000). Difference between Mean scores of male is comparable with that of female. There is no statistically significant difference between Mean academic achievement of male students and their results on physical education skill tests (t-value = -0.927 and p-value =0.354). The same is true for female students. (t-value =-1.365 and p-value=0.173). This also holds true for Mean academic

achievement of female and male students and their Mean results on physical education skill tests (t-value =-1.477 and p-value =0.140).

Academic achievement of female students has statistically significant relationship with their results on physical education skill tests (t-value =o.852 and p-value =0.000). academic achievement of male students has statistically significant relationship with their results on physical education skill tests (t-value =0.602 and p-value =0.000).academic achievement male and female students has statistically significant relationship with their results on physical education skill tests (t-value =0.714 and p-value =0.000). There was no statistically significant difference between academic performance of students and results of physical education skill tests aggregately and dis aggregately for both sexes and when pooled for both genders.

Male students performed better than female students on physical education skill tests and on the four selected academic subjects in aggregate. But female students performed better on physical education and academic achievement when disaggregated by gender. The determined pattern of relationships showed little variation when performance levels were disaggregated to the covered schools and that of corresponding number of students selected from them.

5.2 Conclusion

Based on the major finding of the study, the following points were stated as conclusions.

- There was high/strong correlation between academic achievement and Physical Education skill performance of the students.

  Even though Physical Education skill performance of male and female students was high or strong correlation male students were performed Physical Education skill than female students.

- The finding of the study showed that academic achievement and Physical education skill performance of male and females students have high/strong correlation.

- Participation in physical education had a significant effect on the improvement and enhancement of physical fitness performance and improves academic achievements.

- Better results might have been obtained in academic performance in different learning areas if Physical Education consistently performed. The study offered new and important information that could be used by educators, parents and communities to pro mote Physical Education and Physical activity for better academic achievements among secondary school students.

5.3 Recommendations

Based on the finding of the study, the following points are recommended to find out more on the relationship between academic achievement and Physical Education skill performance of the students.

- It is necessary to verify whether the determined strong relationship between academic performance on subject areas and results of physical education skill tests is by chance or not by conducting deeper investigation.

- It is necessary to set and administer standardized tests for all participant students on subject areas addressed to rule out negative effects of taking non-uniform, standardized examinations biases of subject teachers in assessing and evaluating and grading students' academic achievement.

- Minimum threshold levels of engagement or taking part in physical education skills that boost student's levels of cognition and improves their academic achievement need to be devaluated and determined.

- The students themselves not only depends on one period school Physical Education class, rather than participating different quality vigorous to moderate physical activities regular that helps to improve their physical fitness which is directly important for academic achievement.

- Further systematic study is necessary in order to generalize that there is positive impact of physical education skills practicing and taking part in daily physical education on academic performance of students in other areas.

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Appendix A

	Results of academic subjects						Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-1	50	55	56	59	52	St-28	56	60	60	63	59
St-2	60	59	72	67	57	St-29	58	53	52	54	62
St-3	68	52	68	70	60	St-30	62	59	57	56	65
St-4	53	56	71	67	54	St-31	63	52	66	70	66
St-5	53	69	63	64	59	St-32	59	59	58	50	53
St-6	60	70	64	68	67	St-33	53	50	59	56	56
St-7	54	70	54	58	60	St-34	58	50	54	58	67
St-8	69	58	60	68	68	St-35	76	53	70	75	84
St-9	50	68	54	52	54	St-36	60	75	68	55	64
St-10	51	59	52	55	51	St-37	64	61	71	71	71
St-11	57	51	54	57	54	St-38	79	67	87	89	87
St-12	57	61	63	66	68	St-39	63	61	68	62	62
St-13	57	59	52	56	73	St-40	52	57	56	54	53
St-14	54	63	56	54	59	St-41	63	57	58	62	67
St-15	57	52	61	57	69	St-42	72	68	69	67	72
St-16	03	60	57	61	67	St-43	62	63	60	58	66
St-17	59	52	55	51	57	St-44	87	95	78	74	81
St-18	76	65	74	64	83	St-45	64	58	55	55	68
St-19	43	66	57	50	48	St-46	78	77	63	73	78
St-20	54	54	52	51	60	St-47	62	63	60	60	65
St-21	56	55	60	62	66	St-48	70	70	65	66	63
St-22	58	61	67	71	62	St-49	77	62	68	63	71
St-23	76	64	66	68	86	St-50	69	66	61	57	67
St-24	52	66	52	51	53	St-51	68	61	59	63	65
St-25	59	47	60	63	66	St-52	65	62	60	61	61
St-26	64	56	60	66	56	St-53	70	67	60	65	74
St-27	64	55	63	63	60	St-54	82	85	75	72	83

Appendix B

Students	Results of academic subjects					Students	Results of academic subjects				
	Eng	Math's	Bio	His	PE		Eng	Math's	Bio	His	PE
St-55	50	50	63	61	58	St-82	74	60	80	75	73
St-56	60	55	60	59	64	St-83	57	69	53	56	62
St-57	65	55	62	69	68	St-84	70	71	66	63	68
St-58	57	58	60	68	65	St-85	57	67	44	53	58
St-59	64	61	72	70	68	St-86	76	54	54	59	70
St-60	67	68	71	76	62	St-87	69	84	70	72	78
St-61	50	60	54	53	55	St-88	60	78	51	52	54
St-62	52	51	59	53	54	St-89	61	53	69	67	70
St-63	50	61	66	63	55	St-90	62	66	59	58	54
St-64	60	55	62	57	64	St-91	68	60	67	62	70
St-65	77	62	78	67	76	St-92	55	63	54	51	54
St-66	65	71	64	56	68	St-93	58	56	63	65	65
St-67	51	66	50	57	52	St-94	57	59	64	63	62
St-68	76	55	63	71	78	St-95	79	62	63	64	70
St-69	64	67	54	60	55	St-96	59	61	63	63	55
St-70	67	52	65	65	73	St-97	63	70	55	64	55
St-71	54	69	50	55	50	St-98	70	60	67	57	69
St-72	64	59	66	49	50	St-99	51	67	54	56	50
St-73	66	45	60	66	65	St-100	71	63	62	63	70
St-74	68	61	55	78	71	St-101	60	65	68	69	72
St-75	80	59	82	75	84	St-102	63	68	60	66	65
St-76	90	78	86	88	92	St-103	66	58	62	65	65
St-77	76	84	60	78	73	St-104	57	60	64	62	57
St-78	80	60	78	77	76	St-105	55	61	56	53	58
St-79	85	70	81	78	72	St-106	63	56	69	67	60
St-80	68	68	78	80	66	St-107	79	60	92	84	79
St-81	73	64	69	63	71	St-108	84	78	84	80	82

	Results of academic subjects						Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-109	60	85	59	55	66	St-136	58	61	52	57	60
St-110	53	63	64	69	63	St-137	64	66	61	65	68
St-111	40	52	41	42	49	St-138	67	64	56	66	58
St-112	52	37	53	51	63	St-139	62	62	50	56	55
St-113	53	55	62	53	55	St-140	77	64	70	78	72
St-114	36	54	47	43	41	St-141	50	79	52	55	55
St-115	58	44	60	63	50	St-142	64	58	59	52	55
St-116	53	53	55	53	54	St-143	57	60	70	58	62
St-117	63	50	61	65	62	St-144	61	61	62	78	62
St-118	69	58	72	67	73	St-145	50	68	54	54	56
St-119	53	67	55	53	56	St-146	80	64	78	62	71
St-120	52	54	51	55	62	St-147	50	60	58	60	50
St-121	60	51	55	67	62	St-148	59	53	55	52	55
St-122	50	56	55	52	54	St-149	61	58	54	54	58
St-123	42	51	61	52	48	St-150	54	60	56	56	65
St-124	51	47	54	54	52	St-151	59	57	54	55	55
St-125	50	50	56	53	55	St-152	75	72	67	71	71
St-126	54	53	55	66	60	St-153	41	46	53	57	45
St-127	54	56	60	57	57	St-154	59	63	57	68	61
St-128	56	57	57	51	55	St-155	53	59	53	58	51
St-129	52	57	48	47	53	St-156	38	43	50	54	41
St-130	57	61	57	57	58	St-157	61	70	75	66	61
St-131	43	66	55	52	47	St-158	54	63	62	55	53
St-132	59	50	53	57	56	St-159	55	56	56	62	56
St-133	57	57	51	50	65	St-160	87	80	82	89	88
St-134	42	59	51	50	52	St-161	57	57	53	50	50
St-134	51	56	63	52	59	St-162	60	64	60	64	66

Appendix D

	Results of academic subjects							Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-163	61	68	67	65	65	St-190	59	71	60	77	70
St-164	55	58	58	61	60	St-191	82	66	54	65	57
St-165	50	54	56	56	56	St-192	81	60	79	66	73
St-166	68	62	57	69	64	St-193	59	65	43	58	58
St-167	68	64	65	63	67	St-194	61	67	70	71	70
St-168	56	53	54	56	61	St-195	61	71	50	61	72
St-169	43	57	61	53	47	St-196	64	62	65	78	70
St-170	51	59	56	63	54	St-197	95	86	87	92	92
St-171	55	58	62	51	61	St-198	63	61	74	62	66
St-172	69	67	59	64	62	St-199	62	63	66	61	68
St-173	50	56	57	61	65	St-200	60	55	54	55	58
St-174	52	58	60	54	59	St-201	67	65	68	80	74
St-175	50	64	52	58	65	St-202	52	58	68	62	54
St-176	58	54	48	52	53	St-203	53	54	64	61	50
St-177	60	64	58	62	57	St-204	76	73	72	71	83
St-178	70	72	68	74	75	St-205	51	56	56	57	55
St-179	52	51	48	49	50	St-206	70	72	72	76	82
St-180	60	65	70	65	57	St-207	69	68	74	69	66
St-181	58	52	54	60	65	St-208	64	61	68	63	65
St-182	51	55	60	54	58	St-209	67	69	70	70	72
St-183	56	79	63	50	66	St-210	67	69	69	79	74
St-184	67	55	52	66	67	St-211	60	62	58	64	58
St-185	72	69	44	40	54	St-212	60	60	63	61	69
St-186	52	79	45	50	56	St-213	59	56	61	60	63
St-187	55	69	50	50	54	St-214	73	75	79	84	84
St-188	67	73	69	72	64	St-215	97	87	85	99	92
St-189	56	60	77	63	66	St-216	76	61	51	52	67

Appendix E

	Results of academic subjects							Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-217	64	60	52	56	60	St-244	53	58	69	72	57
St-218	63	61	60	58	62	St-245	59	54	54	69	63
St-219	73	68	63	60	66	St-246	61	57	66	60	62
St-220	55	53	59	61	53	St-247	67	69	58	58	64
St-221	78	55	63	72	65	St-248	68	67	69	60	58
St-222	60	52	58	50	55	St-249	85	78	84	85	86
St-223	70	71	76	75	82	St-250	57	56	54	61	64
St-224	60	67	65	61	74	St-251	73	69	64	62	60
St-225	58	60	55	59	61	St-252	51	53	69	57	69
St-226	67	72	69	78	72	St-253	66	61	65	60	70
St-227	53	52	55	52	50	St-254	65	73	64	66	65
St-228	66	63	60	71	64	St-255	64	65	69	62	67
St-229	62	50	69	59	55	St-256	64	65	62	57	70
St-230	93	94	96	89	91	St-257	70	66	67	69	62
St-231	87	89	79	73	81	St-258	64	62	68	62	65
St-232	80	81	89	78	85	St-259	61	63	70	62	56
St-233	69	72	68	83	71	St-260	54	52	59	55	70
St-234	71	65	57	71	61	St-261	78	62	68	80	59
St-235	59	61	70	67	63	St-262	59	61	53	51	55
St-236	68	77	73	78	71	St-263	51	50	48	63	70
St-237	68	73	69	86	71	St-264	80	62	73	69	67
St-238	86	79	87	73	85	St-265	69	62	79	66	63
St-239	85	79	87	73	63	St-266	63	67	60	54	72
St-240	60	59	70	67	70	St-267	67	69	75	78	79
St-241	68	64	58	80	59	St-268	87	85	66	82	73
St-242	59	61	53	51	55	St-269	71	67	65	69	69
St-243	51	50	51	64	65	St-270	63	62	80	75	65

Appendix F

	Results of academic subjects						Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-271	93	90	96	86	90	St-298	76	65	78	69	65
St-272	61	65	67	78	70	St-299	90	87	92	87	95
St-273	48	45	54	61	51	St-300	69	56	58	61	63
St-274	62	69	65	70	68	St-301	60	67	61	56	62
St-275	62	54	56	56	61	St-302	63	66	69	58	60
St-276	64	64	60	76	73	St-303	85	77	87	83	89
St-277	76	54	71	75	63	St-304	60	64	64	56	60
St-278	74	56	63	63	69	St-305	65	69	59	55	74
St-279	69	61	68	70	66	St-306	67	76	68	69	71
St-280	65	54	58	67	64	St-307	71	65	74	82	74
St-281	59	45	48	52	51	St-308	78	77	69	68	78
St-282	72	69	69	50	67	St-309	85	78	84	85	86
St-283	58	47	53	54	52	St-310	77	76	74	81	74
St-284	79	78	90	73	85	St-311	73	72	75	72	69
St-285	68	74	78	72	75	St-312	51	53	59	50	55
St-286	60	65	64	67	67	St-313	67	61	64	60	70
St-287	64	75	65	65	60	St-314	68	70	72	74	75
St-288	43	51	52	58	47	St-315	75	70	76	71	70
St-289	74	59	60	63	76	St-316	65	66	62	67	67
St-290	66	64	78	84	64	St-317	65	61	76	66	66
St-291	80	82	82	84	84	St-318	71	70	70	73	75
St-292	60	61	68	75	62	St-319	76	69	62	61	64
St-293	52	69	62	65	73	St-320	63	59	66	64	51
St-294	67	75	71	7	75	St-321	57	52	62	49	61
St-295	70	75	77	66	71	St-322	64	68	65	59	65
St-296	76	71	63	67	75	St-323	61	60	58	61	61
St-297	76	73	73	63	71	St-324	65	63	55	61	67

Appendix G

	Results of academic subjects							Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-325	63	68	61	60	54	St-352	69	79	67	69	7
St-326	55	53	56	59	66	St-353	65	73	63	75	73
St-327	81	96	83	88	85	St-354	77	68	77	64	72
St-328	60	68	60	60	67	St-355	77	68	60	63	65
St-329	74	79	67	68	70	St-356	71	75	76	70	75
St-330	62	67	75	74	58	St-357	66	77	65	76	74
St-331	44	49	68	63	51	St-358	68	61	67	72	68
St-332	50	56	52	54	62	St-359	94	89	94	95	90
St-333	69	66	86	79	75	St-360	71	70	70	69	70
St-334	55	62	62	65	60	St-361	77	53	67	75	72
St-335	85	85	92	100	96	St-362	60	60	65	63	64
St-336	90	83	93	90	84	St-363	73	60	66	85	70
St-337	56	68	63	57	68	St-364	57	77	73	73	60
St-338	70	68	76	74	76	St-365	53	56	60	59	60
St-339	58	68	63	71	68	St-366	63	65	67	77	70
St-340	64	69	65	62	68	St-367	53	55	56	72	78
St-341	90	68	72	62	76	St-368	100	94	100	98	98
St-342	71	68	70	71	65	St-369	84	88	85	87	78
St-343	67	66	69	62	61	St-370	72	67	72	77	52
St-344	62	66	64	65	61	St-371	50	47	50	77	48
St-345	64	77	62	77	71	St-372	50	57	52	61	58
St-346	54	60	68	62	64	St-373	55	51	70	60	60
St-347	64	57	66	57	64	St-374	53	51	50	50	54
St-348	66	66	62	66	71	St-375	53	51	62	66	62
St-349	69	62	61	74	68	St-376	53	62	72	57	68
St-350	71	62	62	69	70	St-377	80	74	60	54	69
St-351	92	73	80	87	85	St-378	89	87	94	98	82

	Results of academic subjects						Results of academic subjects				
Students	Eng	Math's	Bio	His	PE	Students	Eng	Math's	Bio	His	PE
St-379	57	50	66	59	62	St-406	56	52	56	52	57
St-380	62	62	65	64	66	St-407	66	57	71	70	61
St-381	70	72	71	71	72	St-408	70	74	73	71	63
St-382	94	92	94	92	98	St-409	63	58	72	63	60
St-383	72	72	77	71	74	St-410	64	62	60	66	70
St-384	68	65	69	54	64	St-411	89	90	88	89	78
St-385	65	59	74	66	67	St-412	56	54	58	56	50
St-386	56	57	53	62	55	St-413	100	98	96	98	95
St-387	51	68	55	50	62	St-414	74	75	56	55	55
St-388	63	54	65	66	64	St-415	72	70	70	72	68
St-389	57	66	73	56	63	St-416	86	80	73	53	77
St-390	50	49	50	55	51	St-417	81	89	92	82	81
St-391	56	52	54	58	59	St-418	68	61	56	59	64
St-392	99	94	92	91	98	St-419	75	75	88	70	85
St-393	74	72	70	68	84	St-420	68	61	59	56	59
St-394	52	54	50	60	58	St-421	73	69	70	72	73
St-395	48	56	56	64	58	St-422	53	58	56	57	50
St-396	73	78	72	81	78	St-423	85	90	92	89	85
St-397	50	51	49	50	55	St-424	75	73	76	72	72
St-398	51	59	56	54	54	St-425	84	52	64	56	66
St-399	68	66	60	70	70	St-426	77	76	78	77	74
St-400	85	89	84	85	96	St-427	86	80	92	86	77
St-401	63	67	65	65	66	St-428	76	56	72	68	69
St-402	65	67	63	65	66	St-429	80	55	72	69	70
St-403	83	87	81	89	90	St-430	82	73	70	67	70
St-404	69	82	67	69	70	St-431	74	75	73	74	74
St-405	78	63	55	56	78	St-432	80	78	76	78	80

	Results of academic subjects				
Students	**Eng**	**Math's**	**Bio**	**His**	**PE**
St-433	79	79	75	83	74
St-434	72	73	70	69	68
St-435	76	78	80	82	76
St-436	67	73	70	70	69
St-437	73	70	67	70	73
St-438	79	80	78	79	73
St-439	60	65	69	50	60
St-440	68	63	58	67	66
St-441	50	59	58	61	66
St-442	75	77	80	72	77
St-443	80	78	70	72	71
St-444	65	65	72	70	70
St-445	63	67	64	66	67

	Results of academic subjects				
Students	**Eng**	**Math's**	**Bio**	**His**	**PE**
St-447	73	71	68	72	65
St-448	74	72	75	71	68
St-449	73	70	68	81	79
St-450	65	59	63	61	73
St-451	68	60	60	60	79

St= Student

Eng= English

Math's= Mathematics

Bio= Biology

His= History

PE= Physical Education

St1 - st182: Female students.

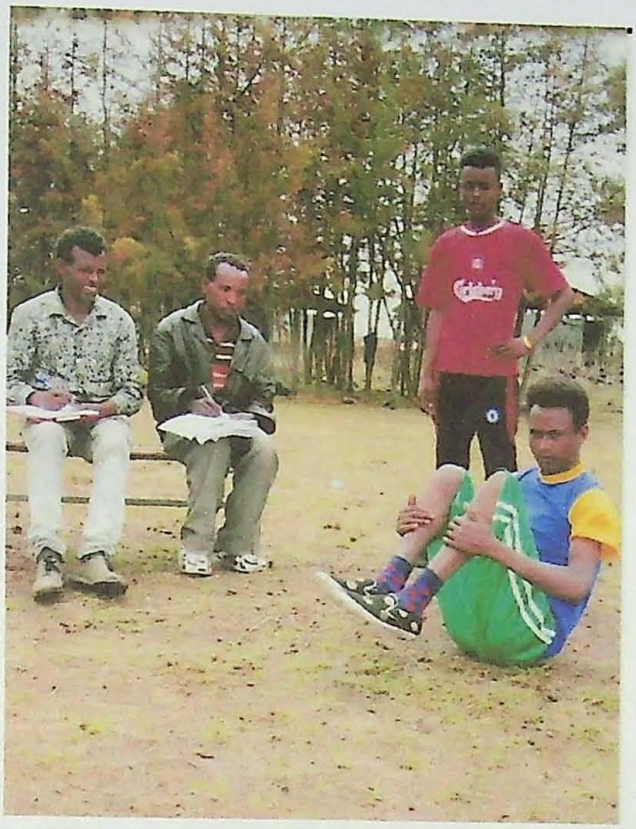
St183 - st451: Male students.

Appendix J



Photograph of some of the sampled Sample students who were selected for physical education skills tests

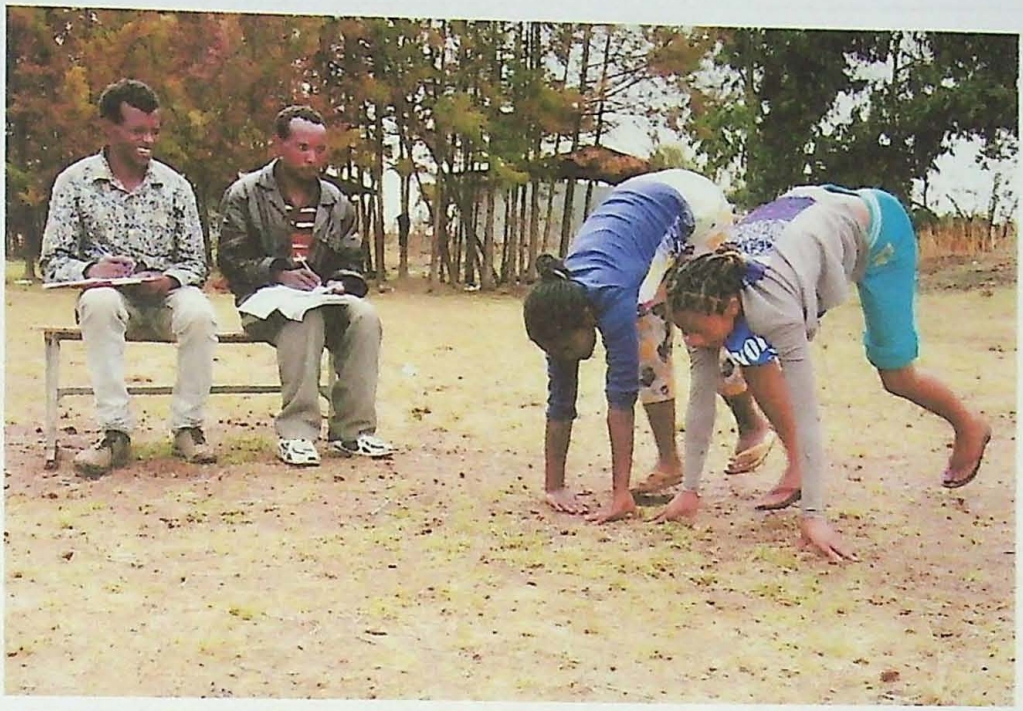
Appendix K





Selected students who were taken physical education skill tests

Appendix L





Selected students who were taken physical education skill tests

Appendix M

Standard for Body Mass Index [BMI]	
Underweight	<20
Health range	20-25
Over weight	26-30
Obese	>30

Source: Adapted from Golding, et al (1986) The y's way to physical fitness [3rd ed]

Appendix N

Standard for sit and reach test		
	Cm	Inches
Superior	>+7	>10.5
Excellent	+17 to +27	+6.5 to +10.5
Good	+6 to +16	+2.5 to+6.0
Average	0 to 5	0 to2.0
Fair	_8 to_1	-3 to-.5
Poor	-20 to -9	-7.5 to -3.5
Very poor	<-20	<-7.5

Source: Adapted from Golding, et.al . (1986).The y's way to physical fitness [3rd ed]

Appendix O

Standard Push up test per minute				
Age	17-19	20-29	30-39	40-49
Excellent	>56	>47	>41	>34
Good	47-56	39-47	34-41	28-34
Above average	35-46	30-39	25-33	21-28
Average	19-34	17-29	13-24	11-20
Below average	11-18	10-16	8-12	6-10
Poor	4-10	4-9	2-7	1-5
Very poor	<4	<4	<2	<1

Source: Adapted from Golding, et .al . [1986].The y's way to physical fitness [3rd ed]

Appendix P

One –minute standard sit –up test for male						
Age	18-25	26-35	30-45	46-55	56-65	+65
Excellent	>49	>45	>41	>35	>31	>28
Good	44-49	40-45	35-41	29-35	25-31	22-28
Above average	30-43	35-39	30-34	25-28	21-24	19-21
Average	35-38	31-34	27-29	22-24	17-20	15-18
Below average	31-34	29-30	23-26	18-21	13-16	11-14
Poor	25-30	22-28	17-22	13-17	9-12	5-10
Very poor	<25	<22	<17	<9	<9	<7

Source: Adapted from Golding, et .al . [1986].The y's way to physical fitness [3rd ed]

Appendix Q

One –minute standard sit –up test for female

Age	18-25	26-35	36-45	46-55	56-65	+65
Excellent	>43	>39	>33	>27	>24	>23
Good	37-43	33-39	27-33	22-27	18-24	17-23
Above average	33-36	29-32	23-26	18-21	13-17	14-16
Average	29-32	25-28	19-22	14-17	10-12	11-13
Below average	25-28	21-24	15-18	1o-13	7-9	5-10
Poor	18-24	13-20	7-14	5-9	3-6	2-4
Very poor	<18	<13	<7	<5	<3	<2

Source: Adapted from Golding, et .al . [1986].The y's way to physical fitness [3rd ed]

Declaration

The researcher here by that the thesis on the title, "Relationship between students academic achievement and physical Education skill performance in secondary schools of Arsi Zone Oromia in Ethiopia." Was my original work and that all sources of the Materials used for this thesis and cited have been properly indicated and acknowledged.

Name: Kebebe Beyene.

Sign _____

Date _____

This thesis has been submitted for examination with my approval as the University advisor.

Main advisor-Name_____

Sign _____

Date_____

Place: Addis Ababa University

College of Education and behavioral studies

Department of science and Mathematics

Date of submission