ATTITUDE TOWARD AND ACHIEVEMENT OF NATURAL SCIENCE AND MATHEMATICS STREAM OF FEMALE STUDENTS IN COLLEGES OF TEACHERS' EDUCATION IN OROMIA REGION.

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This is to certify that the thesis prepared by Genene Bekele, entitled: Attitude toward and Achievement of Natural Science and Mathematics Stream of Female Students in Colleges of Teachers' Education in Oromia Region and submitted in partial fulfillment of the requirements for the Degree of Master of Arts in Curriculum and Instruction complies with the regulations of the university and meets the accepted standards with respect to originality and quality

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ABSTRACT

Attitude toward and Achievement of Natural Science and Mathematics Stream of Female Students in Colleges of Teachers' Education in Oromia Region.

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This study assessed the attitude of female students towards natural science and mathematics education and their level of academic achievement in science and mathematics in Oromia Colleges of Teacher Education. It also investigated gender difference of academic achievement in science and mathematics education. To attain this objective, first three Oromia Colleges of Teacher Education were selected purposely because of their geographical location and accommodate large number of students relative to other colleges. Then 308 college students (110 males and 198 females) were selected by using systematic random selection from the three colleges, Asella, Nekemte and Robe participated in this study. Questionnaire and document analysis were used as a main tool. To substantiate the data obtained by questionnaire and document analysis focus group discussion of college teachers was conducted. The collected data were analyzed using descriptive statistics like (percentage, mean Std. Deviation). The major findings revealed that there are significant gender differences in both attitudes towards science and mathematics education and achievement in science and mathematics education. The study concludes that boys are better achiever than girls in science and mathematics and have more positive attitude towards science and mathematics stream than girls in Colleges of Teacher Education of Oromia region. Beside, most female students perceived that contents of science and mathematics stream subjects are more difficult compared to that of non-science and mathematics streams subjects. Hence for the better achievement in natural science and mathematics and being good competent compared with male students changing the attitude of female students' on natural science and mathematics are important.

CHAPTER 1: INTRODUCTION

1.1. Background of the Study

Education is often regarded as the most determinant factor for socio-economic development and progress of countries. It is obvious that no countries have achieved developmental goals without successful education and training programs.

Scientific knowledge, through technology, has had a lot of practical application. 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).

Science and mathematics are very much involved in our daily life. Only science, with science as its foundation, can solve many of the impending crises facing our society, such as global warming, waning energy and other natural resources, and the poisoning of our planet Pravica (2005).

In the present technology dominated world, mathematics and science subjects are among the crucial subjects of the school curricula in terms of preparing educated human power for the overall development. Congruent with this issue, Prakitipong and Nakamura (2006) stated that studying mathematics and science play a very important role in developing human thinking more creative, reasonable, and able to analyze problems and to forecast future. Hence, quality of mathematics and science education would be at the heart of quality education assurance endeavors around the globe. Performance of students in mathematics and science subjects highly implicated towards their overall cognitive development and performance in other subjects.

Although science and mathematics are in every area in our life and facilitate our lives, international studies show that success in science and mathematics education is lower than other disciplines (Gok and Silay 2008; Dieck 1997; Rivard and Straw 2000, Mattern and Schau, 2002).

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).

According to Hendrickson, attitudes are the best predictor for estimation of students' success (Hendrickson, 1997). Many attitude scales have been developed for the determination of students' attitudes towards natural sciences. Hewitt (1990), Oliver and Simpson (1988), House and Prison (1998), Geban et al. (1994), and Kind et al. (2007) have developed attitude scales toward science and mathematics lessons.

Science and mathematics education is to a nation what protein is to a young human organism. As a vital tool for the understanding and application of science and technology, the disciplines play the vital role of a precursor and harbinger to the much needed technological and of course national development, which has become an imperative in the developing nations of the world.

According to Reid (2006), attitudes express academic performance of students. They are based on our knowledge, feelings and behavior and they may influence future behavior. Attitudes are highly composite and they can affect learning comprehensively. Attitudes influence performance and performance in turn influences attitudes including attitudes.

In this modern era, science and mathematics have become the backbone for the prosperity in each and every field of life. For this purpose, students will have to pay attention on their studies during their educational career. Science and mathematics are important area in the field education for the students of college level. After the secondary school classes, these students have to select such fields which lead to their professional career.

According to Bennet (2003), science and mathematics education is helpful for the students in understanding science ideas. Keeping in view the above ideas, attention has been paid to attitude of students toward science and mathematics and their relationship with their achievements in the subjects of science. A large volume of research is present on factors affecting students' achievement in science and mathematics. Some of these factors are test anxiety, attitude towards science, parental socioeconomic status, self-efficacy, gender, parental influence, self-concepts, ability, learning environment, peers and the teachers (Rodriguez, 2004; Singh, Granville, & Dika, 2002; Okapala, Okapala, & Smith, 2001; Nair & Fisher, 2001; Joyce & Farenga, 2000).

The students' achievement is mainly influenced by attitude towards science and mathematics in all the above mentioned factors. Attitude of college students towards science and mathematics as well as their achievement in the subjects of science and mathematics is very important because students have to select their professional carriers as a result of these two factors. Many researchers have conducted different research studies in other countries which cover the areas of attitude towards science and mathematics and achievement in science and mathematics (Eccles, 2007; Papanastasiou & Zembylas, 2004; Ferreira, 2003; Dhindsa & Chung, 2003; Mattern & Schau, 2002; Freedman, 1997; House, 1993; Simpson & Oliver, 1990) cited in Muhammad Shabbir Ali (2013). All these researches regarding to

attitude towards science and achievement in science were conducted in different countries of the world.

Expected achievement is factor that heavily influenced by attitudes toward science. As would be expected, positive attitude toward science lead to better results on achievement measures of science capability (Weinburgh, 1998). A student's attitude toward science and mathematics is more likely to influence achievement in science and mathematics than achievement influencing attitude (Schibeci & Riley, 1986). Currently, Ethiopia is committed to expand its higher education base and focus on expanding science, technology and engineering fields (MOE, 2007).

Specifically science and mathematics are among the advancing sciences that contributed much to today's technological developments. Scientists in science and mathematics are the by-products of science and mathematics teachers and science and mathematics teaching.

Even though science and mathematics have great importance for human beings, it has not reached the desired level in Ethiopian education system. The competences of students are unsatisfactory for their level. The poor performance of students in science and mathematics is attributed to a variety of factors; teacher's methodology; quality of teacher training; quality of curriculum materials; the evaluation methods; shortage of resources; gender; school and out school environment; teachers knowledge, attitudes of teachers towards teaching science and mathematics and attitudes of students toward learning science and mathematics.

1.2. Statement of the Problem

There is widespread interest in improving the level of science and mathematics performance in schools. Apart from the economic benefits of better preparing young people for the numeracy demands of modern work place and raising the overall skill levels of the work force, there are also social benefits tied to improving access for larger numbers of young people to post-school education and training opportunities and laying stronger foundation to skill for lifelong learning. The interest in raising levels of performance has led to a focus on identifying the range of factors that shape performance as well as understanding how these factors operate to limit or enhance the performance of students by gender. Currently, the world is becoming more and more technical and the study of science and mathematics is becoming highly valued. Sustainable success in global economy demands workers with advanced thinking, reasoning and problem-solving skills. Thus, more than ever before, knowledge and skills in science and mathematics will be linked to every sector of the 21st century economy. Considering this reality, the National Center for Education Statistics in United States (NCES) (1997) marked that in an increasingly technological society, the ability of workers to solve complex scientific problems and to use advanced mathematical skills are crucial components of the Nation's ability to compete in the global market place.

Although science and mathematics are in every area of our world and facilitate our lives, national and international trends show that success in these subjects is lower than other disciplines. Evidences indicate that science and mathematics education are in a state of crisis even in developed world (Tyler, 2007, Manoah, *et.al*, 2011).

The achievement of female students in Asella College of Teacher Education is less compared to male students in science and mathematics stream. The following table summarizes the CGPA of 2nd and 3rd year students of Asella College of Teacher Education.

Table-1 Summary of student CGPA of 2nd and 3rd year students of Asela College of Teacher Education.

Stream	Class (year)	GPA																	
		3.50- 4.00			**3.00- 3.49**			**2.50 - 2.99**			**2.00- 2.49**			**< 2.00 & dismissed**			**Total**		
		F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T
Natural Science	**2nd**	2	3	5	4	17	21	11	26	37	12	18	30	8	6	14	37	70	107
	3rd	1	13	14	10	46	56	32	53	85	53	24	77	18	3	21	114	139	253
Social Science	**2nd**	1	1	2	7	11	18	18	6	24	7	3	10	2	1	3	35	22	57
	3rd	4	6	10	13	8	21	35	7	42	19	3	22	0	0	0	71	24	95
Language	**2nd**	2	5	7	5	6	11	13	8	21	7	4	11	0	0	0	27	23	50
	3rd	3	5	8	6	11	17	6	10	16	4	2	6	0	0	0	19	28	47
Aesthetics	**2nd**	2	7	9	17	15	32	23	13	36	14	9	23	1	0	1	57	44	101
	3rd	1	3	4	21	12	33	29	8	37	18	6	24	0	0	0	69	29	98

Source: Registrar of each stream of Asela College of Teacher Education.

Many researchers mentioned that beginning form secondary schooling males interested in natural science and mathematics seems to flourish while that of females diminishes Yalew (1997). This could be reflected in enrollment, confidence attitude and achievement variances in males and females in natural science and mathematics. According to Yalew (1997:31) "Many investigators indicated that sciences, particularly physics, viewed as a realm of masculine endeavor", (Kelly and Smail, 1986; Chambers and Andre, 1995; Kahel, et al 1993; Archer & McDonald, 1991; Bell, 1991: Megarry, 1984). Megarry (1984:15) extending this idea argued that "The masculine image of science as presented in school made physics particularly 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, Kahle, et al. (1993) contended that since science is viewed as a masculine image, it is considered hard, cold and an analytical discipline. Females do not anticipate higher performance in science subjects. Even teachers and

parents do not expect Females to attain high sores in science and technology-related fields such as physics and electricity. These important figures do not also encourage them to pursue the study science. It is perceived as contradictory to feminine role".

It is believed that females are active in social and language subjects. There is a tendency of female students to choose language and social sciences. As a result natural science and mathematics are viewed as the subject of male. Such believes may create gender disparity in the labor force and bring negative impacts on the national capacity building in various sectors. This condition in the future will lead to more gender disparity in the labor force and can also bring negative impacts on socio-economic of the country. In order to solve such practical problems and wrong belies it requires clear understanding of the factors affecting them. Hence this study will be a practical step to examine status of females' academic achievement of science and mathematics stream and their attitude to word the stream.

The writer of this study noticed the problem while he was in Asela Teachers' College. He perceived a problem from the beginning in the stream choice. Most female students tend to enter non-natural streams. Thus, this study attempts to investigate and seek answer to the following basic research questions.

1. What is the attitude of female students toward natural science and mathematics stream in Colleges of Teacher Education of Oromia region?
2. What is the level of female students' achievement in science and mathematics where?
3. Is there gender difference in attitude toward and achievement in science and mathematics in Colleges of Teacher Education of Oromia region?
4. What is the relationship between female students' attitude and their achievement in science and mathematics in Colleges of Teacher Education of Oromia region?

1.3. Objectives of the Study

Even though the realization of development of a country is the result of team effort, females play a significant role. As a result females' academic achievement in any field of study will have a great impact on the effectiveness of development goals and objectives of the country. Based on these ideas the study is aimed at attaining the following objectives.

1. To identify the attitude of female student teachers toward science and mathematics education.
2. To assess the level of academic achievement of female students in science and mathematics subjects compared to that of male students.
3. To investigate whether there is gender difference in both attitude toward and achievement in mathematics and science education.
4. To find out the relationship between attitude toward science and mathematics and academic achievement in science and mathematics of female students.

1.4. Significance of the Study

This study which focuses on attitude toward science and mathematics and academic achievement in science and mathematics of female students in Oromia Colleges of Teacher Education is expected to initiate female student teachers to improve their academic achievement in science and mathematics. In addition to this, it gives insights to develop female students' attitude toward science and mathematics and getting higher achievement in subjects.

On top of this, the results of this study might serve as direction indicator for further broad and detail research in similar areas.

1.5. Delimitation of the Study

The study particularly focused on the attitude of female students toward science and mathematics and their academic achievements in Oromia Colleges of Teacher Education. The study cannot assess all colleges in Oromia region. Due to shortage of time, budget, facilities materials and the like do not allow considering them all. Therefore, the researcher prefers to delimit the scope of the thesis to only three colleges out of the total twelve colleges in the region in order to manage the size of the study.

1.6. Limitation of the Study

Due to lack of time and budget, it is difficult to conduct the research on all colleges of the region to get better outcome. Thus the research is limited only to the three colleges. Besides because of its psychological nature attitude is difficult to measure directly, there may be a limitation to get the exact feeling (data) from the respondents. However, the researcher used different methods to reduce such limitations. It includes carefully preparation of attitude statement in relation to research problem.

1.7. Operational Definition of Key Terms

Academic achievement:- *Student performance in science and mathematics educations.*

Attitude toward natural science:- *positive or negative feelings* to *science educations*

Attitude toward mathematics:- *positive or negative feelings* to *mathematics educations*

Natural science and mathematics stream: *- Stream that contained Biology, Chemistry, Physics and Mathematics departments/focuses*

Stream:- Field of study that student teachers attending in colleges. There are four streams in Oromia colleges. These are Aesthetics, Language, Natural Science and Mathematics and Social science

Gender difference:- Disparities in females and males attitude toward science and mathematics and academic achievement in science and mathematics education.

CHAPTER 2: 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 linked with an emotional content of the students.

Many theorists have suggested that attitude should be viewed in terms of cognitive, affective and behavioural 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 behavioural 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 don't have their origin in the object themselves because our attitude can change while their objects remain constant. Concerning this Radom1983:571 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 unclear 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 behaviour. 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 acquired 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. For if, as Sir Neil Cossons (1993) argues: the distinguishing feature of modern Western societies is 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. And, 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 (Ajzen and Fishbein 1980).

Based on this 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, Schibeci (1984) 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. The current position is best articulated by Shrigley (1990), who argues that attitude and ability scores can be expected to correlate moderately. Likewise, the measures used in the TIMSS study, albeit somewhat unsophisticated, have found a consistent relationship between attitude and achievement (Beaton *et al.* 1996). Weinburgh's (1995) meta-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 (1990), 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" (Coleman, 2009). 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 (Burris, Heubert, & Levin, 2004).

2.3 Students' Attitude Toward Mathematics

The study of mathematics is considered to be very important in each and every country of the world. Students are required to learn Mathematics which is considered as a basic education, since the skill of mathematics computation is essential in every walk of life.

Attitude towards mathematics denotes interest or feeling of involvement towards studying mathematics. Attitude towards mathematics means mathematical or scientific approach assumed by an individual for solving problems, readiness to respond by associating ideas and making decisions and assessments. Review of relevant literatures , provide diverse opinions and assessments on the students' attitude towards mathematics and their performances in the subject.

Attitude towards mathematics plays a crucial role in the teaching and learning processes of mathematics. It affects students' achievement in mathematics. The teaching method, the support of the structure of the school, the family and students' attitude towards school affect the attitudes towards mathematics. Usually, the way that mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and context dependent way stands to alienate many students from mathematics (Barton, 2000; Furinghetti and Pekhonen, 2002).

Research on attitude towards mathematics has a long history. In the field of mathematics education, research on attitude has been motivated by the belief that attitude plays a crucial role in the minds of the teachers and the taught for mathematics. The study of attitude gains renewed popularity with the reevaluation of the factors affecting the learning of mathematics in the investigations of many researchers. 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 linked with an emotional content of the students.

The connection between attitudes and achievement in mathematics has a rich history. Aiken (1970, 1974, 1976) found significant relationships between attitudes toward mathematics and achievement. Specifically, he showed that attitudes and achievement in mathematics are reciprocal: students who have better attitudes towards mathematics demonstrate higher achievement, and students who have higher achievement exhibit better attitudes. These results confirmed earlier work by Neale (1969), who found a low, but significant, relationship between attitudes toward mathematics and achievement. Ma and Kishor's (1997) meta-analysis on the relationship between attitude toward and achievement in mathematics found a statistically significant positive relationship between the two variables.

Researchers concluded that positive attitude towards mathematics leads students towards success in mathematics. Attempt to improve attitude towards mathematics at lower level provides base for higher studies in mathematics.

Student achievement is one of the main determining factors in assessing the quality of education in a society. Identifying the factors that affect students' learning and, thus, achievement continues to be an important object of study of educators of different countries.

Researchers in mathematics education have expressed concern about the relationship of attitude and achievement in mathematics. Now a day mathematics education research has developed into an extensive field of study around the world, with its own concepts, theories, methods and literature.

Poor attitude towards mathematics has often been cited as one factor that has contributed to lower participation and success of females in mathematics (Willis, 1995; Fullarton, 1993). Interest and attitude in the subject are the special predictors for the students' participation and success in the subject. Gender based differences are due to the individual's perception of own abilities and the sex role (Schiefele and Csikszentmihalyli, 1995).

Poor mathematical skills in women deprived them from a large number of professions because in some countries mathematical background knowledge is the pre requisite for entrance in any profession. Sex differences are the serious concerns for the communities (Willis, 1995; Cuttance, 1995; Barnes and Horne, 1996). In this era of science and technology, every field of life has been tremendously changed so it is necessary to compare the attitudes and achievements in Mathematics on gender basis.

Many studies have reported that there are gender differences in attitude towards mathematics and females have more negative attitudes than that of males. In a meta-analysis of studies on 'gender comparisons of mathematics attitudes and affect' (Hyde, Fennema, Ryan, Frost, and Hopp, 1990), found that, in general, female students held more negative attitudes to mathematics than male students, and these differences increased gradually with age. In general, many studies reported that, as compared to the males, the females lacked confidence, perceived mathematics as a male domain subjects and suffered from anxiety in studying mathematics (Hyde *et al,* 1990)

2.4 The Influence of Students' Attitude And Gender Differences On Mathematics Achievement

Factors relating to attitude and gender differences in mathematics achievement are among those widely examined in the study of the causes of poor performance in mathematics among students. According to Ma and Kishor (1997) the variable 'attitude' is one of the most potent factors that relates to achievement. Borasi (1990) adds that the conceptions, attitudes, and expectations of students regarding mathematics and mathematics teaching have been considered to be very significant factor underlying their school experience and achievement. Patton et al. (1997) propose that learning to solve problems is a primary objective in learning mathematics, as problems are an inevitable fact of life. According to Effandi and Normah (2009), a student needs to think and make decisions using appropriate strategies to solve mathematical problems. They add that students' success in achieving their goals encourage them to develop positive attitudes towards mathematics and other problem solving activities. Positive attitudes are assumed to have significant relationship with students' achievement.

Studies on the impact of gender on mathematics achievement have yet to produce conclusive results. 'Trends in International Mathematics and Science Study' (TIMSS-2003) found no significant difference in the performance of females and males in mathematics. However they observed differences between females and males in terms of their attitude to the subject and ambition for higher education. Some research findings suggest that certain behavioral traits associated with age and maturity affect mathematics achievement of females. According to these findings females' confidence to study mathematics tends to match that of males in the primary school years but this confidence deteriorates more rapidly as they go through secondary school (Brush,

1990; Heller and Parsons, 1981). Frempong and Ayia (2006) observed that female students are less successful in learning mathematics, due to their low interest and confidence in learning mathematics and their low academic expectation. According to them, females initially have more positive attitudes towards mathematics than males do, but as they continue in school, females' attitudes become more negative. This is supported by Swetman (1995) who posited that females develop negative attitudes towards mathematics as they grow older.

2.5 Gender Differences in Mathematics Achievement

Gender differences in mathematics education to try to determine whether females are less capable of doing mathematics than males. Mathematics is as much a social issue as an educational issue. The educational issues are the way in which students are taught mathematics and science and the way in which students are tested as well as the testing producers and questions. The social issue is what students learn in their social environments, that is at home or in the workplace. Examining the roots of gender differences in learning may help find a solution to the problem that women are dramatically underrepresented in mathematics and science-based careers (Hyde and McKinley 1996).

One of the most common explanations for gender disparities in mathematics achievement has focused on attitude that students have towards mathematics. Several studies have reported that there are gender differences in attitude towards mathematics with females showing more negative attitudes than males.

In general, most of the studies reported that, compared with males females lacked confidence, had debilitating causal attribution patterns, perceived mathematics as a male domain, and were anxious about mathematics (Vermeer et al, 2000). The causes of the gender difference were found to be multifaceted.

Fisher and Rickards (1998) found that students' attitude towards mathematics tended to be more positive in classroom where students perceived greater leadership and helping/friendly behaviors in their teachers, and more negative in their classrooms where students perceived their teachers as admonishing and enforcing strict behaviors. Other researchers have compared the effect of separate (single-sex) and coeducational classrooms upon students' attitude (Norton and Rennie, 1998). Studies that compared gender differences in mathematics' self-confidence have mostly reported that females had lower self-confidence in mathematics than males (Case et al, 1997; Norton and Rennie, 1998). In some cases, males were more confident than females even when their mathematics achievement was similar to that of females (Casey et al, 1997). Vermeer et al (2000) have further shown that the gender differences in self-confidence were more marked for application problems than computation problems, with females showing significantly lower confidence for application problem.

Despite such consistent findings of females' low confidence in mathematics, studies of classroom environment have shown that the females' confidence in mathematics improved greatly in classes which actively involved females in the learning of mathematics (Boaler, 2000).

Bono (1991) in his study females would enjoy math, increase their time on math tasks, and have positive emotional reactions to math if math were taught in a cooperative setting. The study explored the impact of cooperative learning on sixth grade females. The results showed that females had more positive attitudes towards math when it was taught in cooperative settings.

As far as differences in attitude development are concerned, females' positive attitudes towards mathematics decline as they grow older. Initially females have more positive attitudes towards mathematics

than males, but as they continue in school, females' attitudes become more negative. In order to improve females' performance in math, teachers need to facilitate positive attitude in females towards math. (Swetman, 1995).

2.6 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 this 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, et al (1993) contained that since science is viewed as a masculine 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, Comber & Keeves (1973) 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 is 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 tends 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)

2.7 Factors Influence Students' Attitudes Towards Science

Many factors can influence a person's attitude, including previous experiences and social influences. Attitude toward science can be defined as, "favorable or unfavorable feelings about science as a school subject," (Morrell & Lederman, 1998), which is the definition used for this study. The type of science courses taken, previous science experiences, science teachers, and various other factors can influence these attitudes toward science (Morrell & Lederman, "Of all the variables that may influence attitude toward science, gender has generally been shown to have a consistent influence," (Weinburgh, 1998). Research on the differences in attitudes toward science of men and women is frequently conducted and has produced valuable results. Several studies have shown that men have better attitudes toward science than women, and that men are more apt to continue studying science (Weinburgh, 1998). In addition, females tend to be more adapted to school and learning, yet males continue to maintain better attitudes toward science and are more motivated to succeed in science (Simpson & Oliver, 1985). These results, showing that females can succeed in school yet still have lower attitudes toward science, support the continued under representation of women in the sciences. According to a study of bachelor degrees awarded between 1966 to 2001 in Science and Engineering fields, women hold nearly half of all the degrees awarded; however, the gap between the number of women receiving Science and Engineering degrees as opposed to other degrees has increasingly widened (National Science Foundation, 2004).

Expected achievement is another factor that is heavily influenced by attitudes toward science. 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). In addition, the number of mathematics and science courses taken in high school has been shown to directly effect the major chosen in college (Maple & Stage, 1991). Unfortunately, several researchers, including Simpson and Oliver, have found that students' attitudes toward science steadily decline with each year of school completed (1985).

2.8 Gender Differences in Science Achievement

Student achievement is one of the main determining factors in assessing the quality of education in a society. Identifying the factors that affect students' learning and, thus, achievement continues to be an important object of study of educators of different countries. Researchers in science educations have expressed concern about the relationship of attitude and achievement in science. Also they are concerned with the tools, methods and approaches that facilitate practice or the study of practice towards enhancing the quality and performance of the students in science. Now science education research has developed into an extensive field of study around the world, with its own concepts, theories, methods and literature. Much of the literature concerning the relative performance of females and males in science indicates that males outperform females in most areas of the science curriculum, and that it is rare to identify areas of the science curriculum in which females outperform males.

Student's attitudes towards science have been found in some studies to be linked to performance in the subject. Many studies looking at gender differences have focused on differences in performance related to the

different science subjects. A number of studies have found that males' achievement in science is significantly better than that of females (e.g. Fleming and Malone, 1983). Levin, Sabar and Libman (1991) found that the achievement of males in all subject area of their study (earth science, biology, chemistry and physics) was significantly better than the achievement of the females. Young and Fraser (1994) in a study of Australian secondary school students also concluded that males' achievement in biology, physics and chemistry was significantly better than females.

Although, as described above, there are many studies which identify differences in performance between males and females, others are less conclusive. Erickson (1984) noted that differences were not consistent across all grades and that a typical pattern of differences was that males perform better in physical sciences, while their advantage becomes relatively small in biological sciences. Houtz (1995), for example, reported that there were no significant differences in performance between females and males in the seventh and eighth grades in midwest USA.

Therefore these ideas indicate that there are gender disparity in achievement of science fields of studies and occupations all over the world.

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

In this part source of data, samples and sampling techniques, data gathering instruments used and data analysis will be described thoroughly.

3.1 Research Design

In this study, descriptive survey research method is used for it is appropriate and suitable for using instruments such as questionnaires, focus group discussion 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' education.

3.2 Source of data

In assessing the attitude and performance of female students both primary and secondary source have been used. In the sample colleges, college students and teachers have been selected as primary data source and documents (achievement tests) from the registrar of the natural science and mathematics steams in the sample Colleges of Teacher Education in Oromia have been used as secondary data sources.

3.3 Population, Sample and sampling techniques

The aim of the study was to examine the attitude towards science and mathematics education and the level of academic achievement in science and mathematics of female students in Oromia Colleges of Teacher Education. The important and the beneficiaries of the study are students. So, student attaining the steam and instructors teaching in the stream have been included in the study.

The population of the study was the whole Colleges of Teachers' Education in Oromia. They are Adola, Asela, Bulehora, Chiro,

Dembidolo Fiche, Jimma, Metu, Nekemte, Robe, Sebeta and Shambu Teachers' Colleges. From these twelve Colleges of Teachers Education three of them were selected purposely. Thus, the selected teachers' colleges were Asela, Nekemte and Robe.

Regarding the respondents, all science and mathematics instructors (68) were included in the sample by using availability sampling technique since they are few in number. Because of the total student population of the three colleges is **2058**; proportional sampling technique employed to include about 20 % (198) of female student teachers since the study focused on females and about 10% (110) of male student teachers and totally 308 student teachers were included using simple random samplings. The following table summarizes the number of selected sample students from each college.

Table -2 Population and sample of student teachers of each college.

College	2nd Year						3rd Year					
	M		F		T		M		F		T	
	Population	Sample	Population	Sample	Population	Sample	Population	Sample	Population	Sample	Population	Sample
Asela	70	8	37	8	107	16	139	15	114	23	253	37
Nekemte	283	30	239	46	522	76	178	20	199	38	377	58
Robe	191	19	236	47	427	66	190	19	182	36	372	55
Total	544	57	512	101	**1056**	158	507	53	495	97	**1002**	150
Total students of the three colleges of 2nd and 3rd in stream **2058**												

3.4 Instrument and procedure of data collections

In order to obtain information for this study, the following methods of data collection instruments were used. These are Questionnaire, Document Analysis and Focus Group Discussions.

3.4.1 The questionnaire

Questionnaire was prepared based on review of related literature. Close ended questionnaire that include degree of respondents agreement (Likert Scale) and multiple choice questions were designed. Part one of the questionnaire was focused on the attitude of respondents' toward natural science and mathematics. In addition, part two was statements about respondents' achievement in natural science and mathematics subjects.

3.4.2. Document Analysis

Student achievement test results were collected from registrars of the three colleges. The test result of three and five semesters of 2nd and 3rd year students respectively were collected to see their achievements. Then relationship between achievement result and their response compared using percentage qualitative description were given.

3.4.3 Focus Group Discussion

Focus group discussions were conducted using the predesigned focus group discussion guide which will help to elicit the data. This was done in order to substantiate the responses collected through questionnaire and document analysis. The contents of focus group discussions were about attitude of respondents' toward natural science and mathematics and their achievement in natural science and mathematics subjects.

3.5 Procedures of Data Collection and Analysis

The questionnaires, focus group discussions and document analysis included in the study were prepared based on the basic questions and review of related literature. Students" questionnaires were translated into Afan Oromo, which is the medium of instruction of the region. The

language translation was done by Afan Oromo teachers in Asela College of Teacher Education. Before the questionnaire was administered to respondents; a pilot test was carried out in Asela Teachers College to ensure the language clarity and appropriateness of the items and reliability value of r = 0.69 was obtained. Based on the above views the pilot study was conducted with 20 students which were later excluded from the study. Finally, modifications were made depending on the comments collected during try-out. This was done to see 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 were arranged. A brief orientation about the whole purposes of the study was given for the respondents. A close follow-up was 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 vice dean and one instructor in each college.

The data collected from the sample colleges through the questionnaire were tallied, systematically organized and tabulated to facilitate analysis. The information gathered using the document inspection form was also organized.

In analyzing and reporting the data, mostly, the descriptive method was used to analyze the information collected using different instruments from different sources. Information obtained from questionnaires and documents from registrar of natural science and mathematics stream of the sample colleges were analyzed quantitatively using mostly percentage and in some case mean and simple one way ANOVA. Information obtained from focus group discussion was analyzed through qualitative description.

CHAPTER 4: DATA PRESENTATION AND INTERPRETATION.

The aim of this study was to examine the attitude toward science and mathematics education and the level of academic achievement in science and mathematics of female students in Oromia colleges of teacher education.

This part of the thesis deals with the presentation and interpretation of the data gathered from the sample colleges in line with the objective of the study. Accordingly, presentation and analysis were made by making use of the data gathered from three college students, instructors and document from registrar sample colleges. Three tools were used to gather data. These were a set of questionnaire including open-ended questions, document analysis and focus group discussion.

To examine the attitude toward science and mathematics education and the level of academic achievement in science and mathematics of female students in Oromia colleges of teacher education, three colleges Asela, Nekemte and Robe Colleges of Teacher Education have been used.

Therefore, based on the responses obtained from the respondents, document analysis and focus group discussion guides analysis and interpretations of the data were made in relation to the basic research questions.

4.1. Presentation

4.1.1. General Characteristics of the Respondents

The study was conducted in three Colleges Asela, Nekemte and Robe Colleges of Teacher's Education in Oromia. The total number of participants were 308 (110 males and 198 females) and also 18 teachers of college (17 males and 1 females) were involved in focus group discussion. The questionnaires were distributed to 308 college students and all the respondents properly filled the questionnaire and

duly return the paper. In addition to this semester test result of female students of the three colleges were analyzed in comparison of male students.

Table-3 Student respondents by college, year, focus and sex

College	Year	Focus	Sex		
			M	F	T
Asella	2nd	-	8	8	16
	3rd	Biology	3	6	9
		Chemistry	3	6	9
		Physics	4	6	10
		Mathematics	4	5	9
	Total		22	31	53
Nekemte	2nd	Biology	8	11	19
		Chemistry	8	11	19
		Physics	7	12	19
		Mathematics	7	12	19
	3rd	Biology	5	9	14
		Chemistry	5	9	14
		Physics	5	10	15
		Mathematics	5	10	15
	Total		50	84	134
Robe	2nd	Biology	4	12	16
		Chemistry	5	12	17
		Physics	5	11	16
		Mathematics	5	12	17
	3rd	Biology	5	9	14
		Chemistry	4	9	13
		Physics	5	9	14
		Mathematics	5	9	14
	Total		38	83	121
Total			110	198	308

As table-3 shows of the total 308 student teacher respondents 198(64.28%) were females and the rest 110(35.72%) were males. Among these student teacher respondents 158(51.3%) were from second year of sample colleges, 57(18.51%) males and 101 (32.79%) females while 150(48.7%) were from third year, 53(17.21%) males and 97 (31.49%) females. Out of 308 student teacher participants 53(17.21%) were from Asela, 134(43.51%) were from Nekemte and

121(39.28%) were from Robe Colleges of Teacher Education in Oromia among the four focuses, Biology Chemistry Physics and Mathematics existing in the natural science and mathematics stream. From this data most of the students are taken from Nekemte followed by Robe and Asella Colleges of Teacher Education. This is because of the proportion of the number of students existed in the colleges.

In addition to these focus group discussion were carried out with 18 teachers of the sample colleges. Among 68 instructors of the three colleges in natural science and mathematics stream (37 with MSc. holders and 31with B.Sc./B.Ed. holders) there is only one female instructor.

4.1.2 Attitude of Female Students Toward Natural Science and Mathematics Stream

The major area of the investigation under this part was attitudes of female students toward natural science and mathematics stream and gender difference in attitude towards science and mathematics education that is focused on the 1st and 3rd basic research questions. Effort was made to acquire relevant information and analyze the attitude of female students towards natural science and mathematics stream and gender difference in attitude towards science and mathematics education for the 2nd and 3rd year students of the sample colleges.

Table- 4 Students' attitude toward science and mathematics subjects while they were in high school.

Alternatives	Respondents					
	Male		Female		Total	
	N	%	N	%	N	%
Highly interested	89	80.9	100	50.5	189	61.4
Interested	15	13.6	92	46.5	107	34.7
Dislike	6	5.5	5	2.5	11	3.6
Highly Dislike	0	0	1	0.5	1	0.3
Total	110	100	198	100	308	100

As shown in table -4 the attitude of student teachers toward science and mathematics subjects depends on the gender as their responses indicated. That is most of the male student teachers have good outlook to natural science and mathematics subjects while they were in high school. As seen from the table-4 above about 80.9% of the male respondents responded that they are highly interested in the science and mathematics subjects, but only about half of the female respondents (50.5%) responded that they are highly interested in the natural science and mathematics stream subjects while they were in high school. The table also shows 13% of the male respondents and 46.5% the female respondents were responded that they have medium interest on science and mathematics subjects while they were in high school.

Thus the data shows that the male respondents have better positive attitude towards science and mathematics subjects than the female respondents. This result is in line with the finding of (Hyde, Fennema, Ryan, Frost and Hopp, 1990) in a meta-analysis of studies on "gender comparisons of mathematics attitude and affect" who found that, in general female students held more negative attitude towards mathematics subjects than male students.

Table-5 How student teachers join natural science and mathematics steam

Choices	Respondents					
	Male		Female		Total	
	N	%	N	%	N	%
First	93	84.6	101	51	194	63
Second	14	12.7	20	10.1	34	11
Third	0	0	6	3	6	2
By assignment	3	2.7	71	35.9	74	24
Total	110	100	198	100	308	100

As indicated by table-5 most (84.6%) of male respondents were joined the stream by their 1st choice while only 51% which nearly about half of the female respondents were joined the stream by their 1st choice. The table also shows that only 2.7% of male respondents were joined the stream by being assigned, while 35.9% which is more than one third of female respondents were joined the stream by being assigned without their choice. The data clearly indicate that about half of the female respondents were joined the stream without their interest.

Table -6 Preference field of the study that students would have been chosen

Item	Alternatives	Respondents					
		Male		Female		Total	
		N	%	N	%	N	%
If you had been given the choice, which field of the study would have been your preference?	Natural Science	95	86.4	95	48	190	61.7
	Language	7	6.3	24	12.1	31	10
	Social Science	8	7.3	63	31.8	71	23.1
	Aesthetics	0	0	16	8.1	16	5.2
	Total	110	100	198	100	308	100

As observed from table-6 among the sampled student teachers 86.4% of male respondents prefer to join natural science and mathematics stream while only 48 % that is less than half of female respondents prefer to join natural science and mathematics stream. On the other hand only 13.6% of male respondents prefer to join other streams while the majorities (52%) of female respondents prefer to join other streams

rather than joining natural science and mathematics stream. This implies that most of female student teachers are not interested in joining natural science and mathematics stream instead they prefer to join non-natural science and mathematics stream stream.

Table-7 Tendency of students to change their steam

Item	Alternatives	Respondents					
		Male		Female		Total	
		N	%	N	%	N	%
If you get an opportunity to change your stream would you change your stream?	Yes	12	10.9	105	53	117	38
	No	95	86.4	87	44	182	59.1
	Undecided	3	2.7	6	3	9	2.9
Total		110	100	198	100	308	100

As table-7 shows 53% of female respondents which are more than half and only 10.9% of male respondents are ready to change their stream if they get an opportunity but most (86.4%) of male respondents and 44% of female respondents have an interest to stay in natural science and mathematics stream. Only 2.9% of the respondents responded to it is difficult to decide whether to change or to stay in the stream.

It is clear that from the table there is significant difference between male and female in staying in the stream with the proportion being 86.4% and 44% respectively. This clearly shows that majority of the female student teachers are less interested to the stream while most of male student teachers are more interested to the stream which means that male student teachers have more attitude to the stream than their female counterparts. The finding of the present study is consistence with the finding of some previous studies. (Kelly and smail;1986, Champers and Ander,1995, Kahel et al 1993 cited in Yalew 1997:31 that indicate females tend to enroll in social science and language subjects and to underrepresented in science and mathematics where males dominate.

Table-8 Possible reason for those who decide to change their stream

Alternatives	Respondents					
	Male		Female		Total	
	N	%	N	%	N	%
Lack of interest	2	16.7	12	11.4	14	12
Difficulty of the subjects	10	83.3	88	83.8	98	83.7
Making me busy	-	-	5	4.8	5	4.3
Total	12	100	105	100	117	100

As can be observed from table-8 among the student teachers which responded, I would change my stream if I get an opportunity, difficulty of the subjects has taken as the main reason for the majority of respondents to change their stream that is more than 83% of both sex and total of the respondents. Lack of interest and making me busy account only 12% and 4.3% of the total respondents to change their stream respectively. Thus one can say the reason why the majority of respondents tend to change their stream is the difficulty of the subjects of the stream which in turn shows that subjects of natural science and mathematics stream perceived as difficult in comparison to other streams.

Table-9 Subject area students like most

Alternatives	Respondents					
	Male		Female		Total	
	N	%	N	%	N	%
Natural science and mathematics	92	83.6	94	47.5	186	60.4
Language	9	8.2	31	15.6	40	13
Social Science	9	8.2	73	36.9	82	26.6
Aesthetics	0	0	0	0	0	0
Total	110	100	198	100	308	100

As clearly indicated by table-9 most of the male respondents (83.6%) and 47.5% of female respondents which are less than half of the sample female student teachers are currently learning the subject they like most (natural science and mathematics subjects). But majorities (52.5%) of female respondents which are more than half of the sample female student teachers and few (16.4%) of male respondents were interested in language and social science subjects. The data show there is significant attitude difference between male and female towards the subjects. Most of the male respondents which are greater than 83% like the natural science and mathematics stream subjects while majority of female respondents which are greater than 52% interested in the non natural science and mathematics stream subjects (language and social science subjects). This is clear indication that females have more negative attitude towards natural science and mathematics stream than males.

Table-10 Possible reasons for the subject area they like most

Rank			Possible reasons					
			Getting good result in it	Has application in daily life	Ensuring me time freedom	Easiness of the subject	job opportunities	Total
1	M	N	68	26	0	3	13	110
		%	61.8	23.7	0	2.7	11.8	100
	F	N	34	38	0	108	18	198
		%	14.2	19.2	0	54.5	9.1	100
2	M	N	28	36	0	24	22	110
		%	25	32.7	0	21.8	20	100
	F	N	39	83	0	59	17	198
		%	19.7	41.9	0	29.8	8.6	100
3	M	N		40	0	26	44	110
		%		36.3	0	23.7	40	100
	F	N	55	39	0	18	87	198
		%	27.8	19.2	0	9.1	43.9	100
4	M	N	14	8	0	57	31	110
		%	12.7	7.3	0	51.8	28.2	100
	F	N	70	39	0	13	76	198
		%	35.3	19.7	0	6.6	38.4	100
5	M	N			110			110
		%			100			100
	F	N			198			198
		%			100			100

As indicated in table-10 majority (61.8%) of male respondents forward that they like the subject area they mentioned because of they got good result in it as they first reason while majority (54.5%) of female respondents argued that they like the subject area they mentioned because of the easiness of the subjects. All of the respondents put ensuring me time freedom as their last options. This implies that the reason they forward for the subject they most like is different since for the subject they most like is different with in gender. That is the reason why most of the male respondents like the natural science and mathematics stream subjects is that because of they got good result in it while the reason why majority of female respondents interested in the non natural science and mathematics stream subjects (language and social science stream subjects) is that because of the easiness of the subjects in the stream. This is also shows that females have more negative attitude towards natural science and mathematics stream than males perceiving natural science and mathematics subjects as hard and difficult subjects on the ground they dislike the stream.

Table-11 Student teachers' view on the stream most female students join

Alternatives	Respondents					
	Male		Female		Total	
	N	%	N	%	N	%
Natural Science	6	5.5	24	12.1	30	9.8
Language	16	14.5	66	33.3	82	26.6
Social Science	76	69.1	79	39.9	155	50.3
Aesthetics	12	10.9	29	14.7	41	13.3
Total	110	100	198	100	308	100

As can be seen from table-11 only 5.5% of the male respondents and 12.1% of the female respondents which is less than 10% of the total respondents responded that most female student teachers prefer to join

natural science and mathematics stream. On the contrary 94.5% of the male respondents and 87.9 % of the female respondents which is more than 90% of the total respondents responded that most female student teachers prefer to join other steam rather than natural science and mathematics stream, especially 69.1% of the male respondents and 39.9% of the female respondents which is more than half (50.3%) of the total respondents responded that most female student teachers prefer to join social science steam.

Thus we can deduce that most female student prefer to join non-natural science and mathematics stream rather than natural science and mathematics stream. The result of this study is congruent with the results of some previous international studies, e.g. Geet, (1997); Ngau, (1997); Yalew, (1997). In his study, Geet reported that in South Africa, females tend to avoid natural science fields; that they have been traditionally considered as male domains. In Ethiopia, (Yalew, 1997) asserted that female students failing in science more than males, have negative attitude. Thus these ideas indicate that there are gender disparities in attitudes towards science fields of studies.

Table-12 Possible reasons for most female students to join the stream they prefer

Possible Reason	Rank							
	1st		2nd		3rd		4th	
	N	%	N	%	N	%	N	%
Stream subjects related to their daily activities	24	7.8	202	65.6	64	20.8	18	5.8
Easiness of the stream subjects	222	72.1	46	14.9	30	9.7	10	3.2
Peer group pressure	60	19.5	24	7.8	93	30.2	131	42.6
Teacher advice	2	0.6	36	11.7	121	39.3	149	48.4
Total	308	100	308	100	308	100	308	100

As can be seen from table-12 most of the respondents argued that, most female students teachers join the stream they prefer because of the easiness of the subjects in the stream. As observed from the table above 7.8%, 72.1%, 19.5% and 0.6% of the respondents argued that stream subjects related to their daily activities, easiness of the stream subjects, peer group pressure and teacher advice as the first reason why female student teachers join other steam rather than natural science and mathematics stream respectively. Thus the main reasons why most female student teachers join other steam rather than natural science and mathematics stream is that the easiness of the subjects in those streams. This implies that natural science and mathematics stream subjects considered as difficult subjects for female students with compared to their counter parts. This is another indication of females have less positive attitude towards natural science and mathematics stream compared to their male counterparts.

Table-13 Possible reasons for those female students who joined natural science and mathematics stream.

Possible Reason	Rank					
	1st		2nd		3rd	
	N	%	N	%	N	%
Further education opportunities	72	23.4	112	36.4	124	40.2
Personal interest	56	18.2	94	30.5	158	51.3
Forced by 70:30 government plan	180	58.4	102	33.1	26	8.5
Total	308	100	308	100	308	100

As table-13 indicate among the sample student teachers only 18.2% rank personal interest as their 1st reasons for those female students who joined natural science and mathematics stream instead of choose non-natural science and mathematics stream, but majority (58.4%) of the respondents responded that the reason why those female students who joined natural science and mathematics stream instead of choose

non-natural science and mathematics stream is forced by 70:30 government plan as their 1st reason. Thus, we can say even if science and mathematics are important area in the field of education for students of college level, majority of the female students joined natural science and mathematics stream without their interest because of 70:30 government plan pressure.

Table-14 Are there any motivating factors that forced you to join natural science and mathematics stream?

Respondents	Male		Female		Total	
	N	%	N	%	N	%
Yes	109	99.1	192	97	301	97.7
No	1	0.9	6	3	7	2.3
Total	110	100	198	100	308	100

As shown in table-14 almost all of the respondents (about 98%) responded that there are motivating factors that forced them to join natural science and mathematics stream. Only 2.3% of the total respondents responded that there is no motivating factor that forced them to join natural science and mathematics stream.

Table-15 Possible motivating factors that forced the students to join natural science and mathematics stream

Possible motivating factors	Rank							
	1st		2nd		3rd		4th	
	N	%	N	%	N	%	N	%
Family encouragement	0	0	11	3.7	17	5.7	273	90.7
Environmental exposure	63	20.9	76	25.2	153	50.8	9	3
Personal interest	92	30.6	87	28.9	110	36.5	12	4
Government 70:30 plan	146	48.5	127	42.2	21	7	7	2.3
Total	301	100	301	100	301	100	301	100

According to table-15 Government 70:30 plan, Personal interest and Environmental exposure account 48.5%, 30.6 % and 20.9% respectively as first factor that forced students to join natural science and mathematics stream. So Government 70:30 plan, personal interest and environmental exposure are the main possible motivating factors that forced the students to join natural science and mathematics stream with the government 70:30 plan accounts a lot.

Table-16 Student teachers' view on the ratio of female students to male students with in the streams.

Item	Respondents	Male		Female		Total	
		N	%	N	%	N	%
When compared with other streams the ratio of female students to male students in natural science and mathematics stream is less. Is this true in the case of your college?	Yes	82	74.5	166	83.8	248	80.5
	No	28	25.5	32	16.2	60	19.5
	Total	110	100	198	100	308	100

As observed from table-16, 74.5% of male respondents and (83.8%) of male respondents which is more than 80% of the total respondents argued that the ratio of female students to male students in natural science and mathematics stream is less with compared to other streams in their college, while only 19.5% of the respondents disagree with this idea. This is clearly shows even if the number of females in the natural science and mathematics stream greater than females in the non-natural science and mathematics stream, the ratio of female students to male students in natural science and mathematics stream is less with compared to other streams in their college which in turn shows females are less interested to the natural science and mathematics stream and have more positive attitude the non-natural science and mathematics streams.

Table-17 Number of students per stream of sample College by sex

College	Stream	2nd year (2005 Entry)			3rd year (2004 Entry)		
		M	F	T	M	F	T
Asella	Natural science	70	37	107	139	114	253
	Social science	22	35	57	24	71	95
	Language	23	27	50	28	19	47
	Aesthetics	44	57	101	29	69	98
Nekemte	Natural science	283	239	522	178	199	377
	Social science	17	29	46	32	35	67
	Language	35	46	81	21	27	48
	Aesthetics	39	46	85	18	28	46
Robe	Natural science	191	236	427	190	182	372
	Social science	34	49	83	21	26	47
	Language	30	19	49	18	27	45
	Aesthetics	14	27	41	37	42	79

Source:Registrar of the stream of sample colleges

As observed from table-17, information from vice dean office and registrar of the stream of sample colleges support the responses of respondents. That is the number of female students in natural science and mathematics of sample colleges is relatively less than that of male counterparts except for the 2nd year Robe College and 3rd year Nekemte College. On the contrary the number of female students in non-natural science and mathematics of sample colleges is relatively greater than that of male counterparts except for the Language stream of 2nd year Robe College and 3rd year Asella College.

Thus this shows that there is significant gender difference in enrolling within the streams. This is in line with the finding of (Mergary,1984) who argued that the masculine image of science as presented in school science as difficult choice for adolescent females who were striving to achieve a feminine identity.

Table-18 Possible reason for why the ratio of female students to male students in natural science and mathematics stream is less.

Possible Reason	Rank					
	1st		2nd		3rd	
	N	%	N	%	N	%
Strong competition with male students	86	34.7	112	45.2	30	12.1
Less efficient of female students	24	9.7	42	16.9	182	73.4
Difficulty in understanding the concepts of the courses	138	55.6	94	37.9	36	14.5
Total	248	100	248	100	248	100

As table-18 indicate among the sample student teachers more than 90% rank difficulty in understanding the concepts of the courses and strong competition with male students as their 1st reasons for the ratio of female students to male students in natural science and mathematics stream is less with compared to other streams. Thus the data can shows that most females assume natural science and mathematics subjects are difficult relative to non-natural science and mathematics subjects. This is in relation with Kahel, et al (1993) contained that science is viewed as a masculine image; it is considered hard, cold and an analytical discipline.

The students were asked to indicate their opinion by rating on five point Likert scale concerning their attitudes towards science and mathematics subjects from strongly agree (5) to strongly disagree(1). The higher the score the more the students agree with the statement for positive statement and negative statements are scored reversely. Score of (3) cross ponds to the midpoint of the scale and the result is summarized in the following tables.

Table-19 Summary of descriptive statistics on student attitudes' towards science and mathematics.

Variables	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Male	110	73.35	6.78	72.06	74.63
Female	198	69.89	7.99	68.77	71.01
Total	308	71.13	7.75	70.23	71.99

Table-20 Summary of one way ANOVA for simple descriptive statistics on student attitudes' towards science and mathematics.

	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Between Groups	842.41	1	842.41	14.64	.000
Within Groups	17601.64	306	57.52		
Total	18444.06	307			

One of the major purposes of the present study was to investigate whether there is gender difference in science and mathematics between male and female students. Accordingly, one way ANOVA for simple descriptive statistics shows that there is significant attitude difference between male and female towards the science and mathematics subjects with the F ratio 14.645. This also strongly congruent with (Yalew, 1997) asserted that female students failing in science more than males, have negative attitude. Thus these ideas indicate that there are gender disparities in science and mathematics fields of studies.

To substantiate and crosscheck the result obtained through questionnaire and document analysis three focus group discussions were conducted with the three college instructors. To triangle the data

the result of focus group discussions on student attitude is summarized as follow.

The focus group discussions carried out with teachers also support the respondents' opinions. Respondents were asked to describe the ways that female students joining the stream they attending and how they look like natural science and mathematics stream. To ward these points almost all teachers responded that female students were assigned to the stream based on their interest, 70:30 government plan provided by Oromia education bureau and their grade ten national examination results and most female students look like natural science and mathematics stream as hard and difficult relative to other streams and they are less interested to the stream compared with male students. The data can revealed that criteria provided from Oromia education bureau cannot give more chances for students to choose other stream. It is highly based on 70:30 government plan that is 70% of the students must be assigned to natural science and mathematics stream. Only 30% of students are assigned to non-natural science and mathematics stream that is to social science stream, language stream and aesthetics stream.

So the discussion can clearly show that the opportunity to join other stream is very little and even if few female students interested to join natural science and mathematics stream since natural science and mathematics stream have 70% of the given quota that regional bureau of education gives to the college, most of female students are forced to join natural science and mathematics stream to get an opportunity to be a teacher. The discussion also forward that if there is equal chance, most of female students tends to enter non-natural science and mathematics stream, believing that the contents of stream subjects are less difficult than that of natural science and mathematics stream subjects comparatively, perceiving that natural science and mathematics subjects as difficult and hard.

Teachers are also asked about the reason why those female students who joining natural science and mathematics stream choose the stream.

Toward this idea most of the teachers argued that most female students join the natural science and mathematics stream because of 70:30 government plan and few of them because of their interest. This clear shows that most females are forced to join natural science and mathematics stream on the ground that they disliked the stream subjects.

Thus from the discussion made one can understand that male students have more positive attitude than their female counter parts and mainly 70:30 government plan forced females to join the natural science and mathematics stream to get an opportunity to be a teacher without their interest.

4.1.3. Achievement of students in natural science and mathematics stream.

Table-21 Questions based on the achievement of students in natural science and mathematics stream.

Item (Concept of the question)	Alternatives	Responses					
		Male		Female		Total	
		N	%	N	%	N	%
Students' achievement of natural science and mathematics subjects in average, when you were in high school	> 70%	74	67.3	51	25.7	125	40.6
	50-70%	36	32.7	147	74.3	183	59.4
	< 50%	0	0	0	0	0	0
Total		110	100	198	100	308	100
Grade 10 (ten) national examination result of sampled student teachers.	> 3	33	30	11	5.6	44	14.3
	2.75 –3	47	42.7	30	15.2	77	25
	2.5 - 2.74	16	14.6	29	14.6	45	14.6
	2 – 2.49	14	12.7	128	64.6	142	46.1
Total		110	100	198	100	308	100
Cumulative grade point average (CGPA) of sampled student teachers at present in the college.	> 3	63	57.3	14	7.1	77	25
	2.75 – 3	18	16.4	14	7.1	32	10.4
	2.5 –2.74	10	9	26	13.1	36	11.7
	2 – 2.49	18	16.4	131	66.2	149	48.4
	< 2	1	0.9	13	6.6	14	4.5
Total		110	100	198	100	308	100
Number of female students found in top ten students per section in natural science and mathematics stream.	0	7	6.4	9	4.5	16	5.2
	1- 3	83	75.4	149	75.3	232	75.3
	4 – 6	14	12.7	23	11.6	37	12
	> 6	6	5.5	17	8.6	23	7.5
Total		110	100	198	100	308	100
Comparison of female students CGPA with that of male students in the stream.	More than male	7	6.4	1	0.5	8	2.6
	Equals to male	18	16.4	47	23.7	65	21.1
	Less than male	85	77.2	150	75.8	235	76.3
Total		110	100	198	100	308	100

Table-22 Summary of t-test on the total students' achievement by sex

Variable	N	Mean	Std. Deviation	t	Sig.
Female	1007	2.35	.783	28.27	.000
Male	1051	3.32	.768		

$P < 0.01$

The major area of the investigation under this part was the level of academic achievement of female students in natural science and mathematics subjects comparably with that of male students which is mainly focused on the 2nd basic research question. Effort was made to acquire relevant information both from sample respondents and concerning bodies to analyze the level of academic achievement of female students in science and mathematics subjects comparably with that of male students for the 2nd and 3rd year of the sample colleges.

As indicated by table-21 majority (67.3%) of male respondents which is greater than two-third of male respondents responded that their high school achievement in natural science and mathematics subjects in average is greater than 70% while only 25.7 which is approximately one fourth of female respondents responded that their achievement in natural science and mathematics subjects in average is greater than 70% when they were in high school. On the other hand 32.7% of male respondents and 74.3% of female respondents responded that their achievement in natural science and mathematics subjects in average ranges 50% to 70%. No one responded their high school achievement in natural science and mathematics subjects in average is less than 50% in both sexes.

Table-21 also shows that 30% of male respondents and only 5.6% of female respondents scored greater than 3.00 point, 42.7% of male respondents and 15.2% of female respondents scored in the range between 2.75 to 3.00 point, 14.6% of both sexes of respondents scored in the range between 2.5 to 2.74 point and only 12.7 of male respondents and nearly two-third (64.6%) of female respondents scored in the range between 2.00 to 2.49 in grade ten (10) national examination.

This table also shows that the majority (57.3%) of male respondents and few (7.1%) which is less than one tenth of female respondents have greater than 3.00 point CGPA in the college at present. On the contrary the table also shows that the majority (66.2%) of female respondents

and only few (16.4%) which is less than one fifth of male respondents responded that they scored between in the range 2.00 to 2.49 point CGPA in the college at present.

Student achievement is one of the main determining factors in assessing the quality of education in a society. According to table 4.19 male and female students are responded to information related to their achievement in natural science and mathematics subjects when they were secondary school, grade 10 national examination result and the present CGPA at colleges and the result revealed that 67.3% of male respondents achieved greater than 70% in natural science and mathematics subjects in average when they were in high school while only 25.7% of female respondents achieved the same result. In addition to this 30% of male respondents and 5.6% of female respondents scored greater than 3.00 point in grade 10 national examination. The table also show that 57.3% of male respondents and 7.1% of female respondents have scored CGPA of 3.00 and above in the college at present. In addition to this a result of t-test (table-22) shows that students' achievement differ by sex among college students ($t= 28.27$, $p< 0.01$). In other words, (table-22) indicates that there is statistically significance difference between male and female in terms of their achievement.

So from the above discussion one can conclude that male students are better achievers than female students in the field in all cases. This finding is in line with the finding of (Comber and Keeves 1973), in their massive international study on science achievements of males and females; they found that in all countries males excelled females in science subjects.

In addition to these table-21 shows that more than 75% of the total respondents argued that the number of female student teachers found in top ten students per section in natural science and mathematics is only ranges from one to three (1-3) and CGPA of female students is less than that of their counter parts in natural science and mathematics in

their colleges. This also confirm that females are low achievers with compared to their male counter parts in natural science and mathematics stream.

Table-23 Summary of descriptive statistics of sample students CGPA

Variable	N	Mean	Std. Deviation
Male	110	3.02	.46
Female	198	2.43	.35

Table-23 shows that the mean scores of the students' achievement of science and mathematics stream, which were 3.0187 and 2.4337 for male and female respectively. This clearly indicates statistically there is a significant difference between the mean score of the male and female students' achievement in cumulative grade point average (CGPA) of the respondents in the college with males students are higher achiever than females in the natural science and mathematics stream.

Table-24 The CGPA of 2nd year and 3rd year natural science and mathematics stream students of sample Colleges of Teacher Educations.

College	Class (year)	Focus	CGPA										
			≥ 3.00		2.5-2.99		2.0-2.49		< 2.00		Total		
			F	M	F	M	F	M	F	M	F	M	T
Asella	2nd	-	5	15	13	32	15	11	4	2	37	70	107
	3rd	Biology	7	13	20	11	35	9	3	2	65	35	100
		Chemistry	3	9	11	14	9	3	1	0	24	26	50
		Physics	2	18	4	17	8	3	0	0	14	38	52
		Mathematics	3	25	4	12	4	3	0	0	11	40	51
Nekemte	2nd	Biology	4	13	37	16	47	10	19	2	107	41	148
		Chemistry	3	25	10	27	29	8	8	2	50	62	112
		Physics	3	39	14	21	20	7	9	1	46	68	114
		Mathematics	5	62	15	30	9	17	7	3	36	112	148
	3rd	Biology	4	12	38	13	55	10	9	2	106	37	143
		Chemistry	4	16	16	15	34	4	3	2	57	37	94
		Physics	3	12	4	19	5	3	1	1	13	35	48
		Mathematics	4	32	9	30	9	6	1	1	23	69	92
Robe	2nd	Biology	7	23	14	14	29	5	8	1	58	43	101
		Chemistry	6	22	15	18	30	1	6	0	57	41	98
		Physics	5	28	8	11	31	3	6	0	50	42	92
		Mathematics	8	37	14	16	38	11	11	1	71	65	136
	3rd	Biology	3	23	9	15	28	10	2	0	42	48	90
		Chemistry	3	28	9	22	36	2	4	0	52	52	104
		Physics	1	28	9	13	33	5	0	0	43	46	89
		Mathematics	6	23	10	17	27	4	2	0	45	44	89
Total			**89**	**513**	**283**	**383**	**531**	**135**	**104**	**20**	**1007**	**1051**	**2058**
Percentage out of total (2058)			**4.3**	**24.9**	**13.8**	**18.6**	**25.8**	**6.6**	**5**	**1**	**48.9**	**51.1**	**100**

Source: Registrar of the stream of sample colleges

Table-25 Summary of descriptive statistics on total students' achievement in natural science and mathematics stream by college

College	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Asela	360	2.96	.847	2.87	3.05
Nekmte	899	2.81	.923	2.75	2.87
Robe	799	2.84	.929	2.78	2.91
Total	2058	2.85	.914	2.81	2.89

Table-26 Summary of multiple comparisons of student performance by college

(I) VAR00001	(J) VAR00001	Mean Difference (I-J)	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Assela	Nekmte	.155*	.007	.04	.27
	Robe	.116*	.045	.00	.23
Nekmte	Assela	-.155*	.007	-.27	-.04
	Robe	-.038	.387	-.13	.05
Robe	Assela	-.116*	.045	-.23	.00
	Nekmte	.038	.387	-.05	.13
*. The mean difference is significant at the 0.05 level.					

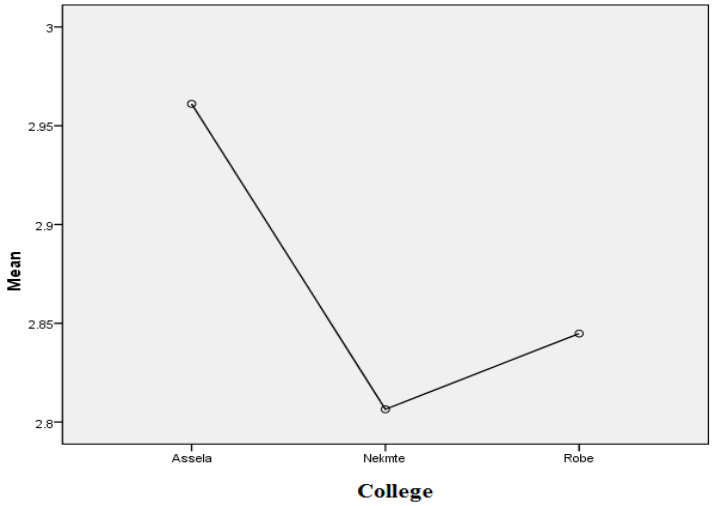

Figure -1

As observed from table-24 documents from registrar of the streams of sample colleges support the responses of respondents. That is the percentage of female students in natural science and mathematics of sample college who scored 3.00 point and above is by far less than that of male counterparts and the percentage of female students in natural science and mathematics of sample college who scored less than 2.00 point and in the range between 2.00 to 2.49 is by far greater than that of male counterparts. That is out of the total population only 89(4.3%) of females have CGPA of 3.00 point and above in the college at present while 513(24.9%) males have CGPA of 3.00 point and above in the college at present which is about six times that of their counter parts. On the contrary 104(5%) of females have CGPA of less than 2.00 point in the college at present while only 20(1%) males have CGPA of less than 2.00 point in the college at present. Generally as scored CGPA goes from 2.00 point to 4.00 point the percentage of female students decrease while the percentage of male students increase and the reverse is also true that is as scored CGPA decreases from 4.00 point to 2.00 point and below the percentage of female students increase while the percentage of male students decrease. This is clearly shows that females are low achiever compared with their male counter parts. In addition to this as indicated in table-26 and figure 1 there is student performance difference among the colleges at alpha .05 level. Table-26 shows that there is student performance difference between Asela and Nekemte, Asela and Robe Colleges at alpha .05 level. But there is no performance difference between Nekemte and Robe colleges at alpha .05 levels.

Table-27 Number of students with A, B, C, D, and F grades in grade ten national Examinations.

Subjects										
Grade scored	Sex		Mathematics	Physics	Chemistry	Biology	Geography	History	Civic	English
A	M	N	8		9	15	17	11	21	13
		%	7.3		8.2	13.6	15.5	10	19.1	11.8
	F	N	5		6	23	18	13	25	22
		%	2.5		3	11.6	9.1	6.6	12.6	11.1
B	M	N	38	37	45	56	59	36	66	39
		%	34.5	33.6	40.9	50.9	53.6	32.7	60	35.5
	F	N	48	34	37	68	63	39	63	57
		%	24.2	17.2	18.7	34.3	31.8	19.7	31.8	28.8
C	M	N	64	66	54	39	33	61	23	58
		%	58.2	60	49.1	35.5	30	55.5	20.9	52.7
	F	N	145	141	149	107	114	145	110	119
		%	73.3	71.2	75.3	54.1	57.6	73.3	55.6	60.1
D	M	N		7	2		1	2		
		%		6.4	1.8		0.9	1.8		
	F	N		23	6		3	1		
		%		11.6	3		1.5	0.5		
F	M	N								
		%								
	F	N								
Total	M	%	110	110	110	110	110	110	110	110
		N	100	100	100	100	100	100	100	100
	F	%	198	198	198	198	198	198	198	198
		N	100	100	100	100	100	100	100	100

As can be observed from table-27 the responses of respondents shows that the percentage of male sample students that have scored “A “and “B” are greater than the percentage of female sample students that have scored the same grade in all subjects. But the responses of respondents shows the percentage of female sample students that have scored “C “are greater than the percentage of male sampled students that have scored the same grade in all subjects. In addition to this number of sample students scored grade “D” in natural science and mathematics subjects are by much greater than number of sample students scored grade “D” in non-natural science and mathematics subjects in both sexes.

The table also shows that among sample students percentage of respondents scored grade “A” in natural science and mathematics subjects are less than percentage of respondents scored grade “A” in non-natural science and mathematics subjects except in biology. Thus from this we can conclude that females are low achievers compared to their male counter parts and they achieve better grade in non-natural science and mathematics subjects than natural science and mathematics subjects. This is in line with Kahel, et al (1993) contained that since science is viewed as a masculine image, it is considered hard, cold and an analytical discipline. Female do not anticipate higher performance in science subjects.

Other point what can be said from the above finding is that achievements in non-natural science and mathematics subjects are better than achievements in natural science and mathematics subjects for both sexes in grade ten national examinations. This is strongly congruent with the findings of (Gok and Silay 2008; Dieck 1997; Rivard and Straw 2000, Mattern and Schau, 2002) who asserts that although science and mathematics are in every area in our life and facilitate our lives, international studies show that success in science and mathematics education is lower than other disciplines

To substantiate and crosscheck the result obtained through questionnaire and document analysis three focus group discussions were conducted with the three college instructors. To triangle the data the result of focus group discussions on students' achievement is summarized as follow.

The focus group discussions carried out with teachers also support the respondents' opinions. The teachers were asked about the performance of female students in natural science and mathematics stream compared to with their male counterparts. The focus group discussions carried out with teachers on this point also support the students' responds. According to discussion made teachers raise that comparing the performance of female students with their male counter parts, even if few female students are best competent, the performance of most female students is less in the stream comparatively. Academic back ground of the subject matter, attitude, social factors and lack of confidence are some of the reasons that teachers raised for the less performance with their male counter parts. According to discussion made number of female students found in the top ten per section in average not exceed 2. For example the discussion made with teachers of Robe College of Teacher Education there is only 11 female students found in the top ten of eight (8) section of the stream in 3rd year students. That is eight to nine of top ten students per section is covered by male students in the stream.

Thus the discussion made can clearly show that females are low achievers with compared to their male counter parts in natural science and mathematics stream. The other unexpected idea that teachers of the college raise is that 70:30 government plan for elementary school teachers is unnecessary because there is no 70:30 fields there. In other hand this results shortage of teachers in non-natural science and mathematics fields and some natural science and mathematics graduates teach subjects out of their field, such as aesthetics and language subjects.

Generally from the focus group discussion made one can conclude that female students are less interested to natural science and mathematics stream compared to their female counter parts with male students having more positive attitude to natural science and mathematics stream and they are better achievers than female students.

Table-28 Summary of descriptive statistics of student attitude by focus

Focus	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Biology	72	3.95	.44	3.85	4.05
Chemistry	72	3.85	.38	3.76	3.94
Physics	74	3.94	.47	3.83	4.05
Mathematics	74	4.02	.39	3.93	4.11
Total	292	3.94	.42	3.89	3.99

Table-29 Correlations among focuses/departments

Attitude	Biology	Chemistry	Physics	Mathematics
Biology	1			
Chemistry	.296*	1		
Physics	.188	.202	1	
Mathematics	.095	.138	.090	1

*. Correlation is significant at the 0.05 level.

The correlation matrix table-29 indicates that attitude toward the natural science and mathematics stream among the focuses is statistically significant at the 0.05 level.

4.1.4 The relationship between attitude and achievement

Analysis of simple regression was used to see whether attitude of students could predict their achievements. Summary of the regression analysis is presented as follows.

Table-30 Summary of regression coefficient for predicting achievement to attitude

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant Variable (Attitude)	1.309	.243	.301	5.393	.000
$R^2 = 0.091$, P = 0.00					

The F ratio indicated in table-30 reveals that at alpha level 0.01, there is significant relation-ship between attitude and achievement. It is learned from the above simple regression analysis that with ($t = 5.393$, $P \leq 0.01$) attitude is found to be contributor to achievement. It is found that attitude contributed about 9.1% for achievement. Therefore the prediction of attitude to achievement is statically significant in this study.

4.2 Discussion

This study was set out to investigate the attitude of female students towards natural science and mathematics stream in Colleges of Teacher Education of Oromia. It also aimed to assess the presence gender difference both in their achievement and attitude toward the natural science and mathematics stream. Furthermore, the relationship between attitude and achievement was 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 The attitude of female student teachers toward science and mathematics stream and gender difference in both attitude toward and achievement in science and mathematics education.

One of the purposes of the present study was to identify the attitude of female student teachers towards science and mathematics stream and to investigate whether there is gender difference in attitude towards science and mathematics education.

The data that was analyzed in the previous section indicate that male students were found to have more positive attitude towards science and mathematics stream than females. Accordingly table-4 shows that about 80.9% of the male respondents are highly interested in the science and mathematics subjects, but only about half of the female respondents (50.5%) are highly interested in the natural science and mathematics stream subjects while they were in high school. In one hand as indicated by table-5 most (84.6%) of male respondents were joined the stream by their 1st choice while 51% which nearly about half the female respondents were joined the stream by their 1st choice.

This is one indication that compared to male, female students have less positive attitude toward science and mathematics stream. In addition to

this students were asked their preference field of study. The data in table-6 shows among the sample student teachers 86.4% of male respondents prefer to join natural science and mathematics stream while only 48 % that is less than half of female respondents prefer to join natural science and mathematics stream. On the other hand only 13.6% of male respondents prefer to join other streams while the majorities (52%) of female respondents prefer to join other streams rather than joining natural science and mathematics stream. Student teachers were asked whether they want to change their stream from natural science and mathematics stream, to other streams. The data shows male are less interested to change their stream when compared to females. Only 10.9 % of male respondents want to change their stream from natural science and mathematics stream to other streams if they get an opportunity which means almost all (89.1) of them like the stream. This can show have positive attitude towards natural science and mathematics stream. However, 53%, which are more than half of female respondents want to change their stream from natural science and mathematics stream to other streams if they get an opportunity which is to mean they are not interested, this shows that most female students dislike the stream.

Student teachers were also asked the stream that most female students want to join. The data in the table-11 shows that 94.5% of the male respondents and 87.9 % of the female respondents which is more than 90% of the total respondents argued that most female student teachers prefer to join other steam rather than natural science and mathematics stream, especially 69.1% of the male respondents and 39.9% of the female respondents which is more than half (50.3%) of the total respondents responded that most female student teachers prefer to join social science steam. On the contrary only 5.5% of the male respondents and 12.1% of the female respondents which is less than 10% of the total respondents agreed that most female student teachers prefer to join natural science

and mathematics stream. The data also show that majority of the female students joined natural science and mathematics stream without their interest because of 70:30 government plan pressure. This is clearly shows that most female students more interested to other streams rather than natural science and mathematics stream which is to mean that they have less positive attitude to natural science and mathematics stream.

The finding of the present study is consistence with the finding of some previous studies. For examples this result is in line with:

(Kelly and Smail; 1986, Champers and Ander,1995, Kahel et al 1993 cited in Yalew 1997:31) that indicate females tend to enroll in social science and language subjects and to underrepresented in science and mathematics where males dominate. (Hyde, Fennema, Ryan, Frost and Hopp, 1990) in a meta-analysis of studies on "gender comparisons of mathematics attitude and affect" who found that, in general female students held more negative attitude towards mathematics subjects than male students.

(Mergary,1984) who argued that the masculine image of science as presented in school science as difficult choice for adolescent females who were striving to achieve a feminine identity. (Geet, 1997); (Ngau1997; (Yalew, 1997). In his study, Geet reported that in South Africa, females tend to avoid natural science fields; that they have been traditionally considered as male domains. In Ethiopia, (Yalew,1997) asserted that female students failing in science more than males, have negative attitude. Thus these ideas indicate that there are gender disparities in attitudes towards science fields of studies.

Generally from the above discussions, we can deduce that there is significant gender difference in attitude towards science and mathematics streams with male student teachers have better positive attitude towards science and mathematics subjects than the female student teachers.

4.2.2. The level of academic achievement of female students in science and mathematics subjects compared to that of male students.

The major area of the investigation under this part was the level of academic achievement of female students in natural science and mathematics stream compared with that of male student teachers, which is mainly focused on the 2nd basic research question. Relevant information both from sample respondents and concerning bodies that was analyzed in section 4.1.3 revealed that male students recorded higher level of academic achievement when compared with female students in science and mathematics stream.

Accordingly the data interpreted in table-21 show that majority (67.3%) of male respondents which is greater than two-third of male respondents scored greater than 70 in natural science and mathematics subjects in average when they were in high school, while only 25.7 which is approximately one fourth of female respondents scored greater than 70% in natural science and mathematics subjects in average when they were in high school.

The table also shows that 30% of male respondents scored greater than 3.00 point in grade ten (10) national examination but only 5.6% of female respondents scored greater than 3.00 point in grade ten (10) national examination. On the contrary only 12.7% of male respondents and nearly two-third (64.6%) of female respondents scored in the range between 2.00 to 2.49 in grade ten (10) national examinations. This table also indicates that the majority (57.3%) of male respondents and few females (7.1%) which is less than one tenth of female respondents have greater than 3.00 point CGPA in the college at present. Beside these table-21 shows more than 75% of the total respondents argued that the number of female student teachers found in top ten students per section in natural science

and mathematics is only ranges from one to three (1-3) which is to mean that males cover seven to nine (7-9) in top ten students per section in natural science and mathematics. The data analyzed in table-24 documents from registrars of the stream of sample colleges also support the responses of respondents. That is the percentage of female students in natural science and mathematics of sample college who scored 3.00 point and above is by far less than that of male counterparts and the percentage of female students in natural science and mathematics of sample college who scored less than 2.00 point and in the range between 2.00 to 2.49 is by far greater than that of male counterparts.

All these clearly indicate that even if few females have good achievement in science and mathematics as a whole there is a significant difference between male and female students' achievement in natural science and mathematics education in different cases. Such as in high school result, in grade ten (10) national examination result and cumulative grade point average (CGPA) in the college at present.

In addition to these, table-23 shows that the mean score of male students was found 3.0187 in science and mathematics stream, whereas the mean score of female students was found 2.4337 in the stream. This also confirm that females are low achievers with compared to their male counter parts in natural science and mathematics stream. This finding is in line with the finding of (Comber and Keeves 1973), in their massive international study on science achievements of males and females, they found that in all countries males excelled females in science subjects and (Kahel, et al 1993) contained that since science is viewed as a masculine image, it is considered hard, cold and an analytical discipline. Female do not anticipate higher performance in science subjects.

In general from the above discussion one can conclude that there is significant gender difference in science and mathematics achievement

with male student are better achievers than female students in the stream in all cases.

4.2.3. The relationship between attitude toward and academic achievement in science and mathematics of female students.

Another objective of the present study was to find out the relationship between attitude towards science and mathematics and academic achievement in science and mathematics education. Accordingly the data analyzed in simple regression that was used to see whether attitude of students could predict their achieve shows that the F ratio indicated in table-30 reveals that at alpha level 0.01, there is significant relation-ship between attitude and achievement. Simple regression analyzed in the section shows that with ($t = 5.393$, $P \leq 0.01$) attitude is found to be contributor to achievement.

It is found that attitude contributed about 9.1% for achievement. Therefore the prediction of attitude to achievement is statically significant in this study. 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 (Weinburgh, 1998), expected achievement is factor that heavily influenced by attitudes toward science. As would be expected, positive attitudes toward science lead to better results on achievement measures of science capability.

The finding of (Willis, 1995) “Poor attitude towards mathematics has often been cited as one factor that has contributed to lower participation and success of females in mathematics”. The finding of (Schiefele and Csikszentmihalyli, 1995)”Interest and attitude in the subject are the special predictors for the students’ participation and success in the subject. According to Hendrickson, attitudes are the best predictor for estimation of students’ success (Hendrickson, 1997).

A number of studies have found that males' achievement in science is significantly better than that of females (e.g. Fleming and Malone, 1983). Levin, Sabar and Libman (1991) found that the achievement of males in all subject area of their study (earth science, biology, chemistry and physics) was significantly better than the achievement of the females. Young and Fraser (1994) in a study of Australian secondary school students also concluded that males' achievement in biology, physics and chemistry was significantly better than females.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter attempts to summarize (highlight) of the finding and some concluding remarks besides and offering recommendations.

5.1 Summary

The main purpose of the present study was to investigate the attitude of female students toward natural science and mathematics stream in Colleges of Teacher Education of Oromia. It also aimes to assess the presence of gender difference both in their achievement and attitude toward the natural science and mathematics stream. Furthermore, the relationship between attitude and achievement is also aimed to be analyzed in order to attain the desired objectives the basic research questions raised so far

1. What is the attitude of female students toward natural science and mathematics stream in Colleges of Teacher Education of Oromia region?
2. What is the level of female students' achievement in science and mathematics?
3. Is there gender difference in both attitude toward and achievement in science and mathematics in Colleges of Teacher Education of Oromia region?
4. What is the relationship between female students' attitude and their achievement in science and mathematics in Colleges of Teacher Education of Oromia region?

The sampling techniques used are a mix of techniques as they were appropriate. Hence first colleges are purposively selected then respondents are randomly selected.

To find out the responses for the above questions 308 respondents were randomly selected from the three purposively selected colleges Asella, Nekemte and Robe in the Oromia region.

To get the required information for the study, relevant and related literature was reviewed. Sets of questionnaires were prepared based on review of related literature, student achievement test results were analyzed and focus group discussions were conducted using the predesigned focus group discussions guide were used to gather the relevant data.

The questionnaire and focus group discussion administered consists of two parts. The first part of the questionnaire and focus group discussion administered are focused on the information related to attitude of female students toward science and mathematics education while the second part of questionnaire and focus group discussion are concerned with information related to academic achievement in science and mathematics of female students. Students' questionnaires are finally translated into Afan Oromo, which is the medium of instruction of the region. The language translation was done by Afan Oromo teachers in Asella College of Teacher Education. Then the questionnaires is distributed to the sample college's trainees to be filled and returned to the researcher properly.

The collected data was systematically organized and analyzed mainly using percentage and in rare cases mean and simple one way ANOVA in descriptive surveying method. Depending on the result of the analysis made the following major findings have been obtained.

1. The attitude of majority of female students tends to social science, language and aesthetics streams than natural science and mathematics stream in Colleges of Teacher Education of Oromia region.
2. Even if few females achieve good result in science and mathematics subjects, as a general the achievement of female students is relatively less with compared to their male counter parts in the subjects.

3. There are gender differences in attitudes towards science and mathematics education with males having more positive attitude than females in Colleges of Teacher Education of Oromia region.

4. Even if science and mathematics are important area in the field of education, majority of the female students joined natural science and mathematics stream without their interest because of 70:30 government plan pressure.

5. About half of female student teachers who attending science and mathematics stream are not interested in joining the stream instead they prefer to join non-natural science and mathematics streams assuming that contents of natural science and mathematics stream subjects are difficult with compared that of non natural science mathematics streams.
6. Achievements in non-natural science and mathematics subjects are better than achievements in natural science and mathematics subjects for both sexes in grade ten national examinations. This is strongly congruent with the findings of (Gok and Silay 2008; Dieck, 1997; Rivard and Straw, 2000, Mattern and Schau, 2002) who assert that success in science and mathematics education is lower than other disciplines although science and mathematics are in every area in our life and facilitate our lives.

5.2 Conclusion

Based on the analysis and interpretation made the following conclusions are drawn.

1. The study revealed that majority of the female students in natural science and mathematics stream are not interested in stream and they are ready to change their stream if they get an opportunity.

2. The study shows that males are better achiever than females in science and mathematics stream in all three colleges.

3. There are significant gender differences in both attitudes towards science and mathematics education and achievement in science and mathematics education.

4. There is a positive relationship between attitudes towards science and mathematics and achievement in science and mathematics for both sexes.

5. Government 70:30 plan, further education opportunity and Peer group pressure forced on students to join natural science and mathematics stream without their interest, especially for females.

6. Most female students perceive that contents of natural science and mathematics stream subjects are more difficult compared with that of non-natural science and mathematics streams subjects.

5.3 Recommendations

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

- For the better achievement in natural science and mathematics, willingness and positive reaction are important. Lack of interest can negatively influence the achievement of student. So changing the attitude of the students is vital. Thus, awareness creation for students on student attitude towards natural science and mathematics education should be carried out continuously with all concerned bodies.

- Males are better achiever than females in science and mathematics stream in all three sample colleges. That is, the differences in student attitude towards science and mathematics and achievement in science and mathematics are based on gender were confirmed. A lot need to be done to fill this gender gap in natural science and mathematics achievement. Females students should be informed of the importance of mathematics that it is the basic tool for further education.

Thus all concerned bodies should try:

- to change the attitude of the students towards science and mathematics
- motivate students to participate in the science and mathematics educations.
- create conditions in which students learn to participate in science and mathematics educations. As a result, student can develop confidence in science and mathematics. Once they acquire the interest to participate in different science and mathematics

education activities, they can easily involve in practicing different science and mathematics related fields

- New reputed female teachers distribution should be made in the science and mathematics stream of colleges of Oromia in order to have better models for girl students.

- The colleges should conduct follow-up study on a regular basis in order to identify problems that influence the female students' attitude toward and achievement of science and mathematics educations.

- Invite professional women in science and technology fields to address about their life and how they succeeded in their study. The purpose is to encourage females and to build up the self-esteem of females in the science and mathematics.
- Further researches needed for improving students' attitudes toward and achievement in science and mathematics education at the college level especially for female students.

Generally in order to develop attitude of female students towards natural science and mathematics education and to minimize the gender gap in achievement in natural science and mathematics subjects, government and all concerned bodies should give special attention for female students starting from elementary school level up to higher education and should work hard and effectively individually as well as cooperatively.

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Appendices

Appendix –A Student questionnaire

(English version)

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF CURRICULUM AND TEACHERS

PROFESSIONAL DEVELOPMENT STUDIES

Questionnaire to be filled by college students

The main purpose of this questionnaire is to assess the attitude and performance of female college students in natural science and mathematics stream. Before completing this questionnaire, please note that:

- all your responses will be confidential
- all the responses will be used only for research purpose
- you are not responsible for the research out comes

You are kindly requested to complete all questions in the questionnaire carefully and honestly. It is only your kind cooperation and honesty that will make the study reliable and valid.

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

I. Respondent background

Direction: Respond to the following biographic information by putting the tick mark '√' on the space provide.

1. Sex Male ☐ Female ☐
2. Year/class 2nd ☐ 3rd ☐
3. College you attend Asella ☐
   Robe ☐
   Nekemte ☐
4. Focus Biology ☐
   Chemistry ☐
   Physics ☐
   Mathematics ☐

II. Information related to the attitude of female students towards natural science and mathematics stream.

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

1. While you were in high school, how much did you like natural science and mathematics subjects?

A. Highly Interested ☐ B. Interested ☐

C. Dislike ☐ D. Highly Dislike ☐

2. How did you join the natural science and mathematics stream? I join natural science and mathematics stream by

A. my 1ft choice ☐ B. my 2nd choice ☐

C. my 3rd choice ☐ D. being assigned ☐

3. If you had been given the choice, which field of study would have been your preference?

A. Natural science and mathematics stream ☐ B. Language stream ☐

C. Social science stream ☐ D. Aesthetics stream ☐

4. If you get an opportunity to change your stream would you change your stream?

   A. Yes, I would ☐

B. No, I would not ☐

C. It is difficult for me to decide ☐

5. If your response for question 4 is "yes", what would be your possible reason?

A. Lack of interest ☐

B. Difficulty of the subjects ☐

C. This stream keeps me busy ☐

6. Which subject area do you like **most**?

A. Natural science and mathematics stream ☐ B. Language stream ☐

C. Social science stream ☐ D. Aesthetics stream ☐

7. Why do you like the subject you mentioned under question no 6 above? Rank the following possible answers for question 7 in descending order beginning with no.1 as most preferred and 5 as least preferred (1^{st}-5^{th}).

_____I get good result in it

_____Easiness of the subject

_____Has application in daily life

_____For job opportunities

_____Ensures me time freedom

8. Which stream do you think most female students join?

A. Natural science and mathematics stream ☐ B. Language stream ☐

C. Social science stream ☐ D. Aesthetics stream ☐

9. Why do most female students prefer to join that stream? Put the following alternatives in sequential order. (Rank from 1^{st} to 4^{th})

_____.Because content of the stream subjects related to their daily activities

_____. Because of the easiness of the stream subjects.

_____. Because of peer group pressure

_____. Because of teacher advice

10. What do you think the reason for those female students who joined natural science and mathematics stream instead of choose none natural science and mathematics stream? (Please Rank from 1st to 3rd)

_____. For further education opportunities

_____. Personal interest

_____. Forced by 70:30 government plan

If any other please specify----------

---

11. Are there any motivating factors that forced you to join natural science and mathematics stream? Yes ☐ No ☐

12. If your response to question 11 is "yes "what do you think were the factors that forced you to join the stream? (Rank from 1st to 4th)

_____. Family encouragement

_____. Environmental exposure

_____. Personal interest

_____. Government plan 70:30

13. When compared with other streams the ratio of female students to male students in natural science and mathematics stream is less. Is this true in the case of your college?

Yes ☐ No ☐

14. If your response to item 13 is "yes", what do you think would be the reason? (Rank from 1st to 3rd)

_____. Strong competition with male students

_____. Less efficient of female students

_____. Difficulty in understanding the concepts of the courses

If other reason specify ----------

---

15. The followings items are on attitudes of student teachers to wards natural science and mathematics field of study. Indicate your level of agreement by using a tick mark"√" in front of the statement given in table. The statements are responded as follows.

5= Strongly Agree, 4 = Agree, 3 = Undecided, 2= Disagree 1= Strongly Disagree

S. No	Statement (Natural science and mathematics stream students attitude)	Responses				
		5	4	3	2	1
1	Females are equally competent with males in natural science and mathematics stream.					
2	Natural science and mathematics subjects are difficult to female students.					
3	Female are gifted in social science and language instead of natural science and mathematics subjects.					
4	It is easier to understand natural science and mathematics than any other subjects.					
5	Natural science and mathematics is very interesting to me.					
6	I easily learn Mathematics and natural science subjects.					
7	I would be happy to take more natural science and mathematics courses					
8	I am afraid to take natural science and mathematics courses					
9	I have enjoyed studying natural science and mathematics.					
10	I learn interesting things in Mathematics and natural science subjects.					
11	I have good feelings toward natural science and mathematics in general.					
12	Natural science and mathematics education are not usable in daily life situations					
13	I am always under stress in natural science and mathematics class.					
14	Boys need natural science and mathematics more than girls.					
15	Studying natural science and mathematics strengthens my thinking ability					
16	Solving natural science and mathematics problems gives me satisfaction.					
17	Natural science and mathematics lessons are boring.					
18	I understand everything lecture in natural science and mathematics.					

III. Information related to the achievement of female students in natural science and mathematics stream.

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

1. When you were in high school, what were your achievement of natural science and mathematics subjects in average ?

A. High (>70%) ☐

B. Medium (50% -70%) ☐

C. Low (< 50%) ☐

2. What was your grade 10 (ten) national examination result?

A. > 3.00 B. 2.75 - 3.00 C. 2.5 - 2.74 D. 2.00 - 2.49

3. What grade did you score in the following subjects in grade 10 National Examination? (Put in letter grade)

I. Mathematics	-------	V. Geography	--------
II. Physics	--------	VI. History	--------
III. Chemistry	-------	VII. Civic	--------
IV. Biology	----------	VIII. English	--------

4. What is your result at present (in the college) cumulative grade point average(CGPA)

A. >3.00 B. 2.75 - 3.00 C. 2.5 - 2.74 D. 2.00 - 2.49 E. < 2.00

5. In your college how many female students were found in top ten students per section

A. Not at all (0) ☐ B. (1-3) ☐ C . (4-6) ☐ D. (>6) ☐

6. In the college when you compare the CGPA of female students in your class with male students A. greater than male ☐

B. equal as male ☐

C. less than male ☐

Appendix –B Student questionnaire

(Afan Oromo version)

“ ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF CURRICULUM AND TEACHERS

PROFESSIONAL DEVELOPMENT STUDIES ”

Gaaffannoowwan barattoota kolleejjiin guutamu

Kaayyoon guddaan gaaffannoo kanaa ilaalcha barattootni shamarrani kolleejjii barachaa jiran istiriimii saayinsii uummamaa fi herregaa irratti qaban fi firii isaan galmeessisaa jiran hubachuu dha. Osoo gaaffannoowwan kana hin guutiin dura yaadota armaan gadii xiinxali.

- Deebiin kee hundi ofitti amantaan ta’uu qaba.
- Deebiiwwan hundi kaayyoo qo’annoo kanaa qofaaf oolu.
- Firii qo’annichaaf itti gafatamummaa hin qabdu.

Gaaffileewwan gaaffannoo keessa jiran hundaa of-eeggannoo fi amanamummaan akka deebistu gaaffatamtee jirta. Qo’annoon kun dhugaa fi bu’a qabeessa ta’uuf deeggarsi dhugaa ati gootu murteessaa dha.

Bu’a qabeessumaan qo’annoo kanaa deebii kee irratti waan hundaa’uuf, gaaffileef deebii kennuun dura qajeelchamootni hunda isaanii sirritti haa dubbifaman.

Galatoomaa

I. Dug-duubee deebii kennitootaa (Respondent background)

Ajaja :- **Gaaffilee odeeffannoo dhuunfaa keetiin walqabatan kanneen armaan gadii mallattoo'√' fayyadamuun iddoo siif kenname irratti deebii kee agarsiisi.**

1. Koorniyaa _____ Dhiira ☐ Dubara ☐
2. Waggaa 2^{ffaa} ☐ 3^{ffaa} ☐
3. Kolleejjii itti barattu. Asallaa ☐
   Roobee ☐
   Naqamtee ☐
4. Fokasii Baayoloojii ☐ Keemistirii ☐
   Fiiziksii ☐ Herregaa ☐

II. Odeeffannoo ilaalcha barattootni shamarranii Istiriimii saayinsii uumamaa fi herregaa irratti qabaniin walqabatan.

Ajaja :- **Mallattoo'√' fayyadamuun iddoo siif kenname irratti deebii kee agarsiisi.**

1. Yeroo mana barumsaa sadarkaa 2^{ffaa} turteetti, barnoota saayinsii uumamaa fi herregaa hammam jaalatta?

A. Baay'een jaladha ☐ B. Giddugaleessa ☐
C. Hagas maraa miti. ☐ D. Gonkumaa hin jaaladhu ☐

2. Istiriimii saayinsii uumamaa fi Herregaa akkamiin seente? Istiriimii saayinsii uumamaa fi herregaa kanan seene:

A . filannoo 1^{ffaa} kootiin ☐ B. filannoo 2^{ffaa} kootiin ☐
C filannoo 3^{ffaa} kootiin ☐ D. ramadamuu dhaan ☐

3. Osoo carraan armaan gadii siif kennamee turee, filannoon istiriimii kee isaa kam ta'a?

A. Istiriimii saayinsii uumamaa fi herregaa ☐ B. Istiriimii afaanii ☐
C. Istiriimii saayinsii hawaasaa ☐ D. Istiriimii esteetiksii ☐

4. Carraa istiriimii jijjiirachuu osoo argate istiriimii kee ni jijjiirtaa?

A. Eeyyee, nan jijjiira ☐

B. B. Lakki, hin jijjiiru ☐

C. Murteessuuf na rakkisa ☐

5. Deebiin kee gaffii 4ffaa irratti "Eeyyee" yoo ta'e, sababa siif ta'uu kan danda'u maal?

A. Fedhii dhabuu ☐

B. Ulfaatina qabiyyeewwan barnoottanii ☐

C. Istiriimiin kun hojii waan natti baay'isuuf ☐

6. Gosootni barnootaa **caalatti** jaalattu kamii dha?

A. Barnoota saayinsii uumamaa fi herregaa ☐ B. Barnoota afaanii ☐

C. Barnoota saayinsii hawaasaa ☐ D. Barnoota esteetiksii ☐

7. Barnoota gaaffii 6ffaa irratti filaatteef sababni kee maal? Dhimoota sababa ta'uu danda'aan kanneen armaan gadii gaaffii 7ffaaf sadarkeessi(1ffaa - 5ffaa). Lakkoofsa 1 isaa hunda caalaa jaalattuuf lakkoofsa 5 immoo isaa hundaa gadi jaalattuuf.

____Firii gaarii waan itti argadheef

____Salphaa waan ta'aniif

____Jireenya guyyaa guyyaa waliin waan wal qabatuuf

____Carraa hojiif

_____Yeroo gahaa waan itti argadhuuf

8. Barattootni shamarranii baay'inaan istiriimii kam seenu jettee yaadda?

A. Istiriimii saayinsii uumamaa fi herregaa ☐ B. Istiriimii afaanii ☐

C. Istiriimii saayinsii hawaasaa ☐ D. Istiriimii esteetiksii ☐

9. Sababa barattootni shamarranii baay'inaan istiriimii kana seenaniif maal? Filannoowwn armaan gadii (1ffaa hanga 4ffaa)tti sadarikeessi.

_____.Sababa istiriimichi gochaalee guyyaa isaaniitiin walqabtuuf

_____. Sababa qabiyyeen korsota istiriimichaa salpphaa ta'eef

_____. Sababa dhiibbaa hiriyyaan

_____.Sababa gorsa barsiisaan

10. Barattootni shamarranii amma istiriimii saayinsii uumamaa fi herregaa barachaa jiraniif sababni istiriimii biroo dhiisanii istiriimii kana filataniif maal ta'a jettee yaadda? Filannoowwn armaan gadii (1ffaa hanga 3ffaa)tti sadarkeessi.

_____. Carraa barnootaa fuul duraaf

_____. Fedhii dhuunfaa

_____.Dhiibbaa Karoora mootummaa 70:30tiin

Yaada biraa yoo qabaatte ibsi.----------

---

11. Istiriimii saayinsii uumamaa fi herregaa seenuuf wanti si kakaasee jira?

A. Eeyyee ☐ B. hin jiru ☐

12. Deebiin kee gaffii 11ffaa irratti "Eeyyee" yoo ta'e, sababa siif ta'uu kan danda'u maal? Filannoowwn armaan gadii (1ffaa hanga 4ffaa)tti sadarkeessi.

_____. Gorsa maatii

_____. Dhiibbaa naannoo

_____.Fedhii dhuunfaa

_____. Karoora mootummaa 70:30tiin

13. Reeshoon barattoota shamarranii barattootaa dhiiraaf istiriimii saayinsii uumamaa fi herregaa qaban yemmuu istiriimoota biroo waliin ilaallamu xiqqaadha. Kun kolleejjii keessanitti dhugaa dhaa?

A. Eeyyee, dhugaa dha ☐

B. Lakki, dhugaa miti ☐

14. Yoo deebiin kee gaaffii 13ffaa "eeyyee" ta'e sababni isaa maal ta'a jettee yaadda? (1ffaa hanga 3ffaa)tti sadarkeessi.

_____.Dorgommii cimaa barattoota dhiiraa waliin jiru

_____.Gahumsa xiqqaa barattoota shamarranii

_____.Ulfaatina yaad-rimee qabiyyee koorsotaa

Sababni biraa yoo jiraate ibsi ----------

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15. Yaadotni armaan gadii ilaalcha kaadhimamtoota barsiisoota shamarranii istiriimii saayinsii uumamaa fi herregaa irratti qaban ta'uu danda'u. Tokkoon tokkoo isaanii irratti hammam akka itti waliigaltu mallatoo "√" fayyadamuun agarsiisi.Yaadotni akka armaan gadiitti deebiifamu.

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 barattoota Istiriimii Saayinsii uumamaa fi Herregaa)	Deebiiwwan				
		5	4	3	2	1
1	Istiriimii saayinsii uumamaa fi herregaa irratti barattootni shamarranii fi barattoota dhiiraa dandeettii qixxee qabu.					
2	Barnoonni saayinsii uumamaa fi herregaa barattoota shamarraniif ulfaatoo dha.					
3	Barattootni shamarranii barnoota saayinsii uumamaa fi herregaa caalaa, barnoota saayinsii hawaasaa fi afaanii irratti kennaa qabu.					
4	Barnoota saayinsii uumamaa fi herregaa hubachuun barnoota biroo hubachuu caala salphaa dha.					
5	Barnootni saayinsii uumamaa fi herregaa anaaf baay'ee gammachiisaa dha.					
6	Barnoota saayinsii uumamaa fi herregaa haala salphaan baradha.					
7	Koorsota barnoota saayinsii uumamaa fi herregaa dabalataan osoon fudhadhee baay'een itti gammada.					
8	Barnoota saayinsii uumamaa fi herregaa fudhachuu nan sodaadha.					
9	Barnoota saayinsii uumamaa fi herregaa barachuu kootiif baay'een itti gammade.					
10	Barnoota saayinsii uumamaa fi herregaa keessatti waan baay'ee nama gammachiisaniin baradhe.					
11	Akka waliigalaatti, barnoota saayinsii uumamaa fi herregaa tiif ilaalcha gaariin qaba.					
12	Barnootni saayinsii uumamaa fi herregaa jireenya guyyaa guyyaa keenya keessatti hin fayyadu.					
13	Wayitiin barnoota saayinsii uumamaa fi herregaa yeroo hunda na dhiphiisa					
14	Barattootni dhiiraa barattoota shamarranii caalaa barnoota saayinsii uumamaa fi herregaa ni barbaadu.					
15	Barnoota saayinsii uumamaa fi herregaa qo'achuun dandeettii yaaduu koo cimsa.					
16	Piroobileemoota barnoota saayinsii fi herregaa furuun gammachuu naaf kenna.					
17	Barnootni saayinsii uumamaa fi herregaa nuffisiisaa dha.					
18	Ibsa barnoota saayinsii uumamaa fi herregaa keessatti waan hunda ni hubadha.					

III. Odeeffannoo firii barnootaa barattootni shamarranii istiriimii saayinsii uumamaa fi herregaan walqabatan.

Ajaja :- **Mallattoo'√' fayyadamuun iddoo siif kenname irratti deebii kee agarsiisi.**

1. Yeroo mana barumsaa sadarkaa 2^{ffaa} turteetti, giddugaleessan firiin barnoota saayinsii uumamaa fi Herregaa maal fakkaata?
   A. Ol'aanaadha (> 70%) ☐
   B. Giddugaleessa (50% -70%) ☐
   C. Gadaanaa dha (< 50%) ☐
2. Firiin qormaata biyyooleessaa kutaa kudhanii (10) kee giddu galeessan hammami?
   A. > 3.00 B. 2.75 - 3.00 C. 2.50 - 2.74 D. 2.00 - 2.49
3. Gosa barnoota armaan gadii irratti firiin qormaata biyyooleessaa kutaa kudhanii (10) kee hammami? (Qubeen kaa'i)
   I. Herrega ------- V. Hawaasaa--------
   II. Fiiziksii-------- VI. Seenaaa---------
   III. Keemistirii ------- VII. Barnoota lamummaa fi amala gaarii-----
   IV. Baayoolojii ------- VIII. Afaan Ingiliizii-----
4. Firiin barnootaa amma kolleejji keessatti galmeesiste meeqa? (CGPA)
   A. > 3.0 B. 2.75 - 3.00 C. 2.50 - 2.74 D. 2.00 - 2.49 E. < 2.00
5. Kolleejjii itti barachaa jirtutti daree tokko keessatti barattoota shamaranii meeqatu barattoota ol'aanoo kudhan (top ten) keessa galu?

A. Hin jiru(0) ☐ B. (1-3) ☐ C . (4-6) ☐ D (>6) ☐

6. Kolleejjii itti barachaa jirtu keessatti firii barattoota (CGPA) shamaranii kan barattoota dhiiraa waliin yemmuu dorgomsiistu
   A. Kan dhiiraa tii oli. ☐
   B. Kan dhiiraa waliin walqixa ☐
   C. Kan dhiiraa ti gadi. ☐

Appendix –C Teachers' Focus Group Discussion questions.

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF CURRICULUM AND TEACHERS
PROFESSIONAL DEVELOPMENT STUDIES

Focus Group discussion (FGD) For Natural Science Teachers

The following sets of guiding questions for FGD will address natural science teachers. The main objective of the FGD is to gather data regarding attitude of female students towards natural science stream and their performance in Oromia Teachers' College of Education. Thus there is no doubt that your kindly help extensively valuable to complete the study. Therefore you are kindly requested to give your frank and relevant data cooperatively on the basis of the following questions.

College_____

Date _____Start(time)_____end(time)_____

1. How do female students join the stream they are attending know?
2. In your opinion how do female students look like natural science subjects? Is it hard, moderate or easy?
3. To what extent do you know female students choose natural science stream?
4. Which stream do you think most female students join? Why they prefer to join this stream? Put your reasons
5. What do you think the reason for those female students who joined natural science and mathematics stream instead of choose none natural science and mathematics stream?
6. When compared with other streams the ratio of female students to male students in natural science and mathematics stream is less. Is

this true in the case of your college? If your response is “yes”, what do you think would be the reason?

7. What do females students’ performance look like in natural science stream?
8. Do you think that female students can perform as good as male students in academic matters? If your answer is “no” for this item,what makes these perform inequalities among female and male specify .
9. In your college how many female students were found in top ten students per section