

**IMPACT OF AFFIRMATIVE ACTION ON GRADE 10 FEMALE
STUDENTS ACADEMIC ACHIEVEMENT AND ATTITUDE
TOWARD PHYSICS: THE CASE OF TWO SECONDARY
SCHOOLS IN SINANA WOREDA, OROMIA
REGIONAL STATE OF ETHIOPIA**

By Berhanu Ketema



A THESIS SUBMITTED TO APPLIED PHYSICS PROGRAM

SCHOOL OF APPLIED NATURAL SCIENCE

**PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER'S OF SCIENCE in PHYSICS**

OFFICE OF GRADUATE STUDIES

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

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DECLARATION

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

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GLOSSARY OF OPERATIONAL TERMS

The terms have the following meaning /definition in this research but may have another meaning in other cases/usage.

Academic achievement: Student performance in physics educations.

Attitude toward physics: positive or negative feeling to physics education.

Attitude towards physics: a belief and feelings that individual have for the physics education.

Attitude: complex mental construct (perception) which emerges out of an integration of an individual's belief and values system that students have developed from physics education topics incorporated in school curricula.

Gender difference: Disparities in females and males attitude toward physics education.

Linear regression model: establishing relation between students' performance and attitudes toward physics by indentifying the effect or impact of independent variables on variation in the dependent variable.

Woreda: is an administrative unit comparable to a district, which covers a number of Kebeles in the present administrative arrangement of the Federal Democratic Republic of Ethiopia.

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ABBREVIATIONS AND ACRONYM

ASTU	Adama Science and Technology University
CSA	Central Statistics Authority
DRMFSS	Disaster Risk Management and Food Security Sector
EC	Ethiopian Calendar
EGSECE	Ethiopian General Secondary Education Certificate Examination
MLR	Multiple Linear Regression
MoE	Ministry of Education
SARC	Sinana Agricultural Research Center
SPSS	Statistical Package for Social Sciences

ABSTRACT

This study is designed to assess impact of affirmative action on students' academic achievement and attitude toward physics education of secondary school female students. The researcher employed both quantitative and qualitative research where the study populations represented 197 sample students selected systematically, 93 students were female and 104 were male, from total population of 400 students in Obora and Hisu secondary schools. Data collections carried out by means of document analysis to test academic achievement based on EGSECE of physics education and to test attitude toward physics by means of questioners carefully designed that correlated with physics issues. The data obtained were analyzed both quantitatively and qualitatively using mean, frequency distributions and percentages, histograms and pie charts. Likert scale used to measure attitudes toward physics. Quantitative descriptions were done using SPSS version 20 software for descriptive of statistical significance level. Obora female students under affirmative action scored a mean value of grades of EGSECE in physics education was 2.04 and their male scored 2.02. But Hisu female and male scored 1.83 and 2.29 respectively. Moreover, 74.19% female and 61.54% male students totally 67.5% of both schools students develop negative attitude toward physics education because of the low achievement. Attitude significantly influences achievements of the students with statistical value of 0.007 and there is significance difference between female and male in their achievement with statistical value of 0.016. From the finding of the research, it can be conclude that Obora female students performed equally to their male and more performed than Hisu female students. There is gender difference in academic achievement with the counterparts of Hisu male students. Attitude has negative impact on students' academic achievement, and the affirmative action has positive impacts on academic achievements of the female students.

Key Words: - Female, academic achievement, attitude toward and physics education

CHAPTER ONE

INTRODUCTION

Learning is one of the mechanisms by which behavior is change much of humans working time are elapsed in formal and informal learning to shape and affect humans behavior, skills, knowledge, attitude, motivation etc. These effects make learning a fundamental process in our life that have social use .In formal learning the process is likely to be effective of process if a great attempt is made by the teacher as well as by students cooperatives effort. (garry &Kingsly 1970) .In the teaching learning process, the pedagogical science scholars appreciate and focus on the methodologies of teaching in addition to the mastery of the subject matter. To attain the desired education objectives one of these methodologies is to understand and to improve educational situation with view to improve the quality of action within it. To acquire behavioral change one has to interact with the environment process carried on an environment that is confine with an interaction among different variables the interaction that brings change in behavior gradually. One of the place at which behavior is change is school. It involves change of skill, attitude and scientific knowledge.

The lives we lead today are very different from those of a thousand or even fifty years ago. The knowledge we might gain from science education could help us understand this technical world and live in it successfully (Newton, 2008).Therefore, achievement and attitude of the students are consecutive of one another. A negative initial reaction to a subject matter may course low motivation and subsequently low achievement.Higher education and the international community as a central site for facilitating human capacity building repeatedly positions more especially science based. The development of knowledge, skill and attitude can be attained .if there appears conductive or healthy interaction and environment for a period, which initiates students and teachers for a common goal. The interaction that is making among these different variables has different outputs ranging from positive to negative. Attitude but the primary cause or relationship is that achievement is the result of attitude. Attitude is related to coping with and management of the emotions occurring during learning process, and they play an important role in directing

human behavior. Whether attitudes occurring as part of a system of values and beliefs are positive or negative affects learning process in a direct manner and influences future lives of individuals (Seferoglu, 2004; Sunbul et al., 2004).

The attitude that student extract from the reaction toward personal or an action relies heavily on the achievement of the students on that subject matter .Achievement can influence more especially to science based courses and whether some socio-economic groups are persistently arginalized. Studies by Lihamba et al. (2004), Wassena (2003), Rwegelera (2007) and Malekela (1999) argue that, while there has been no deliberate attempt to marginalize female enrolments, the performance of girls at secondary school is poorer than that of boys, because of the pressures resulting from socio-cultural processes such as societal expectations and demand for early marriages. Bookie Kethugisile, et al. (2000) also indicates that sociaeconomic and cultural factors which inhibit girl's access to education in primary and secondary levels effectively cut off their access to tertiary education and limits their human capacity building .Mlama (2005) have also illustrated how the school environment is not friendly for girls in secondary schools. They give examples of infrastructure being not conducive, such as the type, location or poor condition of latrines for girls, which is specially difficult when they are in menses; distant/authoritative teacher-student relationships; aggressive behavior in student-student interaction; and irresponsive school management systems, all of which impact on identity formation within the school setting.

The non-intervention by teachers and school managers even when there are obvious gender disadvantages is also discouraging to girls, hence the low retention and achievement that are experienced in secondary level (Morley et al., 2006; Lihamba et al., 2006). There are many explanations for the gender gap in enrollment at higher education level including low enrolment in basic education and gendered sociocultural practices (Sima et al., 1999).In Africa, based on misconception, women students tend not to enroll in fields of science, Technology, Engineering (Rathgeber, 1995). It can also be attribute to the social and cultural behavior and perception in relation to the field of science as male domain. Therefore, as the most researchers explained above in the literature review the academic performance of female students were affected by so many factors. We believe that the affirmative action taken in Obora secondary school may be one mechanism to improve the academic performance of female students on physics, it may be

ways of reducing factors influence on female students' expectation value in society they live in, and it may bring positive attitude toward physics. The researcher conducted this study in order to identify the impacts of affirmative action, to improve the female student's academic achievement and to identify the attitude of female students as compared to the attitude of male students towards the learning of physics. We had been seen that generally their weakness in their performance in physics; while their certificates are giving as well as on real teaching learning process of the subject matter .Why this weakness happens toward this wonderful interesting and scientific subject is the questions of this present study.

1.1. Statements of the problems

The main objective of this paper is to determine whether there is significant differences in academic performance of female students under the affirmative action sponsored by Kristain Horizon NGO supported program, since (2014/15-2015/16) being from grade 9 to grade 10 to assess the results of Ethiopian General Secondary Education Certificate Examination (EGSECE) in Math's, Biology, Chemistry, Physics, Geography and English. This affirmative action is to improve academic performance of female students and narrowing gender gaps in human capacity building based on the result of Ethiopian General Secondary Education Certificate Examination of grade 10 students in 2016. The researchers want to indentify the academic performance of female students and their attitude towards physics of Obora secondary school and Hisu secondary school students' in Bale zone, Sinana Woreda destricte, Oromia regional state of Ethiopia. The type of action performed besides to their regular class, special class arranged for them according to the condition of the school environment to linkage the attention of students with education for develop positive attitude toward subject matter final to be improve the academic achievements of female students. The teaching learning process is also by the mechanism of problem solving method, students centered and by adjusting proper condition of Laboratory instruments help the students to perform experiments. The teaching learning process is also by model teachers, who selected by interesting of the students and each subject learn for two hours per week and they paid 50 Ethiopian birr per hour for one teacher to motivate the teachers.

For the identification of the problem and for the possible solution to the problem we need to answer the following leading questions

- What is the attitude of female students as compared to the attitude of male students?
- What the level of female students' achievement is in physics those of under affirmative action and not under affirmative action in secondary school of Obora and Hisu respectively?
- What teachers' personality and behavior leads the students to have negative attitude as well as positive for the subject?
- Is there gender difference in attitude toward and achievement in physics?
- What facilities in classroom should make for bringing high achievement to the subject?
- What is the relationship between female students' attitude and their achievement in physics?

1.2. Objectives of the study

1.2.1 General Objective

The general objective of this study to assess the impact of affirmative action on grade 10 female students' academic achievement and attitude toward physics of Obora secondary school.

1.2.2 Specific Objective

- To assess impact of affirmative action on grade 10 Obora female students.
- To assess the academic performance of female students of Obora and Hisu school.
- To identify the degree of attitude that influences the academic performance.
- To indentify the relationship between female students' attitude towards their achievement in physics.

1.3. Significance of the research (Justification)

It is hoped that the purpose of this study would generate basic data that could be used to test the impact of affirmative action on female students as well as attitude toward and achievement in physics education. Therefore, this study tried out the following significance value.

- ✓ At the study site, it contributes valuable information about effectiveness of affirmative action on female students and intended input at regional or national level for further investigation.
- ✓ For the teachers it may indicate way to suggest on how female students supported in physics education and become advantageous in academic achievement.
- ✓ Encourage female students to learn physics and develop positive attitude toward physics as well as help them to improve their academic achievement in physics.
- ✓ The result of this study might serve as direction indicator for further studies for all the stakeholders of education ways of implementation affirmative action on female students.

1.4. Delimitation of the study

The study particularly focused on the secondary schools in Bale zone ,Sinana Woreda ,Obora secondary school in which the affirmative action is being implemented and Hisu secondary school those of under normal conditions of grade 10th female students taken Ethiopian General Secondary Education Certificate Examination (EGSECE) in 2008E.C. academic year.

1.5. Limitation of the Study

The limitations surrounding the study during the collection of data, analysis and interpretation of result and making conclusion for research are the major areas of limitation.

- Information collected was restricted to physics in the two schools and can not be necessarily generalized to physics in all secondary schools in Sinana Woreda.
- Even if represented by considerable proportions, all participants group were not equally represented in number.
- Pilot test for attitude was administered at Obora secondary school so that result for the pilot test may be unfair from the side of respondents of Hisu School.
- Because of its psychological nature attitude is difficult to measure directly, there may be limitation to get the exact feeling (information) from the respondents.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Attitude Development

Attitude is considered together with beliefs and emotions that constitute the affective domain of the learners. Attitudes are commonly distinguished from beliefs in the sense that attitudes are moderate in duration, intensity and stability and are links with an emotional content of the students. Many theorists have suggested that attitude should be viewed in terms of cognitive, affective and behavioral components (Feldman1983). It is therefore, could be defined as the aggregate product of the interaction of these components. So that the affective component encompasses the direction and intensity of an individual's evaluation or a kind of emotion experienced toward the objective of attitude. The cognitive component refers to a person's system of beliefs about the attitudinal object. Finally, the behavioral component is a predisposition to act in a certain manner the ward the attitudinal objective (Feldman, 1983:120-121). Thus attitude from the psychological point of view refers to the inner most feeling and outlooks of an individual about things in their environments.

According to psychology today, attitudes do not have their origin in the object themselves because our attitude can change while their objects remain constant. Concerning this (Radom,1983:571) point out: The development of attitude is influenced by many factors, emotional association, expectation of reward or punishment, a desired to emulate the attitude of people we respect and admire a need to establish some degree of consistency between what we say, what we believe and what we do. In other words, attitude about everything from the break that cereals to unclean weapons are subjected to many number of influence. Therefore, these ideas indicate that attitudes are developed and modified because of social and other external factors.

According to Evan attitude determines the pattern of behavior. It determines how a man does, says, or acts in particular situations, what he enjoys or dislikes his approaches to other people and his action to events in his own life and in the world around. Even if there are few scholars, who argue that genetic factors have much contribution for the development of one's attitude

many scholars like. Evan approved that attitude is largely the product of environment in which individuals live. It is to mean that they are largely learned. They are acquired through formal and informal ways of interaction that a person makes with his surrounding environment. Supporting this (Evan 1965:123) Most people are likely to acquire their attitudes from the homes in which they brought up. Parents provide examples constantly for their children. As result parental attitudes, certain things or persons may be taken over by children and they make their own. Moreover, irrespective of the economic affects, the decline of interest in science remains a serious matter of concern for any society attempting to raise its standards of scientific literacy. The distinguishing features of modern Western societies are science and technology. Science and technology are the most significant determinants in our culture. In order to decode our culture and enrich our participation it is essential to educate as many children as possible to the highest level possible within the constraints of the school curriculum. In addition, we would contend, the sine qua non of the public appreciation of science is the public engagement with science something that is the product of positive attitudes generated through formal science education, or at the very least neutral attitudes. For attitudes, once formed, are enduring and difficult to change Based on the idea one can say that the development attitudes begins from one's family impact this is one way in which influence of attitude extended.

2.2. Attitude and Achievement

The relationship between these two variables is a key issue for consideration permeating much of the literature. For much of the generalized concern and interest in attitudes towards school science is based on a somewhat simplistic notion that „the best milk comes from contented cows (Fraser 1982). However, Gardner's review of the research evidence offered little support for any strong relationship between attitude and achievement. Writing somewhat later, draws a stronger link between the two, quoting studies that show a correlation of 0.3–0.5. However, he also cites studies that show no relationship. Shrigley (1990), who argues that attitude, best articulates the current position and ability scores can be expected to correlate moderately. Likewise, the measures used in the TIMSS study, able it somewhat unsophisticated, have found a consistent relationship between attitude and achievement (Beaton et al. 1996). Weinburghs (1998) met analysis of the research suggests that there is only a moderate correlation between attitude

towards science and achievement, although this correlation is stronger for high and low ability females indicating that, for these groups doing well in science is closely linked with liking science. Similar findings have appeared in the major study conducted by Simpson and Oliver (1995), by Jovanic and King (1998) and by Osborne and Collins (2000), Maria Tinio (2009) conducted a study measuring academic achievement by administering a test called the Academic Engagement Scale for Grade School Students (AES-GS) to 250 sixth and seventh graders in the Philippines.

All three subscales (behavioral, emotional, and cognitive) are necessary to measure academic engagement. It is essential to construct such a scale because it could be an avenue of improving the education of a student. With this, it would also help teachers determine what aspects the student is not able to respond to well (Tinio, 2009). Normally, levels of academic achievement are based on cognitive abilities; however, Tinio's study takes into account behavioral and emotional as well. All three levels are equally important to implement in a classroom, but schools often focus on the cognitive aspect because of standardized tests or other requirements that must be met. While cognitive, behavioral, and emotional engagement should be present to increase academic engagement. Brittany Coleman studied the relationship between parental involvement, student motivation, and academic achievement of fifth graders. Student motivation and academic achievement had a positive correlation; therefore, "if a student is motivated to do well in school, then he/she would be more likely to make an effort and therefore achieve higher scores". This statement is expanded in the textbook, *Teaching and Learning Elementary Social Studies* when the author writes, "A student's most powerful motivation to learn a school subject comes from his or her prior success in that subject" (Ellis, 2010). According to these two researchers, the aspects of motivation and academic achievement are reciprocal. The more one increases, the more the other increases; therefore students who are successful and motivated will continue to be, whereas students who do not succeed are less likely to become motivated to succeed.

According to Coleman and Ellis, motivation is a crucial factor in promoting students' academic success and should be implemented into classrooms to increase test scores, which in turn motivates students further. Kusum Singh, Monique Granville, and Sandra Dika (2002) conducted a study comparing the effect of attitude, motivation, and academic engagement on academic

performance among eighth graders in the areas of mathematics and science. Of primary importance is the evidence of the strong effects of motivation, positive attitude, and engagement in academic work for success in mathematics and science (Singh, Granville, & Dika, 2002). In their study, the researchers found that it is important for students to be actively engaged in their learning for success. They also determined that motivation has a significant impact on academic achievement (Singh, Granville, & Dika, 2002). Motivation has been found to affect attitudes by causing students to have more positive attitudes and confidence in themselves (Burriss, Heubert, & Levin, 2004).

2.3 Students' Attitude towards Science

In today's world, having strong back ground in science subjects seems very crucial in getting into many careers and occupations such as engineering and technology-oriented areas. In the advancement of science and technology, in this rapid changing world, the role of science is highly pronounced. To insure these students performance should be high. However, many researchers revealed that female students are not good at science as their counter parts. In this concern, Megarry (1984) argued that the masculine image of science as presented in schools science as difficult choice for adolescent females who were striving to achieve a feminine identity. Once females have fallen behind, feedback loops within the school tend to increase the males' lead. Furthermore, Kahel (1993) contained that since science is viewed as amasculine image, it is considered hard, cold and an analytical discipline. Female do not anticipate higher performance in science subjects. In their massive international study on science achievements of males and females, Schunk, & Hanson, (1995). Found that "in all countries males excelled females in science subject, the difference being small in Biology, intermediate chemistry, and very large in Physics" Cited in Yalew (1997:31). Attitudes toward science are heavily influenced by expected achievement. As would be expected, positive attitudes toward science lead to better results on achievement measures of science capability (Weinburgh, 1998). A student's attitude toward science is more likely to influence achievement in science than achievement influencing attitude (Schibeci & Riley, 1986). In addition to achievement, previous experiences in science can heavily correlate with a student's attitude toward science. Research has demonstrated that, "attitudes toward science change with exposure to science, but that the direction of change may

be related to the quality of that exposure,” (Gogolin & Swartz, 1992). Several researchers, including Simpson and Oliver, have found that students’ attitudes toward science steadily decline with each year of school completed (1985). Evidence from every part the world indicates gender imbalance in science is the problem of both developed and developing countries. Around the world majority of female students appears to be disinterested in studying science fields. As a result, gender disparity in science fields of studies and occupations seems to be worldwide phenomena. To illustrate this situation the case of some countries is given below. National assessment in United States revealed that the magnitude of gender gap varies with scientific domain. Differences are largest particularly for physics (Pergamon, 2003). In almost Asian countries, females do not choose science and technology, which is the primary fields of study for female (Jandhya, 1993) instead, they tend to study social science. In South Africa, females tend to avoid natural science fields; that they have been traditionally considered as male domains (Geet, 1997). In Kenya females participation in science and technology fields extremely low (Ngau, 1997). In Ethiopia, Yalew (1997) asserted that female students failing in science more than males have negative attitude. The impact of a student’s attitude toward science is incredibly important. Recent research has shown that nearly fifty percent of students may lose interest in science by the third grade (Weinburgh, 1998). Participation in science is also being affected, as the number of students preparing for a science-related career is on the decline (Chapman, 1997).

2.4. Attitude toward Physics

Physics is considered as the most problematic area within the realm of science, and it traditionally attracts fewer pupils than chemistry and biology. Physics is perceived as a difficult course for students from secondary school to university and for adults in graduate education. In developed countries, it has been determined that goals of science are never fully realized, that student success in physics is lower than chemistry and biology, that students do not like science lectures and that most have no preference for science, particularly physics (Boylan,1996; Dieck, 1997; Mattern and Schau, 2002; Neathery, 1991; Rivard and Straw,2000). It is well known that both high school and college students find physics difficult, and as a scientific discipline, it is avoided because of its negative reputation that students’ positive attitudes towards science highly correlate with their achievement in science. Achievement, motivation and student interest are

influenced by positive and negative attitudes (Miller, 1961). Morse and Morse (1995) found that students with positive attitudes towards science had positive attitudes towards their science teacher, science curriculum and science-classroom climate. Students' attitude toward science is more likely to influence the success in science courses than success in influencing attitude. The measurement of students' attitudes towards physics should take into account their attitudes towards the learning environment (Crawley & Black, 1992). Research has demonstrated that, "the attitudes toward science change with exposure to science, but that the direction of change may be related to the quality of that exposure, the learning environment, and teaching method" (Newble, 1998; Craker, 2006). Armstrong and Impara (1991) determined that fifth and seventh grade students using nature as a curriculum supplement developed more positive attitudes than those who did not.

If students have negative attitudes towards science, they also do not like physics courses and physics teachers. Based on this premise, numerous studies have been conducted to determine the factors that affect the students' attitudes in science. Some basic factors can be listed, including: teaching-learning approaches, the use of the presentation graphics, the type of science courses taken, methods of studying, intelligence, gender, motivation, attitudes, science teachers and their attitudes, self-adequacy, previous learning, cognitive styles of pupils, career interest, socioeconomic levels, influence of parents, social implications of science and achievement (Craker, 2006; Dieck, 1997; Halladyna & Shanghnessy, 1982; Mattern & Schau, 2002; Normah & Salleh, 2006; Rivard & Straw, 2000). Studies have revealed the influence of methods of instruction on students' attitudes towards science (Adesoji, 2008; Gok and Silay, 2008).

Additionally, Usman (2004) posited that there is gender bias in academic performance of students in science, which could be attributed to poor attitude of students towards Mathematics, and Science. So many reasons have been suggested as responsible for low performance in physics by different authors. For instance, Fenstermacher (1996) acknowledged that teachers and other external factors ranging from unprecedented expansion at all levels of education, lack of school facilities and equipment for effective teaching and learning of the subject contribute to poor academic performance of the students. Morakinwa (2003) believes that the poor academic performance of students in physics is attributed to teacher's attitude to their job, which is reflected in their poor attendance to lessons, lateness to school, and unsavory comments about

student's performance that could damage their ego as well as scarcity of physics teachers. Furthermore, Okoronka and Wada (2014) identified poor teaching methodology. In their research work on Effect of Analogy Instructional Strategy, Cognitive Style and Gender on Senior Secondary School Students Achievement in Physics in Nigeria, found the use of Instructional Strategy significantly effective on academic achievement in Physics. Physics education, various methods and techniques can be used according to the content. Laboratory methods, which are the mostly used method that provides permanent learning, is an educational method encouraging mental activities and allowing students to work individually or in groups Laboratory methods ensure that students learn ways to use the knowledge with this method rather than memorizing it. Students improve their skills to better understand of concepts, and adapt them to daily life as well as their personal skills, and it provides a positive attitude towards physics lessons (Algan 1999).

According to Hendrickson, attitudes are the best predictor for estimation of students' success (Hendrickson, 1997). Activities must be planned, organized and implemented so that students may develop more positive attitudes (Pintrich, 1996). Many attitude scales have been developed for the determination of students' attitudes towards Natural Sciences. Regarding these scales House and Prinson (1998), Geban et al. (1994), Kind et al. (2007) Pell and Jarvis (2001), Reid and Skrybina (2002), Bilgin et al. (2006), Nuhoglu (2004,2008), have developed attitude scales toward physics lessons, physics laboratories, and science lessons.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Description of the Study Area and Schools

Sinana Woreda is one of the 20 Woredas in Bale zone, Oromia regional state of Ethiopia. This Woreda is located surrounding Robe town, the capital city of both the zone and the Woreda itself. This Woreda has an estimated population of 118,594 of which 61,968 are Male and 56,626 are female. The Woreda covers an area of 163,854 hectares (CSA, 2007).

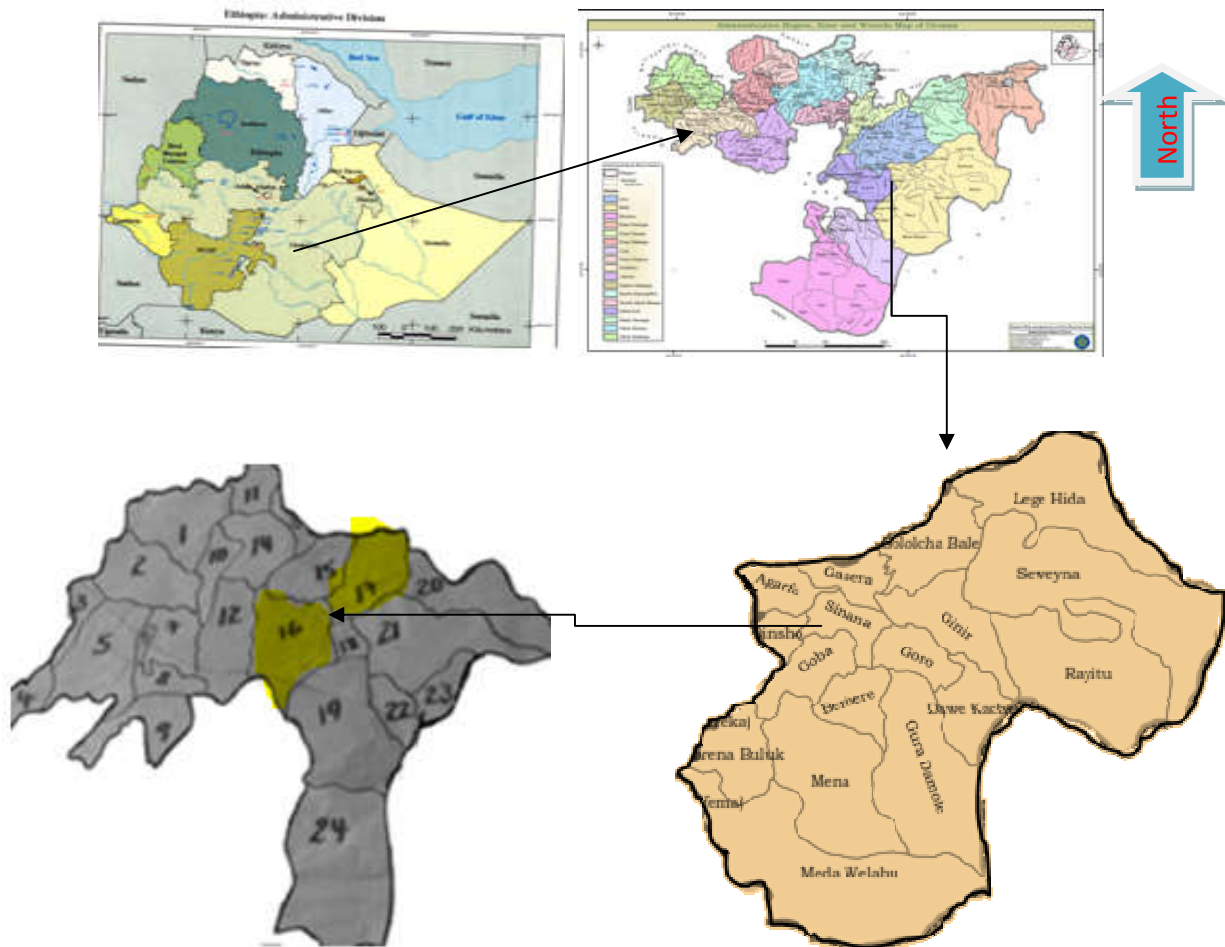


Fig 1. Map of study area

Source: 1. DRMFSS information management, 2004 E.C
2. Sinana Woreda Water, Mineral and energy office

Keys: numbers indicate in the map above represents the name of the kebeles found in Sinana Woreda.

1 = Ilu-Sambitu	7 = Nano Robe	13 = Shewedie	19 = Selka
2 = Kabira temo sulemena	8 = Robe state farm	14 = Hamida	20 = Woltai weib
3 = Woltai berisa	9 =. Hawusho	15 = Asen barera	21 = Woltai arjo
4 = Qaso shemara	10 = Besaso	16 = Obera	22 = Gemora
5 = Hora Boka	11 = Alagie	17 = Hisu	23 = Sinana 3
6 = Robe town	12 = Shallo	18 = SARC	24 = Besmena

This study was conducted at Obora and Hisu secondary schools that are found in this Woreda. These schools were elected purposively out of four secondary schools in this Woreda owing to:

- Identify the difference in academic achievement and attitude toward physics between those of under affirmative action and not under affirmative action of female students.
- Accessibility to the researcher (saving time and money).

3.2. Research Design

In this study, descriptive survey research method is used for its appropriate and suitable for using instruments such as questionnaires and document analysis as it allows the writer to explore and identify typical problems that need to be removed in order to enhance better participation and performance of females in physics.

3.3. Source of Data

For assessing impacts of affirmative action on female student's academic achievement and attitude toward physics from both Obora and Hisu secondary schools primary and secondary source used. In the sample, students have been selected as primary data source and documents analyses (achievement tests) from the record office of the schools have been used as secondary data sources.

3.4. Population, Sample and Sampling Techniques

3.4.1 Subjects of the Study

The subjects of the study were conducted among grade 10 students of Obara and Hisu secondary schools during 2008 E.C academic year. The total population was 400, of which 232 (58%) were in Obara secondary school and 168 (42%) were in Hisu secondary school. In both schools, there were 213 (53.25%) male and 187 (46.75%) female students attending Grade 10. but out of 187 female students 107 were in Obara secondary school and they were under experimental group action for two years (2007E.C up to 2008E.C).

Table 1. Total population and sample size (2008 E.C)

Total number of students					Students sample size		
School	Grade	Male	Female	Total	Male	Female	Total (%)
Obara	10	125	107	232	61	53	114(57.87%)
Hisu	10	88	80	168	43	40	83(42.13%)
Total		213	187	400	104	93	197(49.25)

Sampling formula for sex size = $\frac{n}{N} * \text{Total students of male or female in particular school}$

Where: n= sample size of a particular school and N= number of whole students in a particular school (ያለው እንዳወቀ ፣ 1998 ዓ.ም, MoE.2002).

3.4.2 Study Design (Study Type, Sample Size and Sampling Procedure)

The study was conduct using empirical research method where sample population represents the studied areas and the selections of schools were purposive. From the total population of 400 from Grade 10 students of the two schools, 197 (49.25%) of the students were choose for this study

and using a stratified random sampling technique. Of these, 232 (58%) of the students were from Obera and 168 (42%) were from Hisu. Accordingly, questionnaires were to be distributing to 197 students.

$$\text{Sample size for each school} = \frac{n}{N} * \text{Total students in each school}$$

Where: n=Size of whole sample and N= Size of whole students from both schools

3.5. Methods of Data Collection (Study Methodology)

In this study, we were collected their grades scores of Ethiopian General Secondary Education Certificate Examination (EGSECE) of 2008 E.C for measuring academic achievement and close-ended questionnaires for information of achievement and likert-type scale to test attitude was collected the necessary data from the subject of the students.

3.5.1. Measurement of Attitude

Attitude is a complex mental construct (perception) which emerges out of an integration of an individual's belief and values system. According to psychology today, attitudes do not have their origin in the object themselves because our attitude can change while their objects remain constant. This idea consistent with Radom1983:571 . In this study, Closed ended questionnaires for likert-type Scale used to measure the extent to which the students' feelings are favorable or unfavorable towards Physics education. To do this, thirteen close-ended questionnaires where each item indicating the degree of one's feelings toward the Physics education to be develop. The alternatives with assigned marks are strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1).

3.6. Method of Data Analysis

The questionnaires translated into Afan Oromo, which is the medium of instruction of the region. Afan Oromo and English teachers in Obora and Hisu secondary schools of Teacher Education did the translation. Before the questionnaire administered to respondents, a pilot test was carried out in Obora secondary school to ensure the language clarity and appropriateness of the items and reliability value of $r = 0.85$ was obtained for attitude test. Based on the above views the pilot

study conducted with 30 students that were later excluded from the study. Finally, modifications made depending on the comments collected during try out. This was done to ensure the reliability of the instrument. At last, this questionnaire was set in their final forms. To maximize the quality of the responses and the rate of return the time convenient for the respondents arranged. A brief orientation about the whole purposes of the study given for the respondents. A close follow-up also made to correct problems that arose during the filling of the questionnaire and the distribution and collection of questionnaires were done in collaboration with Directors of each school. Designed was carried out using Guttman split half method formula.

$$r = 2\left(1 - \frac{SE^2 + SO^2}{Sx^2}\right)$$

Keys: SE^2 = variance for the Even numbered items.

SO^2 = variance for the odd numbered items.

Sx^2 = variance for the whole items.

r = the correlation between values for odd and even numbered items, to check for internal consistence of the items because the test was administered only once (no retest) method.

Document analysis used for achievement test results collected from record office of the two secondary schools. The test result of grade scored of one year of achievements EGSECE in Physics collected to evaluate their achievements and to measure students' attitude test result were collected with likert-type scale questionnaires that related to Physics issues. Then relationship between achievement result and attitude toward Physics their response compared using percentage quantitatively description given and the data are present using descriptive and inferential statics because of its appropriateness. I employ by using spss statistics version 20.0 program to analyze the significant difference student in academic achievement between the male students and female students both under affirmative action female and not under affirmative action females in physics subject .male students used as base category.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1. Results

4.1.1. Status of Students' Attitude toward Physics

The objective of this study was to assess the level of attitude toward physics and taking male students as a base of comparison in Obora and Hisu secondary schools. This part of the study deals with the presentation and interpretation of the data gathered from the two secondary schools related with the Objective of the study by the following tables.

Table 2. Level of students interesting to physics at elementary school.

Alternative	Respondents									
	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
highly interested	42	68.85	24	45.28	15	34.88	16	40	97	49.24
Interested	19	31.14	24	45.28	25	58.14	23	57.5	91	46.19
Dislike	-	-	1	1.88	3	6.97	1	2.5	5	2.54
highly dislike	-	-	4	7.54	-	-	-	-	4	2.03
Total	61	100	53	100	43	100	40	100	197	100

As indicated in (Table. 2), majority 42 (68.85%) of Obora school male respondents' forwards that highly interested to learn physics when they were at elementary school. In addition, 24 (45.285) of Obora female respondents forwards both highly interested and interested but the

majority 25 (58.14%) of Hisu male and female respondents forwards was interested to learn the subject when they were in elementary school. Only 4 (2.03 %) of all respondents forwards dislike physics at elementary school. Therefore, this table shows that almost the majority of both schools students were interested to learn physics at elementary level.

Table 3. Students’ subject preference.

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
Biology	42	68.85	14	26.42	34	79.09	33	82.5	123	62.44
Chemistry	9	14.75	11	20.75	4	9.30	4	10	28	14.21
.Physics	10	16.39	28	52.83	5	11.62	3	7.5	46	23.35
Total	61	100	53	100	43	100	40	100	197	100

As can be seen from (Table. 3) majority 42 (68.85%) Obora male students were first choice was Biology and 28 (52.83%) of female was physics as the first choice but the majority 34 (79.06) of male and 33 (82.5%) of female Hisu school students first preference was Biology. Finally, the total preference of all respondents forwards as the first choice was Biology and the second choice was physics.

Table 4. Students’ result vs. subject.

Alternative	Obora				Hisu				Total			
	Male		Female		Male		Female		Male		Female	
	N	%	N	%	N	%	N	%	N	%	N	%
Biology	6	9.84	2	3.77	5	11.63	6	15	11	10.57	8	8.6
Chemistry	16	26.23	10	18.86	20	46.51	23	57.5	36	34.62	33	35.48
Physics	39	63.93	41	77.35	18	41.86	11	27.5	57	54.81	52	55.91
Total	61	100	53	100	43	100	40	100	93	100	104	100

From the (Table. 4) majority students out of 61 students 39 (63.93%) of male and out of 53 students 41 (77.35%) of female of Obora school scored lowest result in physics. But out of 43 students 20 (46.51%) of male and out of 40 female students 23 (57.5%) scored lowest result in chemistry but the total respondents of all students of both Obora and Hisu secondary schools, out of 197 students 109 (55.33%) scored the lowest result in physics. Generally males excelled females in chemistry and physics but females excelled males in Biology.

Table 5. Status of students learn Physics

	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
first choice	27	44.26	21	39.62	19	44.18	15	37.5	82	41.62
second choice	17	27.87	23	43.39	20	46.51	22	55	82	41.62
third choice	17	27.87	8	15.09	4	9.30	2	5	31	15.73
Being obligated	-	-	1	1.88	-	-	1	2.5	2	1.02
Total	61	100	53	100	43	100	40	100	197	100

According to (Table. 5) out of 61 male students of Obora secondary school students 27 (44.26%) learn physics with their first choice but out of 53 female students of Obora school students 23 (43.39) learn physics education with their second choice. However, out 43 male students of Hisu secondary students 20 (46.51%) learn physics education with their second choice and Hisu school female students also out of 40 students 22 (55%) learn physics with their second choice. Generally out of 104 male students 46 (44.23%) learn physics with their first choice and out of 93 female students 45 (48.39%) learn physics with their second choice which is contradict with the idea of their preference in (Table. 2) above physics is the last preference. Students' statuses learn toward physics decreased at secondary school level. These indicate that the students statuses learn toward physics have relationship with their academic achievement, hence their achievement lower in secondary school level than elementary school level.

Table 6. Tendency of students to ignore the subject if they given the choice

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
Biology	-	-	2	3.77	2	4.65	3	7.5	7	3.55
Chemistry	6	9.83	13	24.53	7	16.28	13	32.5	39	19.79
physics	55	90.16	38	71.69	34	79.06	24	60	151	76.65
Total	61	100	53	100	43	100	40	100	197	100

According to (Table. 6) to identify which subject most students want to ignore it from the subject they learn, out of 197 male and female students 151 (76.65%) students want to ignore physics from the subject they learn. This idea is agree with the idea of (Table.3) which indicate that attitude and achievement are correlate each other. The relationship between these two variables is a key issue for consideration permeating much of the research.

Table 7. Possible reason of the students' tendency to hate physics from the subject they learn if they have given the choice.

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
lowest score	40	65.57	24	55.81	4	11.43	5	22.73	73	45.34
Lack of Lab.	14	22.95	14	32.56	26	74.28	17	77.27	71	44.09
Hence my elders dislike it	3	4.92	-	-	4	11.43	-	-	7	4.34
In elementary lowest result	4	6.56	5	11.63	1	2.85	-	-	10	6.21

As (Table. 7) indicates among the sample of 197 students' 73 (45.34%) respondents want to ignore physics from the subject they learn. If they have been given the choice because of they have the lowest score (result) of all subject is physics and the other second reason is they never learn physics with help of experiments (Laboratory) hence physics is the experimental science.

Table 8. Tendency of students' attitude toward Physics

1=strongly disagree 2=disagree 3=difficult to decide 4=agree 5=strongly agree

S No	Items	5		4		3		2		1	
		N	%	N	%	N	%	N	%	N	%
1	I am glad while learning physics than other subjects	58	29	36	18	10	5	34	17	59	30
2	I do my physics home and class work willingly	54	27	34	17	19	10	43	22	47	24
3	I learn physics without any obligation	56	28	30	15	17	9	37	19	57	29
4	Since, I bring low result in physic. I dislike it	69	35	30	15	24	12	36	18	38	19
5	Usually I pass the physics period being glad	55	28	44	22	21	11	35	18	42	21
6	I dislike physics since my elders dislike it	24	12	44	22	16	8	35	18	78	40
7	I devote considerable time on studying physics	24	12	52	26	33	17	40	20	48	24
8	I like physics more than any subject	28	14	36	18	24	12	31	16	78	40
9	I like the method of teaching that the teacher apply	74	38	61	31	11	6	29	15	22	11
10	While my physics teacher teach me I understand nothing	42	21	40	20	22	11	40	20	53	27
11	I never learn physics in lab. class	162	82	16	8	5	3	6	3	8	4
12	Even I did not read more ,I can promote to the next class easily	60	30	25	13	20	10	41	21	51	26
13	Hence I am poor in English it is difficult understand the meaning	87	44	41	21	14	7	30	15	25	13

1. from the (Table. 8) shown above from the total respondents out of 197 students 47% were not glad when they learn physics and equal number of students around 47% students were glad to learn physics than other subject.
2. From (Table. 8) out of 197 respondents 46% of all the students did not do their physics homework and class work willingly. however, around 44% respondents forwards that as they done physics home work and class work willingly if we compare these two idea the number of students did not done their physics home work and class work greater than other students.
3. From the total respondents 48% of the students learn physics education without their interest but around 43% of the students learn physics with their interesting. This indicate that majority of the students learn physics with obligation.
4. Out of all respondents, 50% of the students scored low achievement in physics because of this they dislike physics but 47% of students dislike physics is not the cause of their achievement.
5. Around 50% of the students usually pass the physics period being glad but 39% were not glad during physics period.
6. From 197 students, 34% of students dislike physics because of their elders dislike it. However, 58% of students dislike physics because of other cause.
7. From the total students 44% of respondents' not devoted considerable time on study physics but only 38% of students devoted their considerable time on study physics.
8. From the total respondents of 197 students 56% of students dislike physics more than other subjects but only 32% students like physics more than other subjects do.
9. Out of 197 respondents 69% respondents forwards that they were like the method of taught that the teacher applied but only 26% of students dislike the method of taught that the teacher applied.

10. From 197 students 47% of students were not have the case of understanding when their teacher taught physics but 41% of students were had the problem of understanding at a time of their teacher taught them.
11. Out of 197 respondents, 90% students never learn physics in Laboratory class only 7% of the students have the chance to learn the physic in the Laboratory class.
12. From the 197 students 43% of students did not read more because they can easily promoted to next class but 47% of students did not support this idea.
13. From the total students of 197 respondents 128 (65%) students were poor in English and it is difficult to understanding the meaning of the statements.

4.1.2. Results of linear Regression Model on Status of students' Attitude toward physics

One of the objective of integrating physics issues in the formal system to develop positive attitudes of students toward physics education. In this study, attitude among respondents' were investigated by the responses to 13 questions on the physics issues. Following delivery of the final test the highest result would be 65 (13*5) and the lowest result would be 13 (13*1) if the students totally agree and totally disagree respectively with all the items. The highest score means students have favorable attitude and the lowest score means unfavorable attitude towards physics education this is explained by the following tables.

Table 9. Percentage of students falling under different level of attitude toward physics.

Scores category	Scores range	Obora				Hisu				Total			
		Female		Male		Female		Male		Female		Male	
		N	%	N	%	N	%	N	%	N	%	N	%
Favorable	52-65	-	-	-	-	1	3	3	7	1	1	3	3
Less favorable	39-51	34	64	37	61	19	48	27	63	53	57	64	62
Unfavorable	13-38	19	36	24	39	20	50	13	30	39	42	37	36
Total		53	100	61	100	40	100	43	100	93	100	104	100

According to the result of this study, the respondents were categorized as unfavorable, less favorable and favorable scores. The result from (Table. 9) indicate that out of 53 female students of Obora School 34 (64%) less favorable and out of 61 male students of Obora school 37 (61%) were also less favorable. From Hisu School out of 40 female students 19 (48%) were less favorable and out of 43 male students of Hisu school 27 (63%) were less favorable however 19 (36%) of female students of Obora school were unfavorable and 42 (39%) of male students of Obora school were unfavorable. However, 20 (50%) of Hisu female students were unfavorable toward physics and 13 (30%) were unfavorable. then, majority of the respondents, out of 197 students 117 (59%) have less favorable toward physics and 76 (39%) were unfavorable attitude toward physics but only few students 4 (2%) were favorable toward physics.

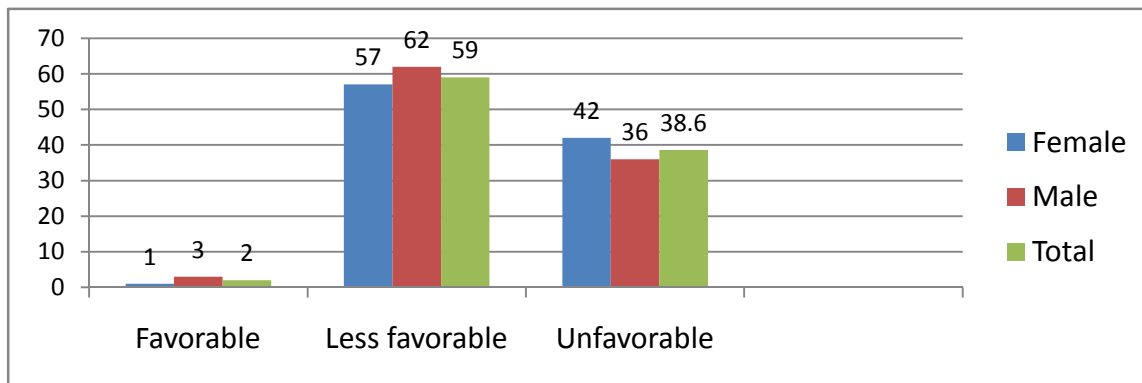


Fig 2. Graph of students status attitude toward physics

Table 10. Spss multiple linear regressions output for effect of the four-selected independent Variables on students' attitude toward physics.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	41.355	3.214		12.868	.000
	School	1.092	.933	.090	1.171	.243
	Sex	-.204	.942	-.017	-.217	.829
	Age	-1.007	.523	-.152	-1.927	.055
	FEB	.027	.609	.003	.044	.965

a. Dependent Variable: Attitude and significant level at $\alpha = 0.05$ and F-to-remove ≥ 0.100

Regression Statistics

Multiple R	0.162
R Square	0.026
Adjusted R Square	0.006
Standard Error	5.983

R square is 0.026. It means that four of the independent variables together can explain 2.6% of the model and the rest 97.4% may be explained by the other factors not mentioned in this regression model.

It is found from the (Table. 10) that Beta or standardized coefficient of percentage of School is 0.090. It implies that impact of a school on students' attitude is positive and it shows that school affects students attitude toward physics is 9%. If there is a good conditions of learn process in school environment the students attitude toward learn physics education is positive, however school is not statically significant factor influences students attitude its P value obtained is 0.243 which greater than the significance level alpha ($P > 0.05$). The standardized coefficient of percentage of FEB (Family Education Background) is also 0.003 means it has positive relation with attitude of students toward learn the subject by 0.3% this indicated that educated family could guide their children to learn better but family education background is not statistically significant factor influences students attitude toward physics because of its P value obtained is 0.965 ($P > 0.05$). The standardized coefficient of percentage of sex and age are -0.017 and -0.152 respectively show that inverse relation on students attitude toward the subject by 1.7% and 15.2% respectively have effect on students attitude toward physics education. Sex has the statistical value of $P = 0.829$ which is greater than alpha ($P > 0.05$) and its then sex is not statically significant impact on students' attitude and standardized coefficient of percentage of age is negative, its statistic value of P is 0.055 that is greater than significance level of alpha ($\alpha = 0.05$) of the table. Therefore, age is reverse relation attitude toward learn indicate that majority students those enter school beyond their school entry age have negative attitude toward learn physics education but fewer students those enter school just at school entry age have positive attitude. Therefore, age has fewer available impacts on students' attitude toward learn physics education but age is not statistical significant factor influences students attitude toward learn physics education.

Table 11. Students' ages when they were in grade 10.

Age	Female		Male		Total	
	N	%	N	%	N	%
16	4	4.3	-	-	4	2.03
17	46	49.46	19	18.27	65	32.99
18	41	44.09	61	58.65	102	51.78
19	2	2.15	16	15.38	18	9.14
20	-	-	5	4.8	5	2.53
22	-	-	3	2.88	3	1.52

From the (Table. 11) above the majority of both female and male students about 97.97% enter school when they were older enough or beyond school entry age, only few students around 2.03% enter school with ages at primary school entry of seven ages in Ethiopian standardized (Bedard and Dhuey, 2012). This indicates that age is negative impacts or inverse relation on students' attitude toward the subject matter as the result of multiple linear regressions of standardized coefficients Beta (-0.152) is negative value.

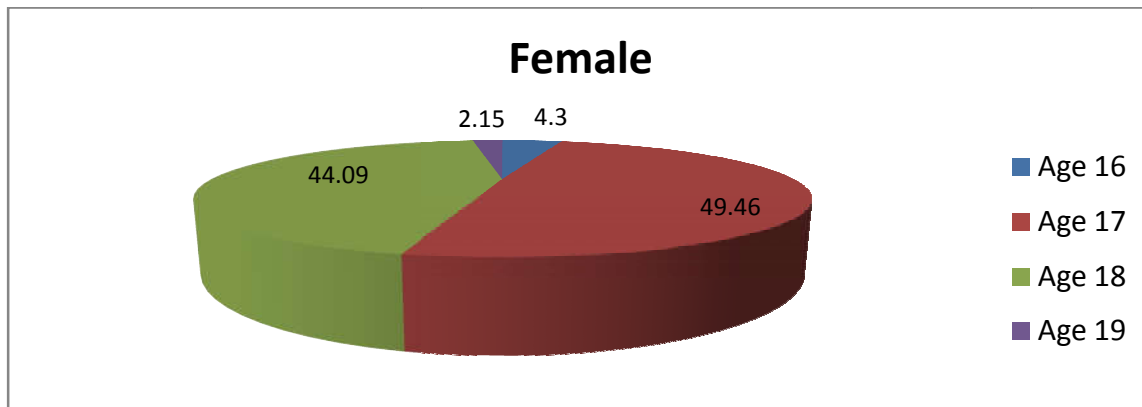


Fig 3. Graph of female students ages when they were in grade 10.

From the Figure 3 above, 49.46% and 44.09% of female students enter school when they were eight and nine years old respectively and their attitude toward physics is less favorable but all the independent variables in this study is not statistically significant impact on students attitude toward physics education. However, around 95.7% of female students enter school at age of greater than seven years old. Which indicate that beyond the school, entry of Ethiopian

standardized but they have negative attitude toward the subject matter only few students enter school when they were younger at age of seven is 4.3%.

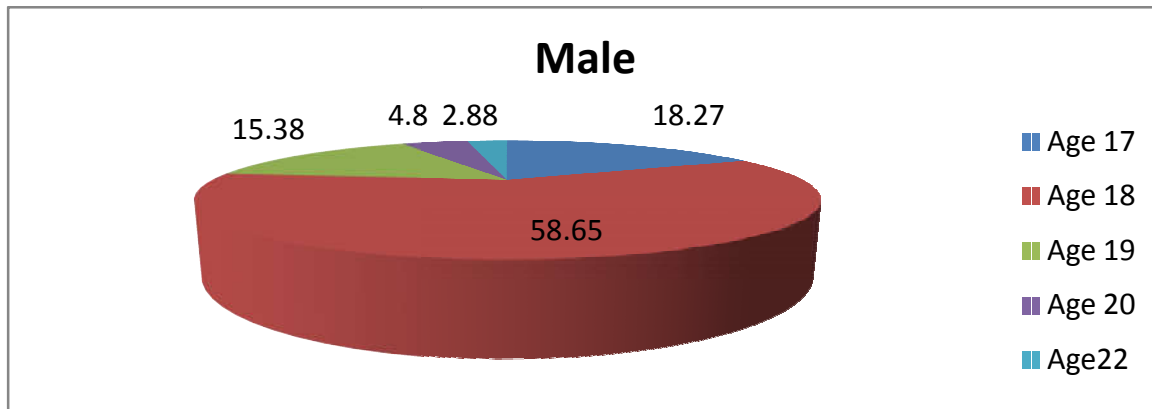


Fig 4. Graph of male students ages when they were in grade 10.

From the (Table. 11) above all of male students enter school when they were enough old with age greater than seven years old which is beyond ages at primary school entry in Ethiopian standardized level and they have less favorable and unfavorable attitude toward physics. However, age is not statistically significant factors it is statistical probability ($P > 0.05$).

4.1.3. Status of Students Academic Achievement in Physics

The objective of this study was to assess the level of academic achievement of female students in physics and taking male students as a base of comparison in Obora and Hisu secondary schools. This part of the study deals with the presentation and interpretation of the data gathered from the sample secondary schools related with the Objective of the study. Accordingly, presentation and analysis were made by using of the data gathered from two secondary schools students and document analysis from record office of the schools. Two tools were used to gather data. These were a set of questionnaire including close-ended questions and document analysis. Therefore, based on the responses obtained from the respondents and from the document analysis and interpretations of the data were made in relation to the basic research questions by the following tales below.

Table 12. The students' achievement Background in physics when they were in elementary school level.

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
90-100% Excellent	8	13.11	3	5.67	2	4.65	5	12.5	18	9.23
80-89% Very Good	5	8.19	2	3.77	9	20.93	7	17.5	23	11.66
60-79% Satisfactory	38	62.29	36	67.92	26	60.46	20	50	120	60.91
50-59% Fair	6	9.83	9	16.98	4	9.30	4	10	23	11.67
Below 50% poor	4	6.56	3	5.67	2	4.65	4	10	13	6.59
Total	61	100	53	100	43	100	40	100	197	100

From the (Table. 12) out of 197 respondents almost 120 (60.91%) of both schools and sex had satisfactory result (60 % up to 79%) achieved but around 11.66% achieved fair and 6.59% of the students achieved poor result only 9.23% of the students achieved excellent result in physics at elementary level.

Table 13. The backgrounds of the students' achievement in physics when they were in high school or grade 9 and grade 10 first semesters.

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
90-100% Excellent	1	1.64	2	3.77	3	6.97	3	7.5	9	4.57
80-79% very Good	9	14.75	4	7.53	5	11.63	2	5	20	10.15
60-79% Satisfactory	20	32.78	27	50.94	13	30.23	15	37.55	75	38.07
50-59% Fair	24	39.34	17	32.08	9	20.93	14	35	64	32.49
Below 50% poor	7	11.48	3	5.66	13	30.23	6	15	29	14.72

As shown from the (table. 13), out of 197 respondents 75 (38.07%) forwards that their achievements when they were in secondary school was also scored satisfactory result. Next to this result 64 (32.49%) of students were scored Fair results. This indicates that the students' achievement is lower in secondary school than in elementary level and also number of students those scored poor result is 29 (14.72%) which is greater than in elementary level. However, few students 9 (4.57%) of both schools had been scored Excellent ($\geq 90\%$) result.

Table 14. The difficulty level of medium of instruction language during learning.

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female		N	%
	N	%	N	%	N	%	N	%		
Afar Oromo	-	-	2	3.77	5	11.63	1	2.5	8	4.06
Amharic	22	36.06	17	32.08	19	44.19	12	30	70	35.53
English	39	63.93	34	64.15	19	44.19	27	67.5	119	60.40
Total	61	100	53	100	43	100	40	100	197	100

According to (table. 14) from the medium of instruction language out of 197 respondents 119 (60.40%) of both schools students gave response as English language was the most difficulty language for them to understand the information from their teachers and from written material.

Table 15. The difficulty level of medium of instruction language during examination.

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female		N	%
	N	%	N	%	N	%	N	%		
High	6	9.84	2	3.77	3	6.98	1	2.5	12	6.09
Medium	24	39.34	22	41.51	31	72.09	26	65	103	52.28
Low	31	50.82	29	54.72	9	20.93	13	32.5	82	41.62
Total	61	100	53	100	43	100	40	100	197	100

As shown from (table. 15) out of 197 students 103 (52.28%) and 82 (41.62%) the level of understanding the meaning of statements which had been written in English was medium and

low respectively but few of students out of 197 students only 12(6.09%) of students understanding the meaning of statements which had been written in English was high.

Table 16. Possible reasons of the students why they did not study hard or devote considerable time on study Physics (other subjects).

Alternative	Obora				Hisu				Total	
	Male		Female		Male		Female			
	N	%	N	%	N	%	N	%	N	%
even I did not study hard I can promote to the next class	27	44.26	17	32.08	20	46.51	13	32.5	77	39.08
I did not have interesting to learn b/c of my elders were not employed	4	6.56	5	9.43	1	2.33	4	10	14	7.10
since ,I can copy from my friends	2	3.28	2	3.77	2	4.65	6	15	12	6.09
hence, I did not have base at elementary level	28	45.90	29	54.72	20	46.51	17	42.5	94	47.72
Total	61	100	53	100	43	100	40	100	197	100

From (Table. 16) out of 61 male students 28 (45.9%) of Obora secondary school students did not study hard or devote considerable time on study physics, hence they were not have base at elementary level and also out of 53 female students 29(54.72%) of Obora school students have the same reasons with that of their male students. But from 43 male students of Hisu secondary school students 20 (46.51%) did not study hard or devote considerable time on study physics because of the problem of base at elementary school level and even they did not study hard they easily promote to the next class. However, of 40 female students 17 (42.5) have the problem of base at elementary school level. Therefore according to (Table. 16) out of 197 students 94 (47.72%) of respondents forwards that they did not study hard or devote considerable time on study physics (other subjects) because of they did not have base at elementary school level.

4.1.4. Impacts of Affirmative Action on Academic Achievement of the Students

Female students those of under affirmative action, their preference subject is physics more than their male students as (Table. 3) indicate above, as the result of their preference female of under affirmative action performed more than those were not under affirmative action. This indicates that affirmative action has positive impact on female students. The result comparisons explain clearly by the tables and graphs below.

Table 17. Grade Scores of EGSECE in Physics education (2016).

Grade scores in Obora secondary School																			
A				B				C				D				F			
Male		Female		Male		Female		Male		Female		Male		Female		Male		Female	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2	1.6	2	1.87	36	28.8	30	28.04	54	43.2	46	42.99	29	23.2	28	26.17	4	3.2	1	0.93
Total = 4				Total = 66				Total = 100				Total = 57				Total = 5			
Grade Scores in Hisu Secondary School																			
A				B				C				D				F			
Male		Female		Male		Female		Male		Female		Male		Female		Male		Female	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2	2.27	1	1.25	38	43.19	16	20	32	36.36	32	40	16	18.18	30	37.5	-	-	1	1.25
Total = 3				Total = 54				Total = 64				Total = 46				Total = 1			
Mean value of grade scores																			
Obora						Hisu													
Male			Female			Male			Female										
2.02			2.04			2.29			1.83										

From the (table. 17) above out of 125 male students 2 (1.6%) of students grade scored **A** .but from 107 female students 2 (1.87%) of students scored **A** from Obora secondary school students and out of 125 male students 36 (28.8%) scored **B** and from 107 female students 30 (28.04) scored **B**. These grade scored by male and female are approximately equal performance. This idea indicated that the academic achievements of female students of Obora secondary school was improved indicate that the aim of affirmative action taken on female students for two years was partially succeed. But grade scored in Hisu secondary school is out of 80 students 1 (1.25%) scored grade **A** and 16 (20%) students scored grade **B** which was less than grade scored by female students scored in Obora school and grade scored by Hisu male students were 38(43.19%) scored **B** there is big difference between their female students. Generally, Obora female students were equally performed to their male students and more performed than female students of Hisu secondary school students that were not under affirmative action. This result is also show below clearly with the help of graphs as anyone can be identified the similarity and difference between each category.

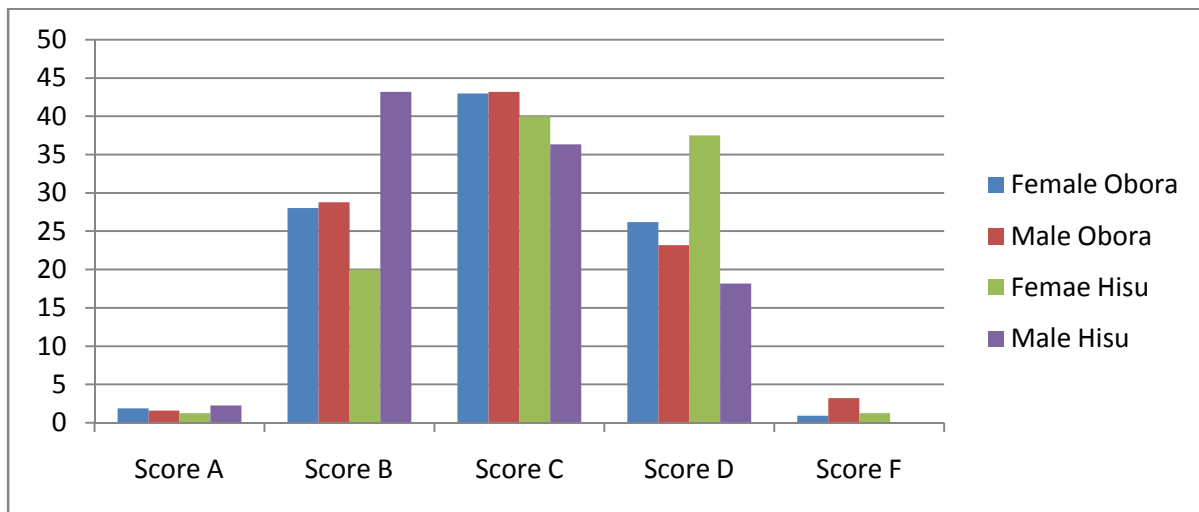


Fig 5. Graph of students with A, B, C, D and F percentage of scores in grade 10 (2008 E.C) of national examination in Obora and Hisu secondary schools for achievement percentage comparisons.

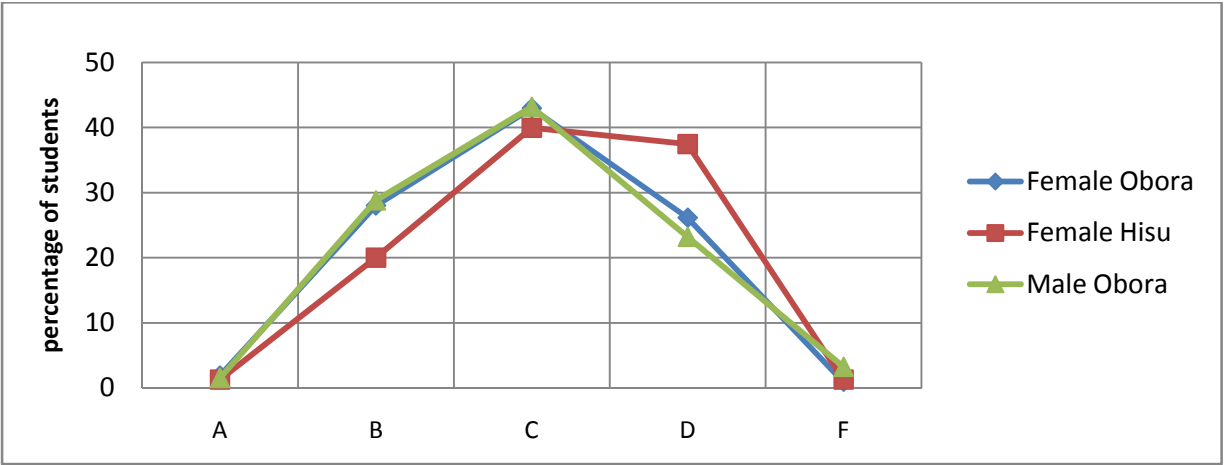


Fig 6. Graph of students with A, B, C, D and F percentage scores in grade 10 (2008E.C) of Ethiopian General Secondary Education Certificate Physics Examination Result.

From the graph shown above the percentage comparison of grade scored by Obora female students and Obora male students were nearly equal to each other. However, the grades scored by Hisu female students were less than Obora female students were. This output of the students result indicate that Obora female students were equally performed their male and more performed than Hisu female students did.

Table 18. The comparison academic achievement between female students of both Obora and Hisu secondary school.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.948	.300		6.484	.000
1 Age	.125	.099	.092	1.258	.210
School	-.218	.120	-.133	-1.822	.070

a. Dependent Variable: achievement. Significance level ($\alpha = 0.05$)

Regression Statistics

Multiple R	0.158
R Square	0.025
Adjusted R Square	0.015
Standard Error	0.80

The value of R square is 0.025. It means that two of the independent variables together can explain 2.5% of the model and the rest 97.5% may be explained by the other factors not included in this linear regression model.

All the independent variables are not statistically significant factors on female students' academic achievement because of the statistical value of ($P > 0.05$) of the statistical significant level.

Table 19. Comparison of academic achievement between female and male of Obora secondary school.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.046	.212		9.666	.000
1 Sex	.009	.117	.005	.074	.941
Age	-.007	.064	-.008	-.113	.910

a. Dependent Variable: achievement. and significance level at $\alpha = 0.05$

$$R^2 = 0.00 \quad \text{Adjusted } R^2 = -0.009 \quad \text{Stand. Error} = 0.832$$

The value of R square is 0.000. It means that two of the independent variables together cannot explain the model and it may be explained by the other factors not included in this linear regression model. As indicated above the statistical significance value of ($P > 0.05$) of all the independent variables. Therefore, there are no any significant difference factors on academic achievement between female and male of Obora secondary school students.

4.1.5. Attitudes Factors and Achievement of both female and male Students

The majority area of the investigation under this part was attitudes factors on students toward physics subject and level of academic achievement of female students in physics subject comparably with that of male students which is mainly focus of the research question. Hence, attitudes are the best predictor for estimation of students' success. Effort was made to acquire relevant information both represent female and male students to analyze attitudes factors and level of academic achievement of the two secondary schools students explained clearly with the help of the following table below.

Table 20. MLR output for the effect three selected independent variables on students' achievement between Obora and Hisu secondary schools.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1	(Constant)	1.337	.442		3.021	.003
	Attitude	.026	.010	.190	2.707	.007
	Obora (Hisu)	.027	.119	.016	.230	.818
	female (male)	-.287	.118	-.170	-2.429	.016

a. Dependent Variable: achievement significant level $\alpha = 0.05$

$$R = 0.247 \quad R^2 = 0.061 \quad \text{Adjusted } R^2 = 0.046 \quad \text{Std.Error} = 0.82531$$

The multiple linear regression analyzed by spss statistics version 20.0 and displayed by (table. 20) indicated that from the three independent variables considered, except school the rest two are significantly influenced the academic achievement. From the above simple regression analysis that with ($t = 2.707$, $P < 0.05$) attitude is found to contributor to achievement. It is found that attitude contributed about 19% for achievement. Therefore, the prediction of attitude to achievement is statically significant factor. There is significant factor between female and male in their academic achievement of both schools with ($t = -2.429$, $P < 0.05$) there is a significant difference between female and male in their academic achievement.

4.2. DISCUSSION

This study was set out to investigate the impact of affirmative action on female students' academic achievement and attitude toward physics education in secondary school. It also aimed to assess the presence of gender difference both in their achievement and in attitude toward physics. Furthermore, the relationship between attitude and achievement were also aimed to be analyzed. In this section, discussion of the finding of the study is presented in line with the basic research questions.

4.2.1. Status of Students' Attitude toward Physics

As can be seen from (Table. 3) majority 42 (68.85%) Obora male students were first choice was Biology and 28 (52.83%) of female was physics as the first choice but the majority 34 (79.06%) of male and 33 (82.5%) of female Hisu school students first preference was Biology. finally the total preference of all respondents forwards as the first choice was Biology and the second choice was physics.

Concerning respondents of the female students in Obora school those of under affirmative action develop positive attitude toward the physics more than male students this finding of the research is agreement with report by (Seferoglu, 2004; Sunbul et al., 2004). Then we can concluded that attitude is related to students' academic achievement and influences their emotional occurrence during learning teaching process and attitude can play determinant factor on human behavior to change directly or indirectly influences future lives of individuals.

From the (table 8) above majority of the students have negative attitude toward physics. Because of they were poor in English and it difficult for them to understanding the meaning of the statements and hence physics is experimental science they never learn physics in Laboratory class and difficulty nature of the subject needs hard work however they did not devoted considerable time on study physics. Beside to these they did not done their homework and class work properly. Therefore, at the end, these causes as they to be achieved low result in physics education and they develop negative attitude toward physics even around 76.65% of students want ignore physics from the subject they learn if they have the chance because of the lowest

result of the entire subject. This finding of the present study is consistent with the finding of some previous studies :(Newton, 2008) and (Schibeci .1984).this idea confirmed that as achievement and attitude of the students are consecutive of one another. As negative attitude is a reaction of low result and positive attitude is a reaction of high result. Therefore, we can conclude that there is strong relationship between attitude and achievements of the students.

From the (Table. 11) above the majority of both female and male students about 97.97% enter school when they were older enough or beyond school entry age, only few students around 2.03% enter school with ages at primary school entry of seven ages in Ethiopian standardized. This indicates that age is negative impacts or inverse relation on students' attitude toward the subject matter as the result of multiple linear regressions of standardized coefficients Beta (-0.152) is negative value from (Table. 18) show that age has reverse relation for attitude toward learn physics education.

The legislated school-entry cut-off date indicates the date by which children need to be a certain age before they begin primary school. Across the world, countries start their children at different ages but the finding of this study disagrees with the idea of (Bedard and Dhuey, 2012). In some countries, children begin at age five; in others, they begin at age seven. Most countries start their children at age six. These indicated that school-entry age in Ethiopia is also at age seven and she/he reached 16 years old at grade 10. But majority of the students were above 16 years old when they were in grade 10 this finding of research is also disagreement with report of (MOE, 2014).

As mentioned above majority of the students enter school when they were enough older but they have negative attitude toward and low achievement in physics. This finding of the researcher is contradict with report of (Bedard and Dhuey 2006). However, the finding of this research is to some extent agreement with the idea of (Dhuey and Lipscomb 2010) the older students are less likely to be identified as disabled and receiving special education services among other outcomes.

Again, as shown from the (Table. 9) above majority of the students have less favorable and unfavorable attitude toward physics indicated that around 98% of the students have negative attitude as the result of so many factors listed above. This finding of the researcher is agreement

with idea of (Sedlacek et.al, 2004). This indicates that status of students' attitude toward physics affects learning in physics. Majority of the students develop negative attitude due to their teachers unable to satisfy their hope and methods of teaching their teachers apply this all are makes the learning of physics education became difficulty this finding of study is consistent with the previous finding of researcher (Ogunleye, 1993).

.Therefore the role of the teacher as facilitator of learning process it contributions to students' achievements. This means, teacher's experiences and behaviors towards the teaching learning process in the classroom contribute greatly in shaping students attitude towards their teachers and the subject being taught. This can affect on the students' academic achievement finally the result of EGSECE of female students those of under affirmative equal performed to their male counterparts and more performed than those of not under affirmative female students. This indicate that those students taught by more experienced teachers tend to have favorable attitude towards the subject and perform at a higher level, because their teachers have mastered the content and acquired classroom management skills to deal with different types of classroom challenge This finding of the study agreement with the finding of (Philiias, 2009) because of female under affirmative action learned by selective teacher with interesting of female students.

4.2.2. Impacts of Affirmative Action on Academic Achievement of the Students

As shown from the (Table. 17) above Obora secondary school female students those of under affirmative action achieved on average 2.04 point, which is approximately equal to their male counterpart achieved 2.02 point. However, greater than female students of Hisu secondary school learned under normal conditions achieved 1.83 point that is more less than their male counterpart achieved 2.29 point. These indicate that the affirmative action have positive impact on students academic achievement. This finding of the research is agreement with the report by (Coleman, 2009) this confirmed that the impacts of affirmative action on female Students and academic achievement in physics education had a positive correlation. But female students those were not under affirmative action achieved lowest result in physics education below their male counterparts this indicates that as female students are not good at natural science. This finding of the research is agreement with (Megarry, 1984). Therefore there is gender gap difference in academic achievement in physics education as many researchers revealed that physics is male

domain subject this idea is also confirmed in this present research and consistent with finding (pergamon, 200).

However, as the (Table. 18) show above the value of standardized coefficient of Beta is negative 0.129, this negative indicates that the school they had been learnt in it has on average fewer services available. This means school has reverse relation on academic achievement of the female students and has certain influence on academic achievement. Nevertheless, the school is not statistically significant as indicated from the (Table 18) above the output statistical significance level of the school is ($P = 0.0780$) that is greater than the statistical significant level of ($\alpha = 0.05$) of the linear regression model result. Finally, there is no significance difference between the female students of Obora and Hisu secondary schools on their academic achievements. However, the achievement of female of Obora secondary school students were to some extent more performed than Hisu secondary school female students. These results indicate that the female students those of under affirmative action were more performed than those were not under affirmative action.

From the (Table. 19) above the comparison of academic achievement between female and male of Obora secondary school students show that the value of R square is 0.000. It means that two of the independent variables (age and sex) together cannot explain the model and it may be explained by the other factors not included in this linear regression model.

The age and sex did not influence the achievement of female and male students of Obora secondary school. There is no any statistical significance difference between females and males students in their academic achievement on physics education as shown from (Table. 19) above the probability significance level of all independent variable are greater than ($P > 0.05$) of the standardized significance level. This indicates that female students those of under affirmative action have equal performance to their male of Obora secondary school students.

4.2.3. The Role of Attitude Factors on Students Academic Achievement

As mentioned above in this research almost the majority of the students response less favorable and unfavorable attitude toward and they achieved low result in physics education as shown from the researcher result above implies that they have negative attitude toward the subject. In general, evaluations of students' attitude influence success of academic achievement in school.

As multiple linear regression analyzed with spss statistics version 20.0 and displayed by (Table. 20) indicate above attitudes is significantly influenced the academic achievement. From the above simple regression analysis that with ($t = 2.707, P < 0.05$) attitude is found to contributor to achievement. It is found that attitude contributed about 19% for achievement. Therefore, the prediction of attitude to achievement is statically significant factor. The finding of the present study is similar with the finding of some previous studies. For examples, this result is in line with: the finding of (Newton, 2008) therefore achievement and attitude of the students are correlate each other the students with low achievements develop negative attitude toward the subject but those of achieved high result have positive attitude toward the subject matter. The development of achievement and attitude can be succeeding .if there appears conductive or healthy conditions for a period, which initiates students and teachers for a common goal. However, the primary cause or relationship is that attitude is the result of achievement. This finding of the research is agreement with the idea of (Weinburgh, 1998).

4.2.4. The Relationship of Academic Achievement of both schools Students'

As the result of Multiple Linear Regression analyzed by spss statistics version 20.0 (Table. 20) indicated that, there is significant factor between female and male in their academic achievement of both schools students with ($t = -2.429, P < 0.05$). This, significant difference between female and male in their academic achievement of the finding of this research is in line with the finding of (Kahel, et al, 1993). There is wide gap difference in achievement between female and male students. specially this challenge seen clearly on those were not under affirmative action they were achieved 1.83 and 2.29 in physics female and male students respectively. Therefore this results of the students confirmed that, there is gap difference in academic achievements in physics education. This indication is also concluded that physics is male domain subject hence

male students more excelled their female students this finding of the study consistent with idea of (Evens, B. 1992).due to their lower achievements female students developed negative attitude toward physics more than male students this agree with (Yalew, 1997).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The aim of this study was attempt to assess the impact of affirmative action on of female students' academic achievement and attitude toward physics based on the EGSECE of physics in 2008 E.C. and information collected from the respondents respectively. The affirmative action on Obora secondary school female students were partially succeed on physics because of their achievement of EGSECE of physics on average 2.04 which is nearly equal to 2.02 of their male indicate that the performance of Obora female students were improved. However, female students of Hisu secondary school achieved on average 1.83 in physics, which is less than the achievement of their male students, were on average 2.29 in physics under the same conditions. These indicate that there are differences in academic achievement in physics. However the impact of affirmative action is not statistically significant factors on academic achievement and attitude toward physics because of its obtained statically value ($P = 0.07$) between two schools females students. The independent variables such as school, ages and family educational background are not statically significant factors, the obtained probability of statistics ($P > 0.05$) of the level of significance. Majority of the students dislike physics, hence medium of the instruction language is difficult for them and they did not understand the concept of the subject matter clearly, besides to this all of the time the teachers used lecture methods due to lack of available equipments in the physics laboratory. Even there is no laboratory Class. Then they never learn physics in laboratory class and they did not study hard, finally they scored low achievement in physics. According to this research, 74.19% female and 61.54% male students totally 67.5% of the respondents have negative attitude toward the physics because of the result of low achievement in physics. In addition, attitude has statistical value of ($P = 0.007$) and it is significant factor that influences the academic achievements of the students in physics education. There is also statistical significant difference between female and male in academic achievement between Obora and Hisu secondary schools students by the statistical significance value of ($P = 0.016$). Therefore, the proportions of percentage negative attitude toward physics of female students are greater than their males by 12.65%.

5.2. Recommendation

From the result obtained and conclusions made, the writer of this paper would like to forward the following recommendations.

- ✓ Hence, physics is experimental science it needs laboratory equipments so the researchers recommend to all the stakeholders of education as laboratory equipments give a life for physics and they must give priority for laboratory equipments to be fill.
- ✓ As much as possible teachers try to used student centered rather than lecture method.
- ✓ To enhance the academic performance of female students in natural science special class is need besides to their regular class.
- ✓ For the better achievement in physics, developing positive reaction in the students' is important. Lack of interest can negatively influence the achievement of student. So changing the attitude of the students' is vital. Therefore, all stakeholders should carry out the creation of awareness on students' attitude towards physics continuously.
- ✓ Males are better achiever than females in physics This confirmed that there is a gender gap, to be filling this gender gap better to adjust good conditions of special program for female students besides to their regular class.
- ✓ In majority parts of countryside, there is no any supplement special class or private school besides to their regular class. Only they learn with English as medium of instruction in grade 9 and 10 after then they set on EGSECE and finally unsatisfactory result achieved by them, because of the problem of the language of medium of instruction. Therefore, the police makers of ministry of education needed further researches on this area.
- ✓ Generally in order to develop positive attitude of female students toward physics and enhancing the academic achievement of physics education and to minimize gender gap in achievement of physics, government and all stakeholders should give priority for female students starting from elementary school level up to higher education and it need great hard work effectively individually as well as cooperatively.

REFERENCE

- Adesoji, F. A. (2008). Managing students' attitude towards science through problem solving instructional strategy, *Anthropologist*, 10(1), 21-24.
- Algan, S. (1999). The Effect of physics lessons supported by lab experiments to students' success and modern mathematics and science programmes conducted in Turkey between 1962-1985. Master Thesis, Gazi University Institute of Science, Ankara.
- Armstrong, J. and Impara, J. (1991). The effect of test administration on environmental attitudes. *Journal of Environmental Education*, 21, 37-39.
- Beaton, A. and Martin, M. L. (1996). *Science Achievement in the Middle School Years: IEA'S Third International Mathematics and Science Study* (Chestnut Hill, MA: Boston College).
- Bedard, K. and E. Dhuey. (2006). "The persistence of early childhood maturity: International evidence of long-run age effects." *Quarterly Journal of Education* 121:4 1437-1472.
- Bilgin, İ., Ozarslan, M., & Bahar, M. (2006). Comparison of the Attitude to Science Lesson and Success on the Nature of Matter of the Primary 8th grade Field Dependent and end of the 20th century. *Hacettepe University Journal of Education*, (11), 29-35.
- Boylan, C. (1996). Attitudes toward teaching and taking science course-a correlation between teachers and students. Unpublished PhD dissertation, University of Michigan.
- Burris, C. C., Heubert, J. & Levin, H. M. (2004). Math Acceleration for All. Improving Achievement in Math and Science, 61 (5), 68-71.
- Chapman, A. (1997). *A Great Balancing Act: Equitable Education for Females and Males*. National Association of Independent Schools; Washington, DC.
- Craker D. E. (2006). Attitudes toward science of students enrolled in introductory level science courses at UW-La Crosse, *UW-L Journal of Undergraduate Research IX*, 1-6.
- Crawley, F. & Black, C. (1992). Casual modeling of secondary science students' intentions to enroll in physics. *Journal of Research in Science Teaching*, 9, 585-599.

- CSA. (2007). The population and Housing Census of Ethiopia. Results for Oromia Region, Volume 1 accessed 13 January 2012. And last modified on 21 December 2014.
- Dhuey, E. and S. Lipscomb. (2010): "Disabled or young? Relative age and special education diagnoses in schools." *Economics of Education Review* 29:5 857–872.
- Dieck, A. P. (1997). An effect of a newsletter on children's interest in an attitude toward science. Unpublished master's thesis, Arizona State University.
- Ellis, A. K. (2010). *Teaching and Learning Elementary Social Studies* (Vol. 9). Boston, Massachusetts: Pearson Education Inc.
- Evans, B. (1992). Staff effective in schools. *Making schools more effective*, 67-68 Federal Republic of Nigeria, (2006). *The National Policy on Education (NPE)* 4th edition, Lagos. Nigerian Education Research and Development Council (NERDC) Press.
- Evans, L. (1965). "Understanding Teacher Morale and Job Satisfaction." *Teaching and Teacher Education*, 13: 109-145.
- Feldman, J. (1983). Females, Males, and Practical Science. *International Journal of Science Education*, 9(5), 112-133.
- Fenstermacher, C. D. (1996). Philosophy of research teaching. Three aspects. In M. C. Wittrock (Ed). *Handbook on research and teaching*. (3rd ed.). New York: McMillan.
- Fraser, B. J. (1982). How strongly are Attitude and Achievement Related? *School Science Review*, 63, 557–559.
- Garry, R. & Kingsley, H. K. (1970). *Psychology Of Learning: The View From London*. Prentice Hall.
- Judd, A. I. (1991). *Attitude: The View From BARON Psychology* 3rd Edition.
- Geban, O., Ertepinar, H., Yilmaz, G., Atlan, A. & Sahbaz, O. (1994). Effect of students' science achievement and science interests of computer-assisted instruction. I. National Science Education Symposium, University of Dokuz Eylul, Izmir.
- Geet, J. (1997). Gender and Science Achievement: are analyses of Studies from Two Meta analyses. *Journal of Research in Science Teaching*, 26, 141–169.
- Gogolin, L. and Swartz, F. (1992). A Quantitative and Qualitative Inquiry into the Attitudes toward Science of Nonscience College Majors. *Journal of Research in Science Teaching*, 29, 487–504.

- Gok, T. & Silay, I. (2008). Effects of problem-solving strategies teaching on the problem solving attitudes of cooperative learning groups in physics education, *Journal of Theory and Practice in Education*, 4(2), 253-266.
- Halladyna, T. & Shanghnessy, J. (1982). Attitudes towards science: A qualitative synthesis. *Journal of Research in Science Teaching*, 66(4), 547-563.
- Hendrickson, A. B. (1997). Predicting student success with the learning and study strategies 14. inventory (LASSI). Unpublished Master's Thesis, Iowa State University.
- House, J.D. & Prison S.K. (1998). Student attitudes and academic background as predictors of achievement in college. English. *Journal of Instructional Media*, 25 (1): 29-43.
- Jandhya, F. (1993). Behind The High Achievement of East Asian Students. *Educational Research and Evaluation: An International Journal on Theory and Practice*, 8(1), 87-108.
- Jovanovic, J. and King, S. S. (1998). Males and Females in the Performance-Based Science Classroom: Who'S Doing the Performing? *American Educational Research Journal*, 35, 477-496.
- Kahle, J. B. & Lakes, M. K., (1993). The Myth of Equality in Science Classrooms. *Journal of Research in Science Teaching*, 20, 131-140
- Kethusigile, B, Kwaramba, A. & Lopi, B. (2000). Beyond Inequalities. Women in Southern Africarare: Southern African Research And documentation Centre.
- Kind, P., James, K. & Barmby, P. (2007). Developing attitudes towards science measures. *Interracial Journal of Science Education*, 29 (7): 871-893.
- Lihamba, A., Mwaipopo, R. And Shule, L. (2006). "The Challenges of Affirmative Action in Tanzanian higher Education Institutions: A Case Study of The University of Dar Es Salaam, Tanzania." *Women's Studies International Forum* 29: 581-591.
- Lihamba, A., Tambila, Bhalalusesa, EP.Andngassapa,O. (2004). Evaluation of The University of Darussalam (UDSM) Gender equity and equality interventions .A research report Submitted Other Gender Dimension Program Committee.
- Malekela, G.A. (1999) "Access and equity in university education in Tanzania." *Perspectives in Education* 15(1): 35-48.

- Mattern, N. & Schau, C. (2002). Gender difference in attitude-achievement relationships over time among white middle-school students. *Journal of Research in Science Teaching*, 39(4), 324-340.
- Megarry, J. (1984). Introduction: Sex, Gender and Education. In Acker, Megarry, J., Nisbet, S., Hoyle, E. (Eds) *Women and Education: World Yearbook of Education 1984*. London: Kogan Page Limited.
- Miller, G. E., Abrahamson, S., Cohen, I. S., Graser, H. P., Harnack, R. S. & Land, A. (1961). *Teaching and learning in medical school*. Cambridge Massachusetts: Harvard University Press.
- Mlama, P. (2005) Gender and education for rural people. Paper presented at a UNESCO/AdeA workshop 20p. Addis Ababa, Ethiopia, September 7-9, 2005.
- MoE. (2014) "Educational statistics: Annual Abstract" (*PDF*). Retrieved 27 April (2014).
- MoE. (2002). Introduction To Applied Educational Research .17000 Distance Education Project For Second Cycle Primary School Teachers, Module II, Addis Ababa, Ethiopia. Pp-10
- Morakinwa, I. (2003). Poor academic performance in science, in technical college of education. Causes and implications. Unpublished PGDE dissertation. Unibadan, Ibadan, Nigeria.
- Morley, L., Guna Wardena, C., Kwesiga, J., Lihamba, A., Odejide, A., Shackleton, L. And Sorhaindo, A. (2006). *Gender Equity in Common Wealth Higher Education: An Examination of Sustainable Interventions in Selected Common Wealth Universities. Researching the Issues Report no.65*. London: Dfid.
- Morse, L. W. & Morse, D. T. (1995). The influence of problem-solving strategies and previous training on performance of convergent and divergent thinking. *Journal of Instructional Psychology*, 22, 4.
- Neathery, M. F. (1991). Relationship between science achievement and attitudes toward science and the relationship of the attitudes toward science and additional school subjects. Unpublished PhD dissertation, Texas University.
- Newble, D. (1998). Assessment. In B. Jolly & L. Rees (Eds.), *Medical Education in The Millennium*, 131-142, Oxford: Oxford University Press [Checked Original].

- Newton, P. D. (2008). *A Practical Guide to Teaching Science in the Secondary School*. New York: Routledge.
- Ngau, J. (1997). Students' Attitude towards Mathematics in Single-Sex and Coeducational Schools. *Mathematics Educational Research Journal*, 10(1): 16-36 .
- Normah. Y. & Salleh, I. (2006). "Problem solving skills in probability among matriculation students". Paper presented at National Educational Research Seminar XIII, 40-55.
- Nuhoglu, H. (2008). The development of an attitude scale for science and technology course. *Elementary Education Online*, 7(3), 627-639.
- Ogunleye, A. O. (1993). Strategies for teaching physics for learning' gain in the senior secondary school: A guide to teachers *Journal of Science Teachers Association of Nigeria*, 28 (1&2), 151-156.
- Okoronka, A. U. & Wada, Z. B. (2014). Effect of Analogy Instructional Strategy, Cognitive Style and Gender on Senior Secondary School Students Achievement in Some Physics Concepts in Mubi Metropolis, Nigeria.
- Osborne, J. F. and Collins, S. (2000). *Pupils' and Parents' Views Of the School Science Curriculum* (London: King's College London).
- Pell, T. & Jarvis, T. (2001). Developing Attitude to Science Scales for Use with Children of Ages from 5 to 11. *International Journal of Science Education*, 23 (8): 847-862.
- Pergamon D.J. (2003). A Multi-Level Analysis of Science and Mathematics Achievement. Paper Presented At The Annual Meeting Of The American Educational Research Association, Chicago, IL, March 24-28.
- Philius, Y. O. (2009). Relationship between Teachers' Attitude and Students' Academic Achievement in mathematics in some selected secondary schools in South Western Nigeria. *An European Journal of social sciences*, 11 (3). 11th march, 2010.
- Pintrich, P. R. & Schunk, D. H. (1996). *Motivation in education: Theory, Research, and Application*. Englewood Cliffs, NJ: Prentice-Hall Inc.
- Radom, A. (1983). *The Attitudes toward Science and Science Technology of the Teachers and Students at Baldwin International School, Quincy, Illinois* (Doctoral Dissertation, University Of Iowa).

- Rathgeber, E.M. (1995) Missing Links: Gender Equity in Science and Technology for Development. Gender on Science and Technology for Development (UNCSTD).
- Reid, N. & Skryabina, E. A. (2002). Attitudes toward physics, *Research in Science and Technology Education*, 20 (1), 67-81.
- Rivard L. P. & Straw, S. P. (2000). The effect of talk and writing on learning science: An exploratory study. *Science Education*, 84, 566-593.
- Rwegelera, M (2007) Factors Influencing Prospective Women Students' Enrolment at the Open University of Tanzania. (Ph.D.Dissertation).
- Schibeci, R. A. & Riley, H. (1986). Attitudes to Science: An Update. *Studies in Science Education*, 11(1) 26-59.
- Schunk, D. & Hanson, A. (1995). Peer models: Influence on children's self-efficacy and achievement. *Journal of Educational Psychology*, 77(3), 313-315.
- Sedlacek, W. (2004). *Beyond the big test: Non Cognitive Assessment in Higher Education*. San Francisco: Jossey Bass.
- Seferoglu, S. S., (2004). Attitudes to Teachers of the Teacher Candidates. XII. National Congress of Education Sciences, Ankara-Turkey: 413-425.
- Shrigley, R. L. (1990). Attitude And Behavior Are Correlates. *Journal of Research in Science Teaching*, 27, 97-113.
- Sima, R., Bhalalusesa, E., Mboya, M., Mgombelo, J. & Possi, M. (1999) "Why Streaming in Higher Education Perpetuates a Gender Gap." In *Gender and Education in Tanzanian Schools*. Bendera, M.J. and Mboya, M.W. (Eds). Dar es Salaam: Dar es Salaam University Press.
- Simpson, R.D., & Oliver, J.S. (1995). Attitude toward Science and Achievement Motivation Profiles Of Male and Female Science Students in Grades Six through Ten. *Science Education*, 69(4): 511-526.
- Singh, K., Granville, M., & Dika, S. (2002). Mathematics and Science Achievement: Effects of Motivation, Interest, and Academic Achievement. *The Journal of Educational Research*, 95(6), 323-332.
- Sunbul, N. & Skryabina, E. A. (2004). Attitudes toward Physics, *Research In Science and Technology Education*, 20 (1), 67-81.

- Tinio, M. F. (2009). Academic Engagement Scale for Grade School Students. The Assessment Handbook, 2, 64-75.
- Usman, H. (2004). Gender difference in academic performance among undergraduate Students of Unimaid Unpublished masters dissertation, University of Maiduguri.
- Wassena, M.M. (2003). Gender Balance in University Enrolments in Tanzania. (M.A. (Education) Dissertation). University Of Dares Salaam.
- Weinburgh, M. (1998) Gender Differences In Student Attitudes Toward Science: A Meta-Analysis Of Literature From 1970 To 1991. Journal of Research in Science Teaching, 32(4), 387-398.
- Yalew Endawoke. (1997). Self-Efficacy, Perceived Importance, Attitudes, and Achievement in Physics among Tana Haik Comprehensive Secondary School Male and Female Students. Ethiopian Journal of Education. XVII, 1, 1997 (30-46).
- ያለው እንዳወቀ:: (1998 ዓ.ም) :: የምርምር መስሪታዊ መርሆዎችና አተገባበር:: ባህርዳር ዩኒቨርሲቲ፣አልፋ አሳታሚዎች ድርጅት:: ገጽ 131-132

APPENDICES

APPENDIX I

A Questionnaire for Students

(English Version)

The purpose of this questionnaire is to study the impacts of affirmative action on female students and attitude toward physics of grade 10 students. Your response will not be used other than research purposes. Therefore, you will be kindly request to give your responses honestly.

As the success of this study depends on your responses, please read all the instructions before attempting to answer the questions.

Thank you in advance

PERSONAL PROFILE:

[A] Put an "X" in the box.

School - Obera Hisu Grade - 10 Sex - M F

[B] Write your age in figure:-

[C] Your families' educational background by grade level: [Put an "X" in the box].

Illiterate 1-8 9-10 >10

II. Information related to the attitude of female students toward physics

Direction: Respond by putting the tick mark '√' on the space provide.

1. While you were in elementary school, how much did you like physics?

A/ highly interested B/ interested

C/ Dislike D/ highly dislike

2. If you had been given the choice, which subject would have been your preference?

A/ Biology B/ Chemistry C/physics

3. Which subject you had been score lowest result?

A/Biology B/Chemistry C/physics

4. How did you learn physics?

A/my first choice B/my second choice

C/my third choice D/being obliged

5. If you were had been given the choice, which subject would you have been ignore it from the subject you learn?

A/Biology B/ Chemistry C/ physics

6. If your response for equation number 5 is “physics” what is your reason

A/It is my lowest score of all subjects B/hence I never see physics in laboratory

C/ hence my elders dislike it D/In elementary level I scored lowest result

II .Information related the achievement of students in physics

Direction: response putting tick “√” on space provide.

1 .when you were in elementary school. What was your achievement of physics subject in average?

A/Excellent (90-100%) B/ very good80-89%)

C /Satisfactory (60-79%) D/ Fair (50-59%)

E/poor (<50%)

2. When you were in high school or grade 9th and grade 10th first semester .what was your achievement of physics subject in average?

- A/Excellent (90-100%) B/ very good80-89%)
C /Satisfactory (60-79%) D/ Fair (50-59%)
E/poor (<50%)

3. Which media of instruction language is the most difficult for you?

- A/Afan Oromo B/Amharic C /English

4/When, you were had been learnt or had been done the examination of physics standard or level of understanding meaning of the sentences, which had been written in English, was.

- A/High B/medium C/ low

5. If you did not study hard or devote considerable time on study physics (other subjects). What is your reason?

- A/even I did not study hard I can promote to the next class
B/I did not have interesting to learn because of my elders were not employed
C/since, I can copy from by friends
D/since, I did not have base at elementary level

APPENDIX-II

II.Questionnaire

The objective of this questionnaire will be to identify the attitude of students toward physics .therefore according to the instruction below under your correct response, please mark tike (✓) where you sure that you can answer each of the following questions

Thank you

Representation of alternatives

1=strongly disagree 2=disagree 3=difficult to decide 4=agree 5=strongly agree

S. No	Items	Scales				
		5	4	3	2	1
1	I am glad while learning physics than other subjects					
2	I do my physics home and class work willingly					
3	I learn physics without any obligation					
4	Since, I bring low result in physic. I dislike it					
5	Usually I pass the physics period being glad					
6	I dislike physics since my elders dislike it					
7	I devote considerable time on studying physics					
8	I like physics more than any subject					
9	I like the method of teaching that the teacher apply					
10	While my physics teacher teach me I understand nothing					
11	I never learn physics in laboratory class					
12	Even I did not read more ,I can promote to the next class easily					
13	Hence I am poor in English it is difficult understand the meaning					

Appendix I

Appendix B students questionnaire

(Afan Oromo Version)

Gaafannoowwan Barattootaaf

Faayidaan gaafannoo barattootaa kun ciimina taatee gochaa fi fedhiin barattoonni shamaran kutaa 10^{ffaa} fiiziksiidhaaf qaban qorachuuf. Odeeffannoon gaafannoo kanaa bu'aa addaa argachuuf osoo hin ta'iin gaalma ga'iinsa qorannootiif waan ta'eef deebii keessan amantummaadhaan deebisaa.

Galatoomaa

Odeeffannoo Dhuunfaa

[A] mallattoo “X” saanduqa keessatti barreessi

Mana baruumsaa

Oborraa

Hisuu

Kutaa 10

Saala

dhii

du

[B] Umrii kee lakkoofsaan barreessi

[C] Dug-deebii sadarkaa barnoota maatii keetii

Hin baranne

1-8

9-10

>10

I. Odeeffannoo barattoonni fedhii barnoota fiiziksiidhaaf qaban waliin wal-qabate.

Kallattii:-iddoo duwwaa irratti mallattoo “√” teechisuudhaan guutii.

1.Sadarkaa 1^{ffaa} tti Fiiziksii yammuu barattu hagam tokko jaalattaa?

A/Sirriittan fedha

B/nanfedha

C/nan jibba

D/Sirriittan jil

2.Osoo carraan filaannoo siif-kenname isa kam filattaa?

A/Baayoloojii

B/Keemistirii

C/fiiziksiii

3. Gosa barnootaa kam qabxii gad-aanaa qabdaa?

A/Baayoloojii B/Keemistirii C/fiiziksiii

4. Haala akkamiitiin Fiiziksii barachaa turtee?

A/filannoo 1^{ffaa} kootiin B/filannoo 2^{ffaa} kootiin

C/filannoo 3^{ffaa} kootiin D/dirqamaan

5. Osoo carraan siif- kenname isa kam akka hin baranne barbaaddaa?

A/Baayoloojii B/Keemistirii C/fiiziksiii

6. deebiin kee kan gaafii 5^{ffaa} Fiiziksii yoo ta'e sababbiin kee maaliif?

A/Qabxii gad-aanaa waanan fideef

B/Fiiziksii yaaliidhaan waan barannee hin beekneef

C/Barattoonni na-duraa waan jibbaniif

D/Sadarkaa 1^{ffaa} tti qabxii gad-aanaa waanan qabuuf

II. Odeeffannoo barattoonni dandeettii Fiiziksii irratti qabaniin wal-qabate.

1. Yammuu sadarkaa 1^{ffaa} barattu qabxiin Fiiziksii keetii

A/Bay'ise bayeessa (90-100) B/ baay'ee bayeessa (80%-89%)

C/Ga'aadha (60%-79%) D/wayyadha (50-59%) E.xiqqaadha <50%

2. Yammuu sadarkaa 2^{ffaa} ykn kutaa 9^{ffaa} fi kutaa 10^{ffaa} seemisteera 1^{ffaa} qabxiin Fiiziksii keetii giddu galeessaan.

A/Bay'ise bayeessa (90-100 %) B/ baay'ee bayeessa (80%-89%)

C/Ga'aadha (60%-79%) D/wayyadha (50-59%) E/.xiqqaadha <50%

3. Afaan barnootaa kamiin yammuu barattu sitti ulfaataa (cima)?

A/Afaan Oromoo B/Afaan Amaaraa C/Afaan Ingiliffaa

4. yammuu barite ykn qormaata Fiiziksii qoramtu dandeettiin hubannoo hiikkaa hima Afaan Ingiliffaatiin barreeffamee hubachuu keetii maal fakkaataa?

A/Ol-aanaadha B/Giddu-galeessa C/Gad-aanaadha

5. Yeroo qu'annaa keetii Fiiziksii ykn barnoota biroo irratti baay'inaan kan hin dabarsine yoo ta'e maaliif?

A/Ciminaan yoo hin qu'atiinis gara kutaa itti aanutti darbuu waanan danda'amuuf

B/Hangafooni koo waan hin qaxaramiiniif fedhii barnootaa hin qabu

C/Yeroo qormaataa hiri'oota kootirraa garagalchuu waanan danda'uuf

D/Sadarkaa 1^{ffaa} tti hubannoo barnootaa gahaa waanan hin qabneef

Appendix II

Kaayyoon gaafannoo kanaa fedhii barattooni Fiiziksiidhaaf qaban addaan baasuuf. kanaafuu haaluma qajeelfa kanaa gaditti kennameen deebii sirrii kee mallattoo “√” iddoo itti mirkaneefatetti guuti.

Galatoomaa

Bakka bu'oota filannoo

5=Baay'een itti waliigala

4=Itti waliigala

3=murteessuuf na

rakkisa 2=Itti walii hin galu

1=Gonkumaa itti walii hin galu

T. L	Yaada (Ilaalcha barattooni Fiiziksiidhaaf qaban)	Deebiiwwan				
		5	4	3	2	1
1	Gosa barnootaa keessaa Fiiziksii barachuun na-gamachiisa					
2	Hoj-manee,hojii daree fi qormaata Fiiziksii itti gammadaatan hojjadha					
3	Fiiziksii kanan baradhu dhiibbaa alaatiin					
4	Qabxiin Fiiziksii waan naa hin dhufneef na-jibbisiise					
5	Yeroo sagantaa Fiiziksii gamaachuudhaanan baradha					
6	Fiiziksii kanan jibuuf hangafooni koo waan jibbaniif					
7	Yeroo qu'annaa kootii baay'inaan Fiiziksii irratti dabarsa					
8	Fiiziksii gosa barnootaa hundaa caalaan jaaladha					
9	Adeemsa barsiisaan Fiiziksii ittiin barsiisu nan-jaaladha					
10	Barsiisaan Fiiziksii yammuu barsiisuu homtuu naaf hin galu					
11	Fiiziksii mana yaaliitti (Laboratory) barannee hin beeku					
12	Baay'eellee yoo hin qu'anne kutaa itti aanutti darbuu waanan danda'uuf					
13	Afaan Ingiliffaa waan natti ulfaatuuf hiikkaa himaa hubachuun na-dhiba					

. APPENDIX TABLES

Appendix table 1-Summary table for knowledge scores mean of female students of Obora and Hisu secondary schools.

ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	3.100	2	1.550	2.370	.096 ^b
1 Residual	120.365	184	.654		
Total	123.465	186			
2 Regression	2.065	1	2.065	3.146	.078 ^c
2 Residual	121.400	185	.656		
Total	123.465	186			

a. Dependent Variable: achievement

b. Predictors: (Constant), school, age

c. Predictors: (Constant), school

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.948	.300		6.484	.000
Age	.125	.099	.092	1.258	.210
School	-.218	.120	-.133	-1.822	.070
(Constant)	2.250	.181		12.435	.000
School	-.212	.120	-.129	-1.774	.078

a. Dependent Variable: achievement

Appendix Table 2. Summary table for t-test on knowledge variation between female and male students of Obora school

Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.011 ^a	.000	-.009	.83266
2	.010 ^b	.000	-.004	.83085
3	.000 ^c	.000	.000	.82909

a. Predictors: (Constant), age, sex

- b. Predictors: (Constant), age
- c. Predictor: (constant)

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.019	2	.010	.014	.986 ^b
	Residual	158.770	229	.693		
	Total	158.789	231			
2	Regression	.015	1	.015	.022	.882 ^c
	Residual	158.774	230	.690		
	Total	158.789	231			
3	Regression	.000	0	.000	.	^d
	Residual	158.789	231	.687		
	Total	158.789	231			

- a. Dependent Variable: achievement
- b. Predictors: (Constant), age, sex
- c. Predictors: (Constant), age
- d. Predictor: (constant)

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.046	.212		9.666	.000
Sex	.009	.117	.005	.074	.941
Age	-.007	.064	-.008	-.113	.910
(Constant)	2.055	.176		11.689	.000
Age	-.009	.059	-.010	-.149	.882
(Constant)	2.030	.054		37.297	.000

- a. Dependent Variable: achievement

Appendix table 3. Summer table for t-test on Attitude of Obora and Hisu secondary schools students

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.162 ^a	.026	.006	5.98343
2	.162 ^b	.026	.011	5.96794
3	.161 ^c	.026	.016	5.95328
4	.135 ^d	.018	.013	5.96116

a. Predictors: (Constant), FEB, Age, School, Sex

b. Predictors: (Constant), Age, School, Sex

c. Predictors: (Constant), Age, School

d. Predictors: (Constant), Age

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	184.793	4	46.198	1.290	.275 ^b
1 Residual	6873.877	192	35.801		
1 Total	7058.670	196			
2 Regression	184.723	3	61.574	1.729	.162 ^c
2 Residual	6873.947	193	35.616		
2 Total	7058.670	196			
3 Regression	183.010	2	91.505	2.582	.078 ^d
3 Residual	6875.660	194	35.442		
3 Total	7058.670	196			
4 Regression	129.263	1	129.263	3.638	.058 ^e
4 Residual	6929.407	195	35.535		
4 Total	7058.670	196			

a. Dependent Variable: Attitude

b. Predictors: (Constant), FEB, Age, School, Sex

c. Predictors: (Constant), Age, School, Sex

d. Predictors: (Constant), Age, School

e. Predictors: (Constant), Age

Appendix X. Attitude pilot test result

Stu.	1	2	3	4	5	6	7	8	9	10	11	12	13	O	E	X
1	4	4	4	4	4	4	3	5	4	5	4	5	4	27	27	54
2	5	5	1	5	5	5	5	1	3	5	5	5	5	29	26	55
3	5	5	5	5	5	5	5	5	5	5	1	5	4	30	27	57
4	5	5	5	4	4	4	5	5	2	5	5	5	3	29	28	57
5	5	5	3	3	4	5	5	5	2	5	5	5	4	28	28	56
6	5	4	4	5	1	5	5	5	4	5	5	5	4	28	29	57
7	4	5	4	4	3	5	5	5	2	4	4	5	4	26	28	54
8	5	5	4	5	5	5	5	1	3	5	5	5	1	28	26	54
9	5	4	4	5	5	5	5	5	3	5	3	5	3	28	29	57
10	5	4	3	5	5	5	5	5	4	5	5	5	3	30	29	59
11	5	2	3	5	3	5	4	5	2	5	5	5	5	27	27	54
12	5	4	3	5	5	5	5	5	2	5	5	5	3	28	29	57
13	5	5	3	5	5	5	3	5	3	5	4	5	3	26	30	56
14	5	5	5	5	5	5	3	5	2	5	5	1	3	28	26	54
15	5	5	2	5	4	5	2	2	4	5	2	3	5	24	25	49
16	4	2	5	5	4	5	5	5	3	5	5	3	2	28	25	53
17	5	5	3	5	5	5	4	5	1	5	2	1	4	24	26	50
18	5	5	4	5	5	5	5	5	1	5	2	4	5	27	29	56
19	5	3	3	5	4	5	4	4	4	3	3	5	3	26	25	51
20	5	5	3	5	1	5	5	5	1	5	5	1	3	23	26	49
21	5	4	4	5	5	5	4	5	2	4	5	4	4	29	27	56
22	5	4	3	5	5	5	2	5	2	5	2	2	5	24	26	50
23	5	5	1	5	5	5	5	5	1	5	5	5	5	27	30	57
24	5	5	2	5	5	5	1	1	2	5	4	4	5	24	25	49
25	5	5	1	5	3	5	5	5	1	5	5	5	5	25	30	55
26	5	4	3	5	5	5	3	5	1	4	5	3	3	25	26	51
27	4	4	3	5	5	5	5	4	4	4	3	3	3	27	25	52
28	4	1	1	5	3	5	2	4	1	5	2	1	5	18	21	39
29	5	4	5	5	4	5	5	4	3	5	1	1	5	28	24	52
30	5	5	2	5	4	4	3	2	5	5	2	3	5	26	24	50
Sum	145	128	95	145	126	147	122	127	76	144	114	110	117	799	803	1600

Key: O= odd numbered items E= Even numbered item Σ = summation n= number of respondents=30 O =mean for 'O' E =mean for 'E' S^2 = variance

$O = 26.57$ $(O_i - O)^2 = 183.207$, $S^2_o = 6.32$, $df_o = df_x = df_E = 29$ $E = 26.77$
 $(E_i - E)^2 = 129.367$, $S^2_E = 4.46$, $X = 53.33$ \square $(X_i - X)^2 = 545.78$, $S^2_x = 18.82$

General formula of Guttman Split-half method is

$$r_{OE} = 2\left(1 - \frac{S^2_E + S^2_O}{S^2_X}\right) = 0.85$$

Keys:- S^2_E = variance for the Even numbered items (E)

S^2_O = variance for the odd numbered items (O)

S^2_x = variance for the whole items(X)

r_{OE} = the correlation between values for odd and even numbered items, to check for internal consistence of the items because the test was administered only once (no retest) method

Summer table for t-test on Attitude of Obora and Hisu secondary schools students

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1	(Constant)	41.355	3.214		12.868	.000
	School	1.092	.933	.090	1.171	.243
	Sex	-.204	.942	-.017	-.217	.829
	Age	-1.007	.523	-.152	-1.927	.055
	FEB	.027	.609	.003	.044	.965
2	(Constant)	41.438	2.612		15.863	.000
	School	1.077	.868	.089	1.241	.216
	Sex	-.206	.938	-.017	-.219	.827
	Age	-1.007	.522	-.152	-1.932	.055
3	(Constant)	41.017	1.769		23.189	.000
	School	1.064	.864	.088	1.231	.220
	Age	-.959	.472	-.145	-2.031	.044
4	(Constant)	42.351	1.400		30.253	.000
	Age	-.897	.470	-.135	-1.907	.058

a. Dependent Variable: Attitude

Filename: Berhanu thesis after defence
Directory: C:\Users\pc\Desktop
Template: C:\Users\pc\AppData\Roaming\Microsoft\Templates\Normal.dotm
Title:
Subject:
Author: pc
Keywords:
Comments:
Creation Date: 9/2/2017 1:26:00 AM
Change Number: 4
Last Saved On: 9/2/2017 1:42:00 AM
Last Saved By: pc
Total Editing Time: 13 Minutes
Last Printed On: 9/2/2017 1:45:00 AM
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Number of Pages: 76
Number of Words: 18,890 (approx.)
Number of Characters: 107,676 (approx.)