**MEKELLE UNIVERSITY**

**COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES**

**FACULTY OF MATHEMATICS AND STATISTICS**

**A**

**THESIS**

**ON**

# FACTORS AFFECTING GRADE 11 AND 12 FEMALE STUDENTS' ACHIEVEMENT IN MATHEMATICS

## (THE CASE OF ADIHAKI PREPARATORY SCHOOL MEKELLE-TIGRAY REGION)

**BY**

**HAILAY AMAHA**

**DECEMBER, 2026**

**MEKELLE**

**TIGRAY**

**ETHIOPIA**

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**BY**

**HAILAY AMAHA**

**ID.NO CNCS/PS175/09**

**SUBMITTED TO THE DEPARTMENT OF MATHEMATICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCES**

**ADVISOR: ABRAHA TESFAY (Ph.D.)**

**CO- ADVISOR: HAILU NIGUS (Ph.D.)**

**DECEMBER, 2026**

**MEKELLE**

**TIGRAY**

**ETHIOPIA**

# Declaration

This is to declare that the thesis "Factors affecting grade 11 and 12 female students achievement in Mathematics", submitted in partial fulfillment of the requirements for the degree of Master of Science is a record of original work carried out by me and has never been submitted to any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

| Hailay Amaha | 05/06/18 E.C |  |
|---|---|---|
| Researcher`s Name | Date | Signature |

## APPROVAL SHEET

## MEKELLE UNIVERSITY

## COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

## DEPARTMENT OF MATHEMATICS

As members of the board of examiners, we examined this thesis entitled "Factors affecting Grade 11 and 12 female student's achievement in Mathematics" by Hailay Amaha. We hereby certify that the thesis is accepted for fulfilling the requirements for the award of the degree of Masters of Sciences.

## Approved by Board of Examiners

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| **1._____** | **_____** | **____/____/2025** |
| (Main-Advisor) | Signature | Date |
| 2._____ | _____ | ____/____/**2025** |
| (Department Head) | Signature | Date |
| 3._____ | _____ | ____/____/**2025** |
| (External Examiner) | Signature | Date |
| **4._____** | **_____** | **____/____/2025** |
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# Abstract

*The purpose of this study was to investigate the factors affecting grade 11 and 12 female students' achievement in Mathematics in Adihaki Preparatory School. To clarify reliable data from the participants, the study used both descriptive and explanatory research design. To investigate the problem, 247 participants were selected from a total of 648 target populations, using simple random sampling, systematic sampling and proportional sampling methods. Stratified random sampling method is also used because the students were divided into heterogeneous classes and streams. The methods for gathering data were achievement test, questionnaire, interview and observations. Primary and secondary sources of information were reviewed in order to gather reliable data. Mean and percentage distribution were used to determine the profile of the respondents. Tables, bar graph and pie chart were used to obtain the result of the data from the respondents to determine personal, in-school and out of school factors. The result of the study showed that the variation in female students Mathematics achievement test was accounted by variability in major socio- economic variables (education, occupation and income) of parents. Similarly, the variation in female students Mathematics achievement test was accounted by Variability in both out of school and in school factors like, home related factors, personal factors and in school related factors. Therefore, the Education office of Adihaki Sub-City and School Principals should handle the problem that affect female students' Mathematics achievement by acting with concerned bodies.*



***Keywords:*** *Academic Achievement, Factors, Investigate, Gender, Mathematics, Self-Motivation, Social Environment & Self Esteem.*

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# Abbreviations

| | |
|---|---|
| PDT | Professional Development for Teachers |
| FME | Federal Ministry of Education |
| NEAEA | National Education Assessment and Examination Agency |
| MOE | Ministry Of Education |
| UNESCO | United Nations Education, Scientific and Cultural Organization |
| EUEE | Ethiopian University Entrance Examination |
| EGSECE | Ethiopian General Secondary Education Certificate Examination |
| MDG | Millennium Development Goal |
| UNGEI | United Nations Girls Education Imitative |
| BECE | Basic Education Certificate Examination |

# CHAPTER ONE:

# INTRODUCTION

This chapter addresses the introductory part of the research. It includes a background of the study, a statement of the problem, significance of the study, delimitation, limitations, Operational Definition of Terms and Organization of the Study.

## 1.1 Background of the Study

In the development of science and technology, Mathematics plays a vital role in daily life of human activities. Over the past 20 years, numerous studies have been conducted on gender differences in Mathematics achievement. In their study of gender differences, the researchers focused on a variety of factors ranging from gender differences in visuospatial skills (Chan & Cheung, 2018), the influence of environmental factors such as parental support (van Mier et al., 2019), student-teacher interactions (Bieg et al., 2015), stereotypical role patterns (Xie et al., 2019), to different enrolments in courses. Giberti (2019) finds that research on gender differences and cognitive complexity in Asia suggests that as the complexity of cognitive processes required to successfully complete a task increases, gender differences in Mathematics topics and other science-related topics tend to become more favorable to boys.

In Africa, Ashcraft (2019) identified Mathematics and other science-related subjects as the critical filters that prevent women from entering many prestigious and lucrative professions. He concluded that one of the fairly well-documented sex differences is that boys are superior in Mathematical ability, although there are few sex differences until the early teenage years when boys' Mathematical skills increase more rapidly than girls. Picho and Schmader (2018) came to a similar conclusion in their review, stating that there are no significant differences between girls' and boys' Mathematical performance until the early years of primary school or the early years of secondary school. However, they went a step further in their analysis by taking into account the cognitive level of the measures used. More specifically, they pointed out that when differences occur, they are in favor of boys when higher-level cognitive tasks are used, but in favor of girls when lower-level cognitive tasks are used.

A year earlier, Hornburg et al. (2017) made the same findings regarding gender differences in Mathematics performance among secondary school students. Academic achievement of students is ability of students to study and remember facts and beingable to communicate his/her knowledge orally or in written for even an examination condition. Students' Mathematics achievement is often associated with the future economic power and competitiveness of a country. Therefore, the desire to understand and identify factors that may have meaningful and consistent relationships with Mathematics achievement has been shared among national policy makers and educators around the world. Educators, trainers, and researchers have long been interested in exploring variables contributing effectively for quality of achievement of learners. These variables are inside and outside the school that affect students' academic achievement. These factors are related to student, parents, leaderships, teachers, school and peer .Several studies and research have been done in many countries to find out the factors that influence students' achievement in Mathematics. Among these factors, students' interest towards Mathematics is one important factor that has been consistently found out.

## 1.2 Statement of the Problem

A various number of studies have been conducted in different parts of the world to identify the factors that affect female students Mathematics achievement. Scholars such as Desai et., al (2008) cited in Abduljelil (2010) stated both school and family as a source of girls lower achievement and dropping out of schools by saying that at the individual level., poor academic performance, retention, lack of teacher's support and guidance, disliking school or teachers, and taking on adult responsibilities such as work and childcare have been found to contribute to lower achievement and dropping out of school. Parental educational attainment, parental involvement, household income and household wealth have informed family contributions to educational attainment. In Ethiopian context, as Yisak et.al (2009) cited in Abduljelil (2010) stated the major influencing factors for female students are social and cultural factors. Factors like early marriage, abduction and rape are the foremost reasons for girls not going to school or for dropout as well as their low academic performance. Parental and societal attitudes towards education for girls, and traditional practices are amongst the other reasons.

Furthermore, researchers added on school related factors that affect academic performance of female students by saying that scarcity of schools, qualified teachers and conducive learning environments are contributory factors. Schools often have shortages of girl-friendly facilities, such as clean latrines and clean water. Besides, long distances to schools and insecure roads mean that parents keep their daughters at home to defend them from sexual abuse and other violence.

Moreover, Tigray Region Education Bureau (2018 & 2019) revealed that the complexity of the disparity in academic Performance between male and female students in EGSECE and EUEE results. Among the students who scored A in EGSECE in 2018, 75.71% were males while females constitute only 24.29% and in 2019, among those who scored A, 66.77% were males and 33.33% were females. In addition the result in EUEE of 2018 showed that, 69.6% male and 30.4% female students got a mark of 80-100.Again in 2019 ,73.4% male and 26.6% female students got a mark of 80-100. This less achievement of female students was high, since Mathematics has strong relationship with other subjects. Thus, the purpose of this study was to investigate the various in school and out of school factors and elements that aggravate female students' Mathematics achievement in Adihaki preparatory school. Thereby to design intervention strategies that could reduce the factors if exist. Moreover, this study was intended to answer the following basic research questions:

1. What are the specific home-related factors that affect female student Mathematics achievement in Adihaki Preparatory School?
2. How do personal factors, such as motivation, aspiration, self-esteem and expectations contribute to the variation in Mathematics achievement among female students?
3. What in-school related factors, like teacher quality and school environment, significantly impact female student performance in Mathematics?
4. To what extent do the socioeconomic variables of parents, such as education, occupation, and income, influence the Mathematics performance of their daughters?

5. What is the relationship between out-of-school factors, such as parental involvement and community support, and female student success in Mathematics?

## 1.3. Objective of the Study

### 1.3.1 General Objective:

To investigate the factors that influences the Mathematics achievement of female students at Adihaki Preparatory School.

### 1.3.2 Specific Objectives:

1. To examine the impact of specific home-related factors on female students' Mathematics achievement.
2. To examine the significance of personal factors like, motivation, aspiration, self-esteem and expectations of female students on their Mathematics achievement in Adihaki preparatory School.
3. To assess the influence of in-school factors on female students' Mathematics achievement.
4. To determine the extent to which socio-economic variables of parents (education, occupation, and income) affect female students' Mathematics achievement.
5. To identify the relationship between out-of-school factors, such as parental involvement and community support, and female student success in Mathematics?

## 1.4. Significance of the Study

Mathematics is a basis for academic successes of an individual. It has a wide application in different fields of natural and social sciences. The study will provide insights to the curriculum developers, teachers, parents, students, counselors, and policy makers regarding the influence that gender, out-of-school factors, in-school factors and socio-economic status of parents can affect female students' academic achievement in Mathematics. The findings of the study will necessitate the stakeholders to advice on what best can be done so that these factors can help to improve female student's achievement in Mathematics. The findings of the study will add to empirical data bank on the influence of gender, out-of-school factors, In-school factors and socio-economic

status of parents, on female students' academic achievement in Mathematics. Better achievement in Mathematics influences students to develop positive attitude towards learning the subject. This in turn rises in other areas. Moreover, achievement in Mathematic helps learners to develop high orders thinking skills and reasoning abilities in all other subjects. In relation to this Perry (1993) indicated that truly exceptional students in Mathematics tended to have advanced skills in other areas as well. On the top of this, this study expected to explore the influencing factor of female students' Mathematics achievement. Hence, the findings Could be vital importance for Adihaki Sub-City education officials, educational personnel's, school principals', subject teachers, parents, and students to devise the appropriate measure in order to improve female students' Mathematics achievement in Adihaki preparatory Schools.

## 1.5. Delimitation of the Study

This study was limited to Adihaki Preparatory School (Grade 11-12) in Mekelle. Specifically focus on investigating personal, in school and out of school factors those affect female students' Mathematics achievement .It tries to see the effect of in school factors such as the availability of school library, pedagogical center, teachers experience and qualification, interaction of teachers with pupils, the effect of organized school instructional leadership and the effect of guidance and counseling on female students Mathematics achievement in Adihaki preparatory schools will be assessed. Similarly, out of school factors like home environment, parents' socio economic status and personal factors on female students' Mathematics achievement would be assessed. Quantitative approach with embedding qualitative data descriptions in discussion part of the study was used. Finally, even though there are a number of variables that affect female students' Mathematics achievement such as early marriage, location of the school, abduction and rape, scarcity of school etc., this study due to time and financial constraints only focuses in aforementioned variables such as personal factors, in school and out of school factors.

## 1.6. Limitation of the Study

Even though different efforts have been made, the researcher faced some challenges while doing this study. To begin with, the fact that the majority of the respondents'

educational background is low, it creates some negligence in filling the questionnaire. Some did not give values to the questionnaire and some others did not return it on time. Again there was a big challenge to give the required information about the respondents and the background of the school from the principals and the teachers. At last, since the test took one and half hour, the school principals were not willing to give permission for the researcher to pilot the achievement test. However, the item validly was checked by those teachers from the school in the study area since they know better about their students' background in problem solving skill and ability. The other drawback of this study could be the potential respondents might hide key information. However, in order to elicit key information multiple data collection tools such as questionnaire and interview were used.

## 1.7. Operational Definition of Terms

**Out-of-School Factors:** These are factors that influence students' learning and academic performance outside of the school environment. This study considers two categories:

- **Home-related factors:** These could include the home learning environment, parental support, availability of resources, family dynamics and quarrelsome with parents etc.

- **Socio-economic Variables:** These are characteristics related to the social and economic conditions of the parents. In this study, the key socio-economic variables examined are:

  **-Education:** The level of formal education attained by the parents.

  **-Occupation:** The type of employment held by the parents.

  **-Income:** The financial resources available to the family.

**In-School Factors:** These factors relate to the school environment and its impact on student learning. Examples include:

- **Teacher quality:** The effectiveness of teaching practices and the level of teacher expertise in Mathematics.
- **Curriculum and Instruction:** The design and delivery of the Mathematics curriculum, teaching methods, and learning resources.
- **School Climate:** The overall learning environment, including student-teacher relationships, peer interactions, and school safety.

**Personal Factors:** These could encompass students' individual characteristics, such as motivation, study habits, self-esteem, aspiration, expectation and attitudes towards Mathematics.

**Interventions:** These are planned and implemented actions or programs designed to address the identified factors affecting female students' Mathematics achievement. Examples of interventions could include:

- **Parental involvement programs:** Initiatives to enhance parental support and engagement in their daughters' Mathematics education.
- **After-school tutoring or mentoring:** Providing additional support and guidance to improve students' understanding and skills in Mathematics.
- **Professional development for teachers:** Training and resources to enhance teachers' instructional practices in Mathematics.

**Academic Performance:** refers to the ability and capability of the students to meet the needed level of competence in General Mathematics subject which will be taken from their general average grade on the said subject.

**Teacher-related factors:** refer to the condition and performance level of the teacher in the execution of General Mathematics subject in the class, and the way he/she behaves and go along with his/her students and/or co-teachers.

**Mathematics Achievement:** This refers to the level of proficiency and understanding demonstrated by female students in Mathematics. It can be measured through various methods, such as achievement tests, which are used in this study.

## 1.8. Organization of the Study

This study was organized and presented in six chapters .The first chapter gives a general idea on the backgrounds, statement of the problem, explains the significance of the study and describes the delimitation and limitation of the study. The second chapter review of literature section develops background of the study by discussing the relevant literature from international and national perspectives. In the third chapter, research methods were Explained briefly how the study was conducted. The fourth chapter was about data Presentation and Interpretation. The fifth chapter stated briefly the findings of the study. From the data analysis, finally the sixth chapter was the summary, conclusion and recommendation part which tried to summarize briefly and conclude the whole Study based on the main findings. Based on the conclusions drawn, some suggestions were also forwarded to concerned bodies and stakeholders in this section.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

The review of related literature focuses on factors that affect students' academic achievement. It mainly discuses both in school and out of school factors that affect female students' Mathematics achievement. Hence, the in school factors such as influence of school facilities, instructional leadership, teachers' qualification, experience and competence was assessed. Similarly out of school factors, such as, socio-economic status of parents and home related factors were also assessed in the review of literature. In addition to this the impact of personal factors on female students' Mathematics achievement was indicated in literature section.

## 2.1. Gender Equity in Education

The enrolment trend from pre-primary to secondary schools in Nigeria is examined in order to see the extent of equity or parity between male and female learners (the boy-child and girl-child). The data covers all the thirty-six (36) states of Nigeria and the Federal Capital Territory, Abuja and showed gender disparity from pre-primary to secondary school levels. The enrolment percentages of the boy-child are consistently higher than that of the girl-child. These differences are significant. Despite government programmers for children's education, there are still gaps in the enrolment of the boy-child and the girl-child education in Nigeria. The FME (2006) found out that in the south, a moderate bias towards boys' enrolment is evident in the south west, while the south east displays a bias towards girls' enrolment. In the north there is a strong evidence of bias towards boys' enrolment. Offorma, (2008) confirmed that disparity is more in the northern part of the country in favors of the boy-child than in the southern part. In south-eastern states there are more girls than boys in the secondary schools, but more boys than girls in the pre-primary, except for Ebonyi and Imo state.

In South Africa, the enrolment of girls in schools has increased to 53% in secondary school. The intake and access to primary school has attained 100%. This implies that the girl-child at that level of education has equal access to school as the boy-child. The UN

Millennium Summit in September (2000) also set Millennium Development Goal (MDG) to promote gender equality and empower women with the target to eliminating gender disparities in primary and secondary education. The Millennium Development Goals (MDGs) are eight international development goals which all the 193 United Nations member states and at least 23 international organizations have agreed to achieve by the year 2015.The second goal deals with achieving universal primary education and the third goal deals with promoting gender equality and empowering women. Education is key to achieving the Millennium Development Goals. The education of girls must be mainstreamed within a nation's education system. Related to Girls' Education, the Millennium Development Goals sets the following targets: to ensure that by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling and eliminate gender disparity in primary and secondary education preferably by 2005 and to all levels of education not later than 2015. The Millennium Development Goals on education and gender equality reinforce previous international agreements most notably the Education for All Conference in 1990, and the Dakar World Education Forum in 2000 that launched the Secretary-General's United Nation Girls Education Initiative, to which practically all countries have subscribed. The United Nations Girls' Education Initiative works to fulfill these goals.

The Millennium Declaration, endorsed by 189 governments and 147 heads of state, represents a wider and more authoritative consensus which UNGEI, with its quantitative and qualitative objectives, can both support and benefit from. The declaration puts the goals related to poverty and development in the context of rights based approach, and, very clearly, makes reaching people the centerpiece of its vision. The MDG "roadmap" presented to the 2001 General Assembly, emphasizing the "people" focus, estimates that, in the year 2000, there were 113 million children of primary school age not in school, of whom about 68 million are girls. These children are the main targets of the declaration, together with the cohorts who will be denied school entry and completion in succeeding years. Girls' education needs to be addressed in a broader context that acknowledges the need to fight against hunger, rural poverty or other barriers to gender equity.

## 2.2. Over View of Major Factors That Affect Student's Academic Achievement

Students' academic performance was positively correlated with school related factor and out of school factors. In school factors that correlate to students' achievement were physical facilities of school environment, availability of library, pedagogical center, laboratory, instructional leadership, teachers' qualification, experience and competence, whereas, out of school factors were home environment, parent's socioeconomic status and personal factors. Factors that affect the academic achievement of female students could be lack of study time and lack of encouragement both at home and at school which is highly influences Mathematics achievement since it consumes much time to study and master concepts in Mathematics Mekasha (2000).

## 2.3. School Environment /in School Factors/

A good environment must be created for knowledge to be fostered on the part of the females. According to Vernon (1986) "an environment must be created which is stimulating enough for children to develop their abilities and satisfy their interests." He states further that "it is important that the child be happy in school, that his/her life develop from day to day with a feeling of achievement, that he/she consider himself/herself a person of work, that he/she feels that he/she is understood and appreciated, and that he/she has opportunities to express his/her creative and artistic abilities. The lack of teaching media and subject apparatus e.g. laboratory facilities seems to be another factor that contributes towards the poor performance and passing rate of female students. This means that most of the teaching is based on theory (Ornstein, 1992). According to UNESCO (2000) school related factors were a function of school policies defined by political and educational leaders at the national, district or local level. These includes elements such as retention policies, the qualification of teachers, the length of the school year and homework polices, the availability of textbooks and other educational materials, and how convenient schools are to where pupils live.

### 2.3.1 The Social Environment and Girls' Achievement in Mathematics

The social environment as used in this context refers to female students' social interaction with teachers and peers and the availability of teaching and learning resources in Mathematics. Both social and physical environments have been found to have an impact on female student performance in general. In a study of student performance in Mathematics among Senior High School students in the Western region, Marginson and Dang (2017) employed an exploratory design involving 68 students and 12 teachers to assess the factors that accounted for the poor performance of female students in Mathematics. Performance in Mathematics was measured by students' scores in Mathematics in their last two terms and their scores in the Basic Education Certificate Examination (BECE). They found that female student performance in Mathematics was affected by factors such as teacher-student relationships, students' relationships with their peers, students' family background, students' gender and students' perception of Mathematics. They concluded that most of the factors that predicted female students' performance was from the school environment and could be addressed by the school management. Adhesive management in general can be defined as the organization and mobilization of all human and material resource in any system for effective achievements of the identified objectives of the system. In many organizations including the school systems, effective management was considered to be a prerequisite for successful accomplishment of the organizational objectives. This study considers the factors that affect female students' performance in Mathematics in Adihaki preparatory school.

### 2.3.2. Teacher Efficacy and Female Students' Performance in Mathematics

Many studies report that what teachers know and believe about Mathematics is directly linked to their instructional choices and procedures. Also, it seems undisputed that the teacher's philosophy about Mathematics has a significant impact on the structure of Mathematics lessons. Teachers must have the skills and knowledge to apply their philosophy of teaching and instructional decisions. In the 21st century, there is a shifting paradigm in education about teachers' roles and competencies. Findings from research on teacher competencies suggest that if teachers are to prepare an increasingly diverse group

of learners for much more challenging work - for formulating problems; finding, integrating and summarizing information; creating new solutions; independent learning; and collaborating, they will need significantly more knowledge and radically different skills than most now have and most education schools are now developing (Luttenberger et al., 2018). Teachers must not only have knowledge of a particular subject, but also pedagogical knowledge and knowledge of their students (Moreno- García et al., 2017).

Teacher competence in these areas is closely linked to pupils' thinking, understanding and learning in Mathematics education. There is no doubt that student achievement in Mathematics education requires that teachers have a rigorous understanding of the subject matter and epistemology that guides Mathematics education (Jiang et al., 2018) as well as an equally rigorous understanding of the different types of instructional activities that promote Mathematics education. Skilled Mathematics teachers provide a roadmap to lead students to an organized understanding of Mathematical concepts, to reflective learning, to critical thinking, and ultimately to Mathematical achievement (Jiang et al., 2018).

### 2.3.3. Impact of School Guidance and Counseling

According to Ukeje et al.,(1992) guidance and counseling is a service designed to assist female students to adjust their environment, develop an ability to set realistic goals for themselves and important to their total progress .Researchers have established that guidance and counseling programs in schools can positively influence students' achievement. Brown (1999) indicated that in schools where comprehensive guidance programs were implemented, there was higher grade in Mathematics.

### 2.3.4. The impact of School Facilities

Karemera,(2003) found that female students' performance is significantly correlated with satisfaction with academic environment and the facilities of library, computer lab, latrine, water, and etc. in the institution. With regard to background variables, he found a positive effect of high school performance and school achievement. He found no statistical evidence of significant association between family income level and academic performance of the student. A Study effort from student and the proper use of the facilities provided by the institution to the student, a good match between students'

learning style and the instructional materials use positively affect the student's performance.

## 2.4. Out School Factor /External Factors/

One of the theories that deal with why female students leave the school is a "pull out theory" which refers to factors that makes students to measure the costs and benefits of staying in schools. Employment opportunities, family liabilities and other conditions that attract students to leave schools were "pull out" factor (Nuri, 2008).

### 2.4.1. Home Environment

Dornbush *et al*., (1987) stated that there seems to be a general consensus among theorists in psychology and education that a child's academic achievement is not a simple function of her/his innate ability. In addition to ability, environmental factors play significant role in child's academic achievement. In particular exposure to different types of stimuli out of school may produce different level of academic achievement independent of ability. Among those out school variables which influence academic achievement were home environments. Similarly, Tilaye (1999) indicated that the quarrelsomeness of the home environment (for instance, between father and mother, between mother and child etc., could also create a serious emotional disturbance among female students in the form of tension, anxiety, fear or instability in their lives which in turn are hindrance to their concentrations in classes for school work in general.

### 2.4.2. Socio Economic Status

Socio-economic status has been found to be a predictor of Mathematics achievement. Studies have repeatedly shown that parents' annual income is correlated with females' Mathematics achievement (Letsoalo, 2017). Socioeconomic status was found to be significant in Mathematics and science scores (Hornburg et al., 2017). Another study found that the poor academic performance of Canadian female students was due to the low socio-economic status of their parents (Jiang et al., 2018). Socio-economic status was examined and found to be one of the four main predictors of differences in academic performance of South African female students aged 15 in reading, Mathematics and science by the Program for International Students Assessment (Letsoalo, 2017). Several

studies show that parents with higher socioeconomic status are more involved in their children's education than parents with lower socioeconomic status. This greater involvement results in the development of positive attitudes of children towards school, classes, and improvement in academic performance (Migosi & Muola, 2013). Low socioeconomic status is believed to have a negative impact on academic achievement, in part because it denies female students access to various educational materials and resources and creates a troubling atmosphere at homes such as possible disruptions to parenting or an increased likelihood of family conflict (Migosi & Muolas, 2013). For these reasons, the socio-economic status of the parents of a pupil is a common factor determining school performance including performance in Mathematics

### 2.4.2.1 Socio Economic Status and math achievement

Socio economic status, because of its effect on all aspects of students' lives, has been included in a large body of research on academic achievement. It is widely believed that socio economic status is strongly related to academic achievement at the individual level. White (1982), however, in his meta-analytic review of 143 studies, came up with results that are contradictory to this widespread belief. He concluded that when socio economic status was typically defined as a combination of (income, parents' education, and/or parents' occupation) and the student was the unit of analysis, socio economic status was only weakly correlated (r= 0.197) with Math achievement. Yet the correlation between socio economic status and Math achievement jumped to(r= 0.697, when aggregate units of analysis (such as schools) were used. Many researchers reported similar findings that school-level socio economic status had a positive effect on student achievement above and beyond student-level socio economic status Anderson et al., (1992); Myers (1985); Jencks & Mayer (1990).

According to various literatures, socio-economic status estimated by family (annual income, level of education, and occupational prestige) has a paramount potential in influencing students' school achievement Ginsburg& Bronstein (1993) as cited in UNESCO (2000). Family background characteristics have a considerable influence on participation and achievement in Mathematics education. Children from poor families have less access to learning materials and educational activities, and are

less likely to complete high schools Oakes (1990); Sanabary (1993) also added that family's socio economic status influence their daughters' education through financial and moral support for own schooling and indirectly through a set of variables that include the daughter's physical, cognitive, and psychological development as well as her motivation, aspiration, and expectations. In addition to this, he also pointed that those girls from middle and upper income families were more likely than those from low income families to enter schools and progress all the way to the university level. Perceiving Mathematics as a male domain, parents give more support to Mathematical learning for boys than for girls Burton (1990).

### 2.4.2.2 Family income and math achievement

Family income, another component of socio economic status, also plays a unique role in the relationship between socio economic status and math achievement. Financial capital, defined as the fiscal resources of the family used to meet the basic necessities of the student Coleman (1988), significantly affects student achievement. Families with greater financial capital can provide their children with educational resources that would enrich their educational experiences, such as books and computers. From the perspective of student motivation toward success, students from middle and high socio economic status families are more likely to have higher levels of motivation for school success. For Example, students from middle class families usually expect that academic achievement will bring real-life awards in the form of good jobs and high salaries. These students have their parents and neighbors who have succeeded in school and already enjoying the benefits of their success. That is, they have their "daily reminders" both in their families and environments that school success will have social and economic payoffs Oakes (1990).

The problem of insufficient family income for individuals can be translated into a matter of poverty concentration at the community level. Poverty concentration has long been perceived as a big problem for poor minority neighborhoods in big cities. Statistics reveal that this is a continuing, or even an ever-growing problem. For example, although the numbers of students in urban schools have remained the same at approximately 11 million between 1980 and 1990, the percentage of students living in poverty increased

over the decade. Data from the Schools and Staffing Survey, collected in the 1987-1988 school year, indicated that forty percent of urban students attended high poverty schools (defined as schools with more than forty percent of students receiving free or reduced price lunch), while only ten percent of suburban students and 25 percent of rural students did so. These high poverty schools have a long list of problems that have an extremely negative effect on academic achievement. Among these problems are limited English proficiency, violence, and poor health Lippman et al., (1996).While students from families with high levels of income have their "daily reminders" that school success will bring real-life awards in the form of good jobs and high salaries, many minority children in big cities have little or no experience to support such beliefs and expectations Oakes (1990). These students may know few adults who have succeeded in school or who have translated school success into economic gain.

Lack of social institutions in poor communities which would provide students with contact with positive role models can be added as another problem Oakes (1990); Lippman, et al.,(1996). Previous research also points to the negative effect of poverty concentration on academic achievement .Anderson, et al. (1992), in their study found out that low income students in schools with small concentrations of such students score higher than their counterparts in schools with high concentrations of low income students. Myers (1985), using data from the high School and beyond study, found out that students in high poverty schools had lower scores than did students in low poverty schools, even controlling for family socio economic status.

### 2.4.2.3 Socio Economic Status and parental Expectations/Involvement

Parents' positive attitude towards child's education is important in determining school attendance and academic achievement of the child. Favorable attitude towards schooling and education enhances parental involvement in children's present and future studies. Often, the affluent parent will have access to educational resources for his/her child directly or indirectly. It is more likely that these parents will have higher regards for education, set educational goals for the child and/or be models.

Home environment also affects the academic performance of the students. Educated parents can provide such an environment that suits best for the academic success of their

children. The school authorities can provide counseling and guidance to parents for creating positive home environment for improvement in students' quality of work (Marzano, 2008). The academic performance of students heavily depends upon the parental involvement in their academic activities to attain the higher level of quality in academic success (Barnard, 2004).

Weiss et al. (2006) also provide an integrative model of family involvement that is evidence-based or clearly linked to positive child outcomes. This includes Parenting, Home-School Relationships, and Responsibility for Learning Outcomes.

## 2.5. Personal Factors

Personal factor play a significant role In addition to in school factors and out of school factors in Mathematics achievement. The students' motivation, expectation, self-esteem and self-directed learning have effect on their Mathematics achievement. These factors in conjunction with in school and out of school variables may influence female students' Mathematics achievement either positively or negatively.

### 2.5.1 Self-Motivation and Female Students' Performance in Mathematics

Mathematics education requires highly motivated learners because it requires reasoning, making interpretations and solving problems, Mathematical issues and concepts. The challenge of Mathematics education for today's schools is that it requires discipline, concentration and motivation. To meet these challenges, students need to be focused and motivated to make progress. Anghel et al. (2019) investigated the relationship between classroom motivation and academic achievement among elementary school-aged children which involved 122 first-grade participants and 129 third-grade participants. Consistent with previous studies, they found that for higher levels of mastery, motivation was related to higher Mathematics scores. The teacher's role in motivating students to learn should not be underestimated. To help students become motivated learners and producers of Mathematical knowledge, the teacher's most important task is to create a learning environment in which students can engage in Mathematical thinking activities and conceive of Mathematics as something that requires "exploration, conjecture, representation, generalization, verification and reflection (Davadas & Lay, 2017). The study collected data and determined whether the girls' attitudes towards Mathematics in

Westland District were attributable to demographic factors, gender factors, parental influences and learning facilities. Conclusions were drawn on this basis.

### 2.5.2. Self Esteem and Academic Achievement

Self-esteem is the experience of being competent to cope with the basic challenges of life and of being worth of happiness (Branden, 1987). Purkey (1993) also indicated that self-esteem refers to the totality of a complex, organized, and dynamic system of learned beliefs, attitudes and opinion that each person holds to be true about his/her personal existence. Branden (1987) showed that positive self-esteem is necessary because it is the immune system of the bounce back from adversity and hence it is critical during the turbulence of adolescence. He also expressed that self-esteem built up on the experience of success and through these experience the individual's self-confidence is grew up. As individuals experience success they develop the capacity to cope with whatever life throws their way. This leads to further growth of self-confidence, self-reliance and self- esteem. Moreover, self-esteem affects the academic achievement of individuals Bandura (1977); Marsh et al., (1986). In this regard, Costello (1991) explained that success in learning Mathematics relies heavily on earlier experience and activities. Construction of toys, practical work, familiarity with technology and a variety of games are all accepted as useful in this respect. Girls are less likely to come with the benefits of this background and yet relatively little attempt has been made to rethink the Mathematics curriculum to make better use of girls experience.

A number of studies have examined the relationship between self-esteem and academic achievement (Albright, & Chang ,1976) using grade point average (GPA) to measure achievement they found that grades are positively associated with self-esteem. Bachman and O'mally (1977) as cited in Solomon (1999) pointed out that educational success is positively correlated to self-esteem. Their eight years longitudinal study showed that the higher the level of education respondent eventually attained, the higher was his/her self-esteem throughout the course of study. Fennema & Sharman (1977) concluded that self-confidence has strong correlation with achievement. According to Fennema, one has to do those thinks that one feels confident to do and

avoid activities. Those arose with anxiety. Badger (1981) reported that, the fact that girls were significantly less self-confident in their Mathematical ability before they showed any signs of poorer performance tends to confirm the influence of this variable on performance. persons who score high in self-esteem were those who focus and emphasize their abilities, strengths and good qualities whereas persons who score low in self-esteem were those who focus and emphasize their deficiencies, weakness, and bad qualities. Moreover, the primary reason that the females are afraid of the Mathematics courses was the fear comes from the low self-esteem, rather than lack of liability Hachat (1996). The discrepancy between high and low self-esteem may arise either from differential levels of ability or differential patterns of selective perception and memory Bahiru (1999).

## 2.6. Gap in the existing literatures

Most revived literature mentioned above recognized common factors that affect female students' achievement in Mathematics in pre-primary, primary and secondary schools. However, they did not take in to account the effect of the factors in preparatory schools.

The researchers conducted their study specifically on urban areas, but they could not also find a study that specifically searches for solutions to the factors in rural areas to female students. Moreover, they didn't consider the male-dominated classroom environment in their study. That is, in most of the classes, there were more boys than girls and this condition made the girls not to express and share their ideas openly. There were also very few mathematics female teachers. Therefore the researcher intended to need further research to fill in the existing methodological and knowledge gap by including all vital points that were not touched previous studies This study, therefore, aimed to address this gap.

## 2.7 Conceptual Frame Work of the Study

This study looks at the achievement of female students' in Mathematics at Adihaki preparatory school in Adihaki sub-city Mekelle and the factors that influence the performance. It highlights the out of school, in school and personal factors and the strategies for improvement. The category of school principals, Adihaki Sub-City educational office, Parental involvement programs, Mentoring/After- school tutoring and

PDT are believed to have a significant contributory effect on the performance of girls. These have been summarized in conceptual framework as shown in Figure 2. 1.

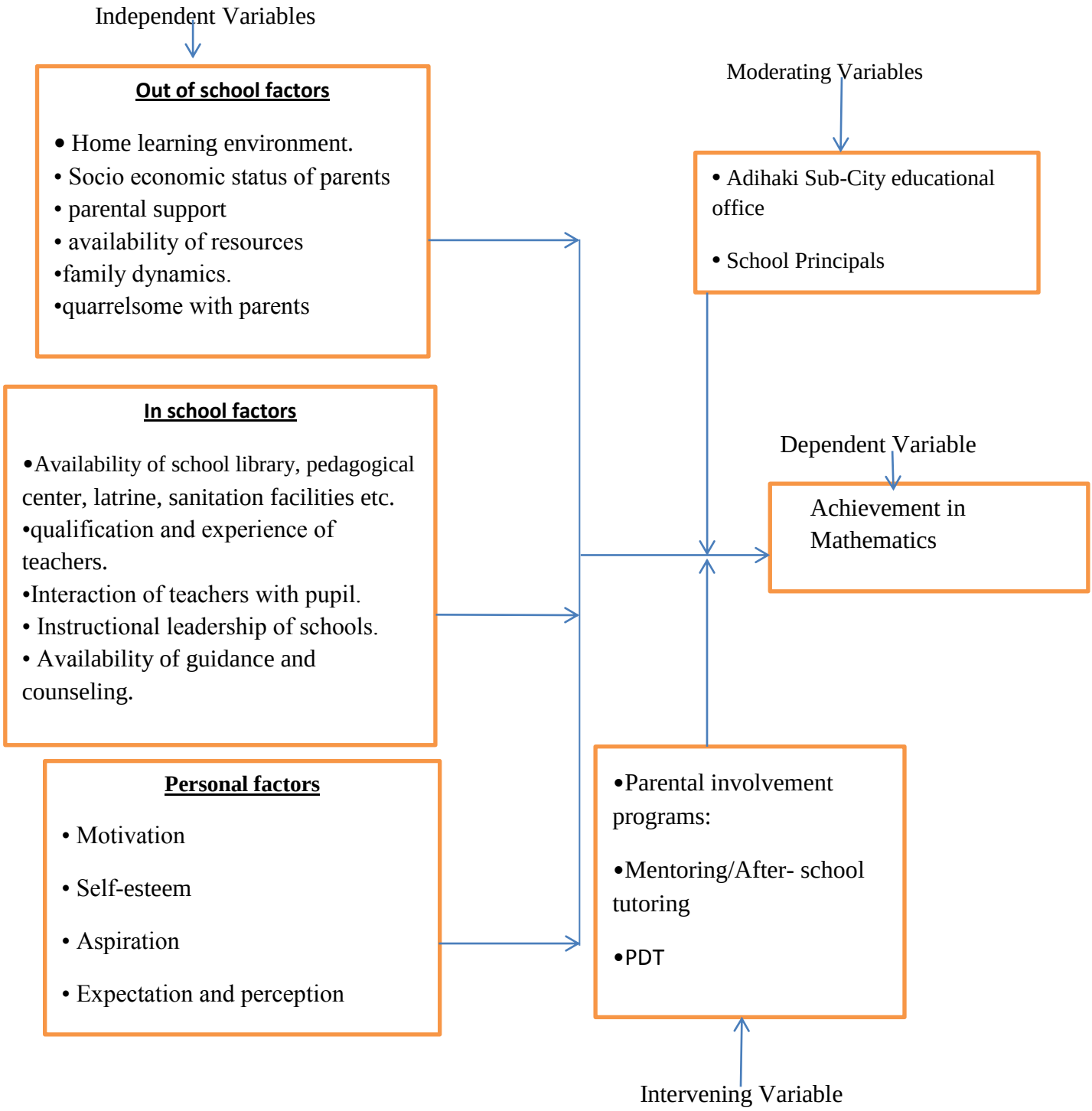


**Figure 2. 1 conceptual frame work Adapted from** RAUTTA CATHERINE AWUOR

## 2.8 Summary

Students' academic achievement in general Mathematics achievement in particular correlated with a number of factors. Among these, school factors, out school factors and personal factors were paramount on students' Mathematics achievement in general and females' students' achievement in particular. According to ( Barbour 2009) ,those factors influence female students' Mathematics achievement were the attitudes, values emanating from school and communities. School facility was also one of school related variable that influence students' achievement in general and female students achievement in particular. It includes well-organized library, safety toilet, pedagogical center, well organized instructional leadership, teachers and guidance related factors and etc.

According to MOE (2005) School facilities have a great impact on students in general and girls in particular. Similarly, students achievement in general females in particular can also affected by out-school factors and one of the out school factor that affect female students achievement was home environment. Tilaye (1999) indicated that the quarrelsomeness of the home environment (for instance, between father and mother, between mother and child etc.), could also create a serious emotional disturbance among students in the form of tension, anxiety, fear or instability in their lives which in turn are hindrance to their concentrations in classes for school work in general. Generally, this chapter gave an important overview of the variables related with students' academic achievement.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1. Research Design

Research design is the blueprint for fulfilling research objectives and answering research Questions (John et al., 2007). In other words, it is a master plan specifying the methods and procedures for collecting and analyzing the needed information. It ensures that the study would be relevant to the problem and that it uses economical procedures. By taking this into consideration, the study used both descriptive and explanatory research design. The major purpose of descriptive research design is to describe the characteristics, behavior and demographics of the participants. It can use both qualitative and quantitative methods with closed-ended questions. It often involves structured data collection techniques such as questionnaires, interviews, observations, or existing data analysis to describe the factors that affect female students 'achievement in Mathematics.

Explanatory research design was used to explain the casual relationship between the independent variables ( socio-economic factors, personal factors, out of school factors and in school factors ) and the achievement of female students in Mathematics. It is often quantitative. Here the researcher has a clear understanding of the problem and wants to investigate the cause. Michal (2004) explained that causal variables compete with each other to explain variation in an outcome variable. A good contender in this competition was an independent variable that was strongly correlated with the dependent variable. Moreover, Creswell & Clark (2009) also indicated that mixed method approach is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study was greater than either qualitative or quantitative research. Hence, interpretation of qualitative data collected through interview was embedded in discussion section to support quantitative data analysis.

## 3.2. Research Paradigm

The paradigm focuses on female students in grades 11 and 12 on Mathematics achievement, which can be measured in test scores .It again focuses on two sets of variables, namely dependent and independent variables. The independent variables are factors that affect female students' achievement in Mathematics, which could include the out of school factors, in school factors and personal factors such as the socioeconomic status of parents, educational background and income of parents, interaction of teachers with pupil, self-esteem, school environment, motivation etc. The dependent variable is Mathematics achievement, typically quantified through academic performance metrics.

The paradigm also examines how societal norms and expectations influence female students' engagement and performance in Mathematics. It describes the research questions and research approaches (quantitative and qualitative).The quantitative approach was used to gather data through questionnaire and achievement test and the qualitative approach was applied to gain deeper insights into personal experience and perceptions through interviews and observations. Finally it recommended for educators, policy makers, parents and other stakeholders to support female students in improving their Mathematics performance.

## 3.3 .Description of the study Area

This study was conducted in Adihaki Preparatory School in Adihaki Sub-City, Mekelle. It was established in 2000 E.C with a total land area of 16,860$m^2$.Currently the school has a total of 3403 students with 1517 male and 1886 female,102 teachers with 71 male and 31 female and 8 office workers 2 male and 6 female. Study area`s (Adihaki Preparatory School) map is shown in figure below.

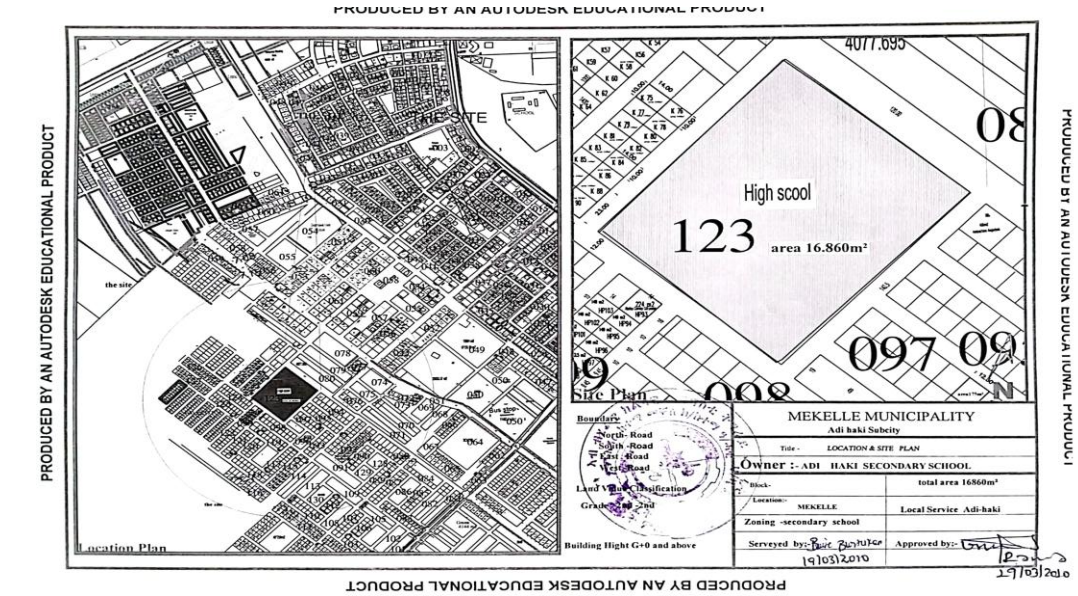


Figure3.1. Description of study area

## 3.4. Target population of the Study

Target population is an item constituted in any field of inquiry. The present study considered justifiable sample size of female students from Adihaki preparatory school in Adihki -Sub City which is considered sufficient for successful quantitative analysis to arrive at sound conclusion and recommendations. The target population of the study was 648 female students that were operating in two grade stratified streams. The strata were grade 11 (342) and grade 12 (306).

### 3.5. Sampling Technique

Depending on the nature and the objective of the study, there are several ways of taking a sample. The major sampling techniques may be grouped into probability (random) sampling and nonprobability (non-random) sampling. For this study, probability sampling method such as simple random sampling, systematic sampling and Stratified sampling were used. Stratified sampling is a sampling method where the population is divided into a number of strata and a sample is drawn from each stratum by simple random sampling (lottery method) and by systematic sampling. In the lottery method, the researcher follows some steps to determine a sample such as; preparing a slip of paper identical in size and color, writing codes, folding the slips and finally a blindfold selection is made to get the required sample.

In a systematic sampling, the researcher uses k=N/n for a sampling interval, where N is population size, n is size of the sample. After this, the researcher selects an arbitrary number b/n 1 and k and then every sample member is selected by considering the $k^{th}$ member after the selected one. Stratification creates heterogeneity among the strata and homogeneity within the stratum. Stratification is the division of the heterogeneous population into homogeneous subgroups (strata) and then selecting samples from each stratum (Jha, 2014). As mentioned in the target population, subjects of this study were classified into two categories (grade11 and 12). Such behavior of the target population demands the study to use stratified random sampling treatment. The variation within the stratum is small relative to the variation among strata in terms of underlying variables. The sample size for each stratum was proportionally computed. To determine the sample size from each stratum proportional allocation was done. The proportional allocation formula is as follows:

$$nh = \left(\frac{Nh}{Ns}\right) n, \text{ Where:}$$

nh= sample size from each stratum,

Nh= total population in each stratum,

Ns =total population of the sum of Strata for study (x) and

n = total sample size from the study population (Israel, 1992; Cochran, 1963).

Based on this formula, sample size from each stratum is provided in the following Table 1 below.

**Table 1: Proportionate sample size from grade 11 and 12 female students**

| Grade 11 | No of females in class | **Proportionate sample size from stratum $n_h = (N_h/N_s)n$** |
|---|---|---|
| 11A | 45 | **(45/648)•**247 =17 |
| 11B | 36 | **(36/648)•**247 =14 |
| 11C | 40 | **(40/648)•**247 =15 |
| 11D | 38 | **(38/648)•**247=15 |
| 11E | 45 | **(45/648)•**247=17 |
| 11F | 51 | **(51/648)•**247=19 |
| 11G | 43 | **(43/648)•**247=16 |
| 11H | 44 | **(44/648)•**247=17 |
| **Total** | **342** | **130** |

| Grade 12 | No of females in class | **Proportionate sample size from stratum $n_h = (N_h/N_s)n$** |
|---|---|---|
| 12A | 38 | **(38/648)•**247=14 |
| 12B | 26 | **(26/648)•**247=10 |
| 12C | 21 | **(21/648)•**247=8 |
| 12D | 23 | **(23/648)•**247=9 |
| 12E | 43 | **(43/648)•**247=16 |
| 12F | 28 | **(28/648)•**247=11 |
| 12G | 38 | **(38/648)•**247=15 |
| 12H | 48 | **(48/648)•**247=18 |
| 12I | 41 | **(41/648)•**247=16 |
| **Total** | **306** | **117** |

### 3.6. Sample Size Determination

There is one government preparatory school in Adihaki sub-city, called Adihaki preparatory school, with a total number of 648 female students which were the target population of this study. The sample frame of this study was all grade 11 and 12 government preparatory School female students. To determine the sample, Yemane (1967) provides a simplified formula to calculate the required sample size at 95% confidence level and the desired level of precision of 3%,5%,7% and 10%.For this study, the desired level of precision is 5% and I use Yemane's formula;

$n = \frac{N}{1+N(e)^2}$ , where

N=total population for the study

n=sample size

e=tolerable error or desired level of precision, which is 5% or 0.05.Using this formula, $n= \frac{648}{1+648(0.05)^2}$ =247 female students were selected which accounts about 38.1% of the total expected maximum sample size.

### 3.7. Instrument of Data Collection

Multiple source of information were required because of no single source of information could be trusted to provide comprehensive data. To accomplish the objective of this study, three data collecting instruments (questionnaire, achievement test, interview and observation) were employed. These instruments, without which the study would be incomplete, were appropriately used to elicit relevant information for the study under investigation. Hence, the questionnaire which was prepared for this study has five parts. part one includes demographic information, part two includes indicator of personal factors, part three includes indicator of home related factors, part four includes indicator of school related factors and part five includes open ended items. The questionnaire was validated by expertise judge. The achievement test which consisted of 40 items was constructed by the Mathematics expertise at Adihaki sub-city education office. Then the item accuracy was validated by two subject teachers from the school in the study. To supplement the data obtained through questionnaire and achievement test, the researcher conducted interview with school principals, councilors, Mathematics teachers and selected female students.

### 3.8. Procedures of Data Collection

The procedure for the achievement test was as follows: the achievement test was constructed by the Mathematics expertise at Adihaki Sub-city education office and then the item validity was checked by two teachers from the school in the study. Similarly, the validity of the questionnaire was examined by expertise value judge and item reliability was examined by pilot test for 19 students from already selected school. The return rate of pilot test was only 10.The students involved in pilot test were not included in actual

sample. From the feedback on pilot test after some correction and modification the questionnaires were administered for the whole (247) sampled respondents.

### 3.8.1. Administration

Both achievement test and questionnaire were administered to respondents in face-to-face fashion with the help of assistants. Initially, orientation was given to assistant data collectors on how to handle questions raised from respondents. In addition, a brief explanation was provided to respondents about the instruction of the tools and confidentiality of the information. Finally, 40 items of one and half hour achievement test were distributed for respondents. After collecting the achievement test questionnaire was coded with the corresponding achievements test and distributed to the respondents to fill out. After collection of questionnaire, interview was administered for principals, councilors, Mathematics teachers and selected female students to support quantitative data through achievement test and questionnaire.

## 3.9. Ethical considerations/Issues

Research ethics refers to the morals of investigation or intervention with regard to minimal abuse or disregard of social and psychological wellbeing of persons, community, and/or animals that participate in the research work. So the researcher sought permissions from MU, from education office of Adihaki Sub-city and from Adihaki preparatory school. The questionnaire was approved by the supervisor before being used in the research. The participants were informed of the purpose of the study and assured of confidentiality. They were also told not to write their names on the questionnaire and participation is voluntary.

### 3.10. Validity and Reliability of the Research

The validity and reliability of the data was check carefully. Validity and reliability of scores on instruments, additional standards for making knowledge claims, lead to meaningful interpretations of data.

## 3.10.1. Validity

Validity defined as the degree to which results obtained from the analysis of the data actually represent the phenomenon under the study. Validity checks if the research instrument are doing what they were intended to do. The questionnaire was validated by

expertise judge and the achievement test was constructed by the Mathematics expertise at Adihaki sub-city education office. Then the item accuracy of the test was validated by two subject teachers from the school in the study. The experts scrutinized the detail of these instruments and give their opinion in view of reviewing pilot study. Pilot study helped to make clarification and improved the content for use in the instrument that was administered for study.

### 3.10.2. Reliability Test

Reliability refers to the consistency and stability of a measuring tool, which is the ability of a measurement instrument to measure the same thing each time used. The process of developing and validating an instrument is in large part focused in reducing error in the measurement process. There are different means of estimating the reliability of any measure. The researcher preferred to use the Kuder – Richardson formula (KR-20), which is suitable for tests with dichotomous choices (eg, correct/incorrect). This was conducted in Excel. The Kuder – Richardson formula (KR-20) is given by:

$$\text{KR-20} = \frac{K}{K-1}\left(1- \frac{\sum pq}{\delta^2}\right), \text{ where}$$

K= number of items.

p = proportion of participants who answered the item correctly.

q = proportion of participants who answered the item incorrectly.

$\delta^2$ =variance of scores of individuals who took the exam.

Hence the result from the Excel was as follows.

$$\text{KR-20} = \frac{k}{k-1}\left(1- \left( \frac{sum\ (p_{avg\ x}\ q_{avg})}{\delta^2}\right)\right), \text{ where}$$

K = 40

$P_{avg}$ = average proportion correct = 4.65

$q_{avg}$ = average proportion incorrect = 5.57742 and $\delta^2 = 74.585$

$$\text{KR-20} = \frac{40}{40-1}\left(1- \left( \frac{25.935}{74.585}\right)\right) = 40/39(1\text{-}0.347724707) = 0.669 \approx 0.67$$

A KR-20 value closer 1 suggests high reliability, while a value closer to 0 indicates low reliability. Since the reliability for this test was 0.67, the test appears to be reasonably reliable and acceptable.

# CHAPTER FOUR

# RESULTS AND PRESENTATION

## 4.1. Data Analysis

The quantitative data collected through questionnaires and achievement test have analyzed by using simple descriptive statistical tools like frequency and percentage. The qualitative data which have gathered through interview and observation have analyzed thematically. Finally the mean is used to see the prediction power of personal factors, out of school factors and in school factors on female student Mathematics achievement test.

## 4.2 Characteristics of respondents

The demographic variables were presented using descriptive statistics in the following tables as follows:

**Table 2: Grade and age**

| Variables | Categories | Frequencies | Percentages |
|---|---|---|---|
| Grade level | 11th | 130 | 52.6 |
| | $12^{th}$ | 117 | 47.4 |
| | Total | 247 | 100.0 |
| Age | 16-17 | 87 | 35.2 |
| | 18-20 | 121 | 49 |
| | 21-23 | 34 | 13.8 |
| | Not responded | 5 | 2 |
| | Total | 247 | 100 |

As shown in Table 2 above two hundred forty seven female students were participated in this study. Among these, 130 (52.6%) participants were from grade 11 while the rest 117(47.4%) of them were from grade 12.Table 2 also showed that of the total two

hundred forty seven respondents, 87(35.2%) participants were aged 16-17,121(49%) of participants age ranged from 18-20 and 34 (13.8%) of the respondents were from 21-23 years old. While 5(2%) of the participant were not respond.

**Table 3：Parents' Educational Background**

| Variables | Categories | Frequencies | Percentages |
|---|---|---|---|
| Father's educational Background | Can't read & write | 20 | 8 |
| | Grade 1-8 | 67 | 27 |
| | Grade 9-12 | 79 | 32 |
| | Certificate and above | 81 | 33 |
| | Total | 247 | 100.0 |
| Mother's educational Background | Can't read & write | 40 | 16.2 |
| | Grade 1-8 | 65 | 26.3 |
| | Grade 9-12 | 50 | 20.2 |
| | Certificate and above | 92 | 37.3 |
| | Total | 247 | 100 |

One can noticed that from Table 3 above, 20 (8%) of respondents' father were illiterate and 227 (92%) of respondents' father were literate, while 40 (16.2%) of respondents' mother were illiterate and 207 (83.8%) of respondents mother were literate.Table 4: Residential Background of Parents

| Variables | Categories | Frequencies | Percentages |
|---|---|---|---|
| Residential background | Lived With father and mother | 100 | 40.5 |
| | Lived With father only | 22 | 9 |
| | Lived With mother only | 35 | 14.2 |
| | Lived With husband | 20 | 8 |
| | Lived With relatives or guardian | 60 | 24.3 |
| | Others | 10 | 4 |
| | Total | 247 | 100.00 |

When we examined residential background of participants; Table 4 showed that about 100 (40.5%) of respondents were lived with their father and mother and 22 ( 9%) of participant lived with their father only while 35 (14.2%) of them were lived with their mother only and 20 (8%) of participant lived with their husband and 60 (24.3%) of the respondent lived with their relatives and the rest of 10 ( 4%) of the participants were respond as other.

**Table 5: Parents' Occupation and Monthly Income**

| Variables | Categories | Number | % |
|---|---|---|---|
| Parents occupation | Employee | 100 | 40.5 |
| | Merchants | 35 | 14.2 |
| | Daily laborer | 20 | 8.1 |
| | Other | 92 | 37.2 |
| | Total | 247 | 100 |
| Parents monthly income | 2000-4000 | 65 | 26.3 |
| | 4000-8000 | 55 | 22.3 |
| | 8000-20,000 | 70 | 28.3 |
| | Above 20,000 | 52 | 21.1 |
| | Others | 5 | 2 |
| | Total | 247 | 100.0 |

Regarding parents' occupation as it was observed in Table 5, 100 (40.5%) of participants' parent were employee and 35 (14.2%) of participants' parent were merchants while, 20 (8.1%) of participants' parent were daily laborer. The rest of 92 (33.2%) of the participants' parent were indicate as other. One can also noticed that 65(26.3%) of the participants' income ranged from 2000-4000, while 55(22.3%) of the participants' income ranged from 4000-8000 and 70(28.3%) of the participants' income ranged from 8000-20,000.The rest 52(21.1%) of the participants income was above 20,000 and 5(2%) of the participants' income was indicated as others.

**Table 6: Family Size of the Household**

| Responses | Frequency | Percentage (%) |
|---|---|---|
| 1-4 | 81 | 32.8 |
| 5-6 | 101 | 40.9 |
| Above 7 | 65 | 26.3 |
| Total | 247 | 100 |

As it has depicted in Table 6, 32.8% and 40.9% of the respondents responded that their parents have1-4 and 5-6 family members respectively. Similarly, 26.3% of the respondents responded that their parents have 7 and above family members.

**Table 7: Level of domestic work responsibility of female students in a day**

| No of working hours in a day | Frequency | Percentage |
|---|---|---|
| 1 hour | 80 | 32.4 |
| 2 hours | 65 | 26.3 |
| 3 hours | 43 | 17.4 |
| 4 & above hours | 59 | 23.9 |
| Total | 247 | 100 |

As noticed from Table 7 above 32.4% & 26.3% of female students work for 1hr & 2hrs respectively and 17.4% of the participants work for 3hrs & finally 23.9% them work for more than 4hrs.

**Table 8: The Mean Value of Achievement Test with the Corresponding Fathers and Mothers Education**

| Variables | Categories | Achievement test Mean value |
|---|---|---|
| Father's educational Background | Can't read & write | 32.85 |
| | Grade 1-8 | 37.31 |
| | Grade 9-12 | 41.13 |
| | Diploma and above | 48.68 |
| Mother's Educational Background | Can't read & write | 27.27 |
| | Grade 1-8 | 31.28 |
| | Grade 9-12 | 38.00 |
| | Diploma and above | 49.74 |

Table 8 revealed that female students who have illiterate fathers scored an average of 32.85 and those who have elementary school complete fathers scored 37.31 on achievement test. Similarly, those who have secondary school complete fathers scored 41.13 and female students whose fathers were diploma and above scored 48.68 In addition to fathers' educational background, when we examined mothers' educational background, it indicated the following result: Those female students who have illiterate mothers scored 27.27 and female students with elementary school complete mothers scored 31.28 on Mathematics achievement test. Similarly, female students whose mothers were secondary school complete scored 38.00 on Mathematics achievement test. Finally, female students whose mothers had diploma and above, scored an average of 49.74 on Mathematics achievement test.

Table 9: The Mean Value of Achievement Test with the Corresponding Major Socioeconomic Status of parent's occupation and income

| Variables | Categories | Achievement test Mean value |
|---|---|---|
| Parents' Occupation | Employed | 45.31 |
| | Merchants | 35.89 |
| | Daily laborer | 27.30 |
| | Other | 38.04 |
| Parent's income | 2000-4000 | 35.38 |
| | 4000-8000 | 39.98 |
| | 8000-20000 | 45.00 |
| | More than 20000 | 48.08 |
| | Others | 27.00 |

Table 9 ; above indicated that, female student whose parents' were employed scored an average of 45.31 on Mathematics achievement test and female students whose parents' were merchants scored 35.89 on Mathematics achievement test. Female students from daily laborer families scored an average of 27.30 on Mathematics achievement test and those who scored 38.04 respond their parents' occupation as other. Similarly, from Table 9 above one can observed that female students from parents whose monthly income was below 2000-4000 Ethiopian birr per month scored an average of 35.38 and female students whose parents' monthly income was from 4000-8000 Ethiopian birr scored an average of 39.98 on Mathematics achievement test. Female students whose parents' monthly income was from 8000-20000 Ethiopian birr were scored 45.00 on Mathematics achievement test. Finally, female students whose parent's monthly income was above 20000 Ethiopian birr scored an average of 48.08 on Mathematics achievement test and those who scored an average of 27 on achievement test were indicated as others.

**Table 10: The Mean Value of Achievement Test with the corresponding family Size of the Household**

| Responses | Frequency | Achievement test Mean value |
|---|---|---|
| 1-4 | 81 | 53.6 |
| 5-6 | 101 | 46.3 |
| Above 7 | 65 | 23.7 |

As it has indicated in Table 10 above, participants whose family members 1-4 & 5-6 scored 53.6% & 46.3% on Mathematics achievement test respectively and those with family member above 7 scored 23.7% on Mathematics achievement test.

**Table 11: The Mean Value of Achievement Test with the corresponding domestic work responsibilities of female students in a day**

| No of working hours in a day | Frequency | Achievement test Mean value |
|---|---|---|
| 1 hour | 80 | 67.8 |
| 2 hours | 65 | 59.3 |
| 3 hours | 43 | 45.9 |
| 4 & above hours | 59 | 33.6 |

As it has indicated from table 11 above, participants who work for 1hr & 2hrs scored 67.8% and 59.3% on Mathematics achievement test respectively, while those participants who work for 3hrs % and above 4hrs scored 45.9% & 33.6% on Mathematics achievement test respectively.

## 4.3 Factors Affecting Academic Performance of Female Students

Female students' academic performance may be affected by variety of factors. However, for the purpose of this study, the factors that affect female students' academic

performance have categorized as family-related, school- related and student-related factors.

## 1. Family-Related Factors

Under family-related factors, variables like family size, parents' educational level, monthly income, domestic workloads and attitude of parents towards educating their daughter were considered.

### a) Family size

Concerning the association between family size and students' academic performance, Lewis (2005) argued that due to the fact that parents in large families cannot interact as closely with their children as those in smaller families, children from higher family size achieved lower academically. He further argued that when large family face problem in educating their children, they are forced to educate boys at the expense of girls.

Similarly, Adamu (2004) stated that in large family size, there is a great need for girls' labor at home. In line with thi, data were collected on the issue that which gender is more affected by family size. The result of the data obtained from the respondents has presented in the next figure 4.1.

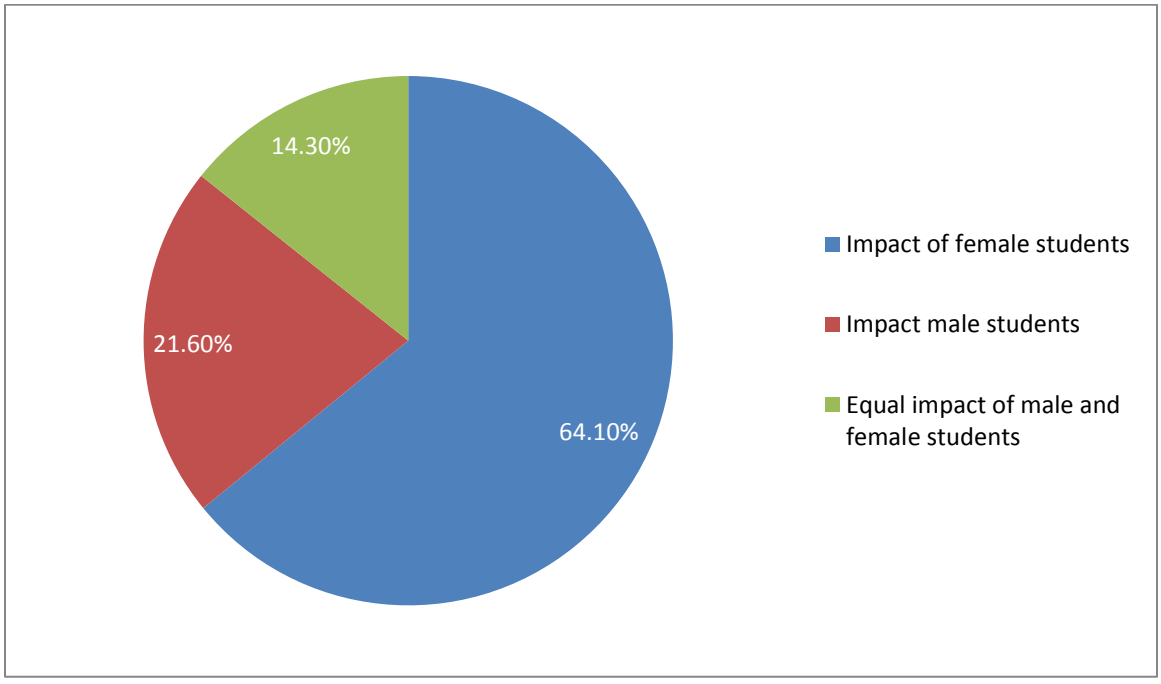


**Figure4.1**: Level of family size impact across male and female students' academic performance

As presented in figure 4.1, Out of the total 247 respondents, 64.10% have replied that family size has more impact on female students' academic performance than male students. While, 21.60% of the respondents responded that family size has more impact on male students' educational performance than female students. The remaining, 14.30% of the respondents answered that family size has equal impact across male and female students' on their academic performance. From this, one can understand that female students' academic performance is more affected by family size than male students.

**b) Impact of Parents Educational Level on female student's achievement**

Different scholars argued that educational level of parents has positive relationship with academic performance of students. For instance, Sackey (2007) argued that parents' educational level may perhaps the main source of influence that determine child's academic achievement. Parental education, particularly mother's education has a ripple effect upon the participation of girls' in education at family, societal, country and global level. Thus, mother's education is likely to increase the rate of girls participation in education in terms of enrolment, persistence and completion (Seifu, 2007). In line with this, data were collected from the respondents regarding the impact of parental education on female students' academic performance presented in figure 4.2 below.

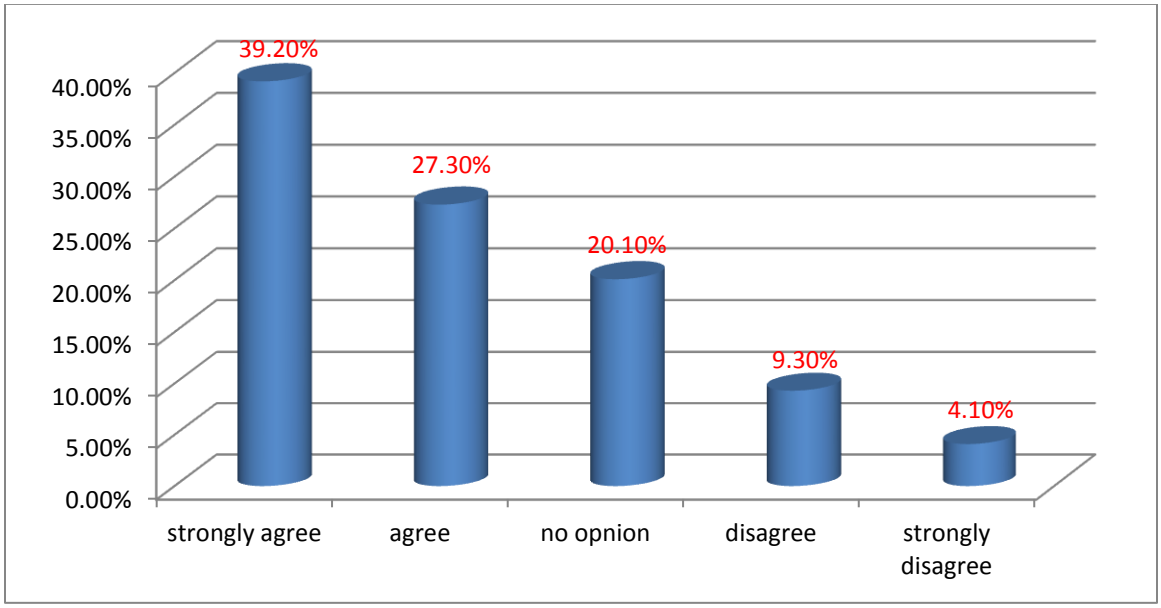


**Figure4. 2** The level of impact of parents' educational level on female students' academic Performance

As it has indicated in figure 4.2, majority, 39.2% and 27.3% of them strongly agree and agree that parent's educational level has an effect on female students' academic performance respectively. As pointed out previously, majority of parents do have low educational level. Hence, one can understand that female students' academic performance could be affected by parents' educational level.

### c) Impact of Monthly Income of parents

Monthly income of family was another family related factor. Regarding to the association between family income and educational attainment of students, Sackey (2007) argued that the amount of family income or resources allocated to children and the timing of their distribution ultimately affects the schooling attainments of children and this is also positively associated with the educational attainment of children. He further stated that the financial and moral support provided to girls for schooling is limited as compared to boys. In line with this, students were asked regarding the influence of monthly family income presented in figure 4.3 below.

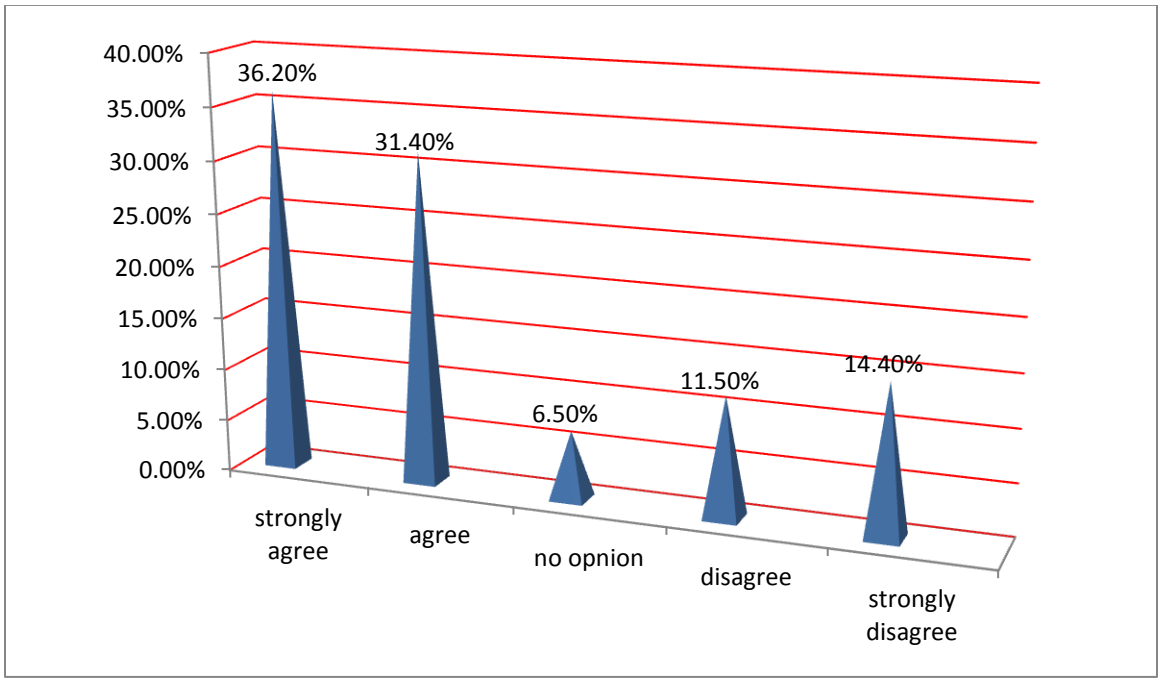


**Figure4.3** Estimated monthly family income

As it has presented in figure 4.3, 36.2% and 31.4% of them responded as strongly agree and agree respectively regarding the impact of monthly family income on female students' academic performance. Similarly, 11.5% and 14.4% of the respondents replied as disagree and strongly disagree respectively regarding the issue. From the above figure, one can conclude that monthly income of parents has an influence on female student's Mathematics achievement.

### d) Attitudes of Parents towards female education

Attitude of parents towards educating their daughter is another family related factor that affects female students' academic performance. In this regard, data were collected from student respondents and the result has presented in table 12 below.

**Table 12: Attitude of parents towards educating their daughters (student's response)**

| Attitude of your parents towards Mathematics | Strongly agree | Agree | No opinion | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| My parents do not encourage me to score a good result in Mathematics like what they do in other subjects. | 29(11.7%) | 39(15.8%) | 25(10.1%) | 82(33.2%) | 72(29.2%) |
| My parents don't encourage me to study Mathematics; rather they told me the difficulties of the subject. | 30(12.1%) | 21(8.5%) | 61(24.7%) | 57(23.1%) | 78(31.6%) |
| My parents considered that Mathematics is difficult to female students. | 24(9.7%) | 44(17.8%) | 34(13.8%) | 79(32%) | 66(26.7%) |
| My parents considered that teaching Mathematics to girls as wastage of time. | 33(13.3%) | 44(17.8%) | 35(14.2%) | 74(30%) | 61(24.7%) |

| | | | | | |
|---|---|---|---|---|---|
| My parents believe that boys have better access to the world of work than girls | 30(12.1%) | 49(19.8%) | 37(15%) | 83(33.6%) | 48(19.5%) |
| My parents have an attitude that sending girls to school will lead them to be harassed by boys, teachers and other outsiders. | 29(11.7%) | 53(21.5%) | 30(12.1%) | 59(23.9%) | 76(30.8%) |
| My parents don't have the knowledge of the benefits of educating their female daughters | 26(10.5%) | 40(16.2%) | 25(10.1%) | 84(34%) | 72(29.2%) |

As shown in Table 12 item 1, majority, 29.2% of the respondents disagreed that parents do not encourage me to score a good result in Mathematics. As the responses to item 2 table12, 31.6% of the respondents disagreed that parents don't encourage me to study Mathematics. Item 3 of table12, majority, and 32% of the respondents disagree that my parents considered Mathematics as a difficult subject to female students. Regarding to item 4, 30% of the respondents replied as disagree that parents considered that teaching Mathematics to girls as wastage of time. Regarding to item 5, 33.6% of the respondents disagreed on parents believe that boys have better access to the world of work than girls. As the responses to item 6 of Table 12, majority, 30.8% of the respondents strongly disagree that their parents have an attitude that sending girls to school will lead them to be harassed by boys, teachers and other outsiders. As responses to item 7, 34% of the respondents responded as disagree on that parents do not have the knowledge of the benefits of educating their daughters.

Generally, the results of the data presented in Table 12 shows that parents' attitude do not affect female students' academic performance since parents do have positive attitude towards educating their daughter. In contrast with this, the findings of the study done by Adamu (2004) and Abduljelil (2010) show that parents attitude affects female students' academic performance.

## 2. School-Related Factors

Under school-related factors, variables like basic school sanitation facilities, the school environment and tutorial class, were considered.

### a) School environment

Regarding the school environment, such as availability of basic sanitation facilities like (water, separate toilet for male and female students), conducive library & pedagogical center the following results have obtained

**Table 13: The school environment**

| school-related factors | Yes | No | Total |
|---|---|---|---|
| Is there a separate toilet for male & female in the school? | 22(9%) | 45(18.2%) | 67(27.2%) |
| Is there a sanitation facility for females in the school? | 20(8.1%) | 66(26.7%) | 86(34.8%) |
| Does your library have enough reference books? | 27(10.9%) | 51(20.7%) | 78(31.6%) |
| Does your school have a standardized pedagogical center? | 8(3.2%) | 8(3.2%) | 16(6.4%) |
| Total | 87(35.2%) | 160(64.8%) | 247(100%) |

As depicted in Table 13, 18.2% of the respondents replied that their school doesn't have a separate toilet. 26.7% of the respondents replied that their school doesn't have proper sanitation facilities for females. 20.7% of the respondents replied that their school doesn't have enough reference books. The remaining, 8% of the respondents replied that their school has/has no standardized pedagogical center. Regarding to school facilities especially the toilet, Gant (1971) asserted that it is very difficult for girls to concentrate if toilets are not enough. Brunner and Jerome (1961) suggested that lack of or inadequate sanitation facilities particularly toilets negatively affected girls education more than boys. This is because girls need sanitary facilities that give them privacy. In line with this, data were collected regarding the impact of lack of conducive school environment presented in table 14 below.

**Table 14: Impact of school environment on female student's achievement in Mathematics**

| Effect of school environment | Strongly agree | Agree | No opinion | Strongly disagree | Disagree |
|---|---|---|---|---|---|
| Lack of separate toilet for male & female affect female students achievement in Mathematics | 63(25.5%) | 70(28.3%) | 40(16.2%) | 36(14.6%) | 38(15.4%) |
| Lack of sanitation facility for females has an effect on their achievement in Mathematics | 69(28%) | 67(27.1%) | 46(18.6%) | 35(14.2%) | 30(12.1%) |
| Lack of enough reference books in your library has an effect on your achievement in Mathematics | 70(28.3%) | 67(27.1%) | 37(15%) | 39(15.8%) | 34(13.8%) |
| Lack of standardized pedagogical center has an effect on your achievement in Mathematics | 64(26%) | 58(23.5%) | 44(17.8%) | 43(17.4%) | 38(15.3%) |

As shown in Table 14 item 1, majority, 28.3% and 25.5% of the respondents respectively agree and strongly agree that the school doesn't have separate toilet for male & female students and this has an effect on their achievement in Mathematics. As the responses to item 2 table14, 28% and 27.1% of the respondents respectively strongly agree and agree that there are no sanitation facilities for female students and have an effect on their achievement in Mathematics. Item 3 of table14, majority, 28.3% and 27.1% of the respondents strongly agree and agree that there are no enough reference books in the school library and this has an effect on their achievement in Mathematics. Regarding to item 4, 26% and 23.5%of the respondents strongly agree and agree that there is no standardized pedagogical center in the school and this has an effect on their achievement in Mathematics.

### b) Impact of different school related factors on female students' academic Performance in Mathematics

Different school factors which affect female students' academic performance in Mathematics are shown in Table 15 below.

**Table 15: Impact of different school related factors on female students' academic performance**

| Factors(Items) | Strongly agree | Agree | No opinion | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| There are good r/ships b/n teachers & female students. | 40(16.2%) | 29(11.7%) | 22(9%) | 88(35.6%) | 68(27.5%) |
| There are a lot of teaching aids to support the theories on Mathematics. | 38(15.4%) | 44(17.8%) | 26(10.5%) | 60(24.3%) | 79(32%) |
| Our Mathematics teacher gave feedback on class work & home work. | 66(26.7%) | 54(21.9%) | 39(15.8%) | 45(18.2%) | 43(17.4%) |
| The counselor of the school gave a good advice to female students about Mathematics. | 65(26.3%) | 57(23.1%) | 40(16.2%) | 44(17.8%) | 41(16.6%) |
| Distance from home to school has an effect on Mathematics achievement. | 69(28%) | 50(20.2%) | 40(16.2%) | 45(18.2%) | 43(17.4%) |
| Our Mathematics teacher gave a tutorial class for female students. | 74(30%) | 53(21.3%) | 39(15.8%) | 43(17.4%) | 38(15.4%) |
| Our teachers have low attitude towards female student's ability on Mathematics. | 40(16.2%) | 35(14.1%) | 32(13%) | 65(26.3%) | 75(30.4%) |

As presented in Table 15, item 1, 35.6 % and 27.5% of the respondents respectively replied as disagree & strongly disagree that there is a good r/ship b/n teachers & female students. As the responses to item 2 of the Table 15, 32% and 24.3% of the respondents

replied as strongly disagree & disagree that there are a lot of teaching aids to support the theories on Mathematics. Regarding to item 3, 26.7 % and 21.9% the respondents replied as strongly agree & agree that our Mathematics teacher gave feedback on class work & homework. Item 4 of the same Table 15, 26.3% and 23.1% of the respondents replied as strongly agree & agree that the counselor of the school gave a good advice to female students about Mathematics.. Regarding item 5 of the Table 15, 28% and 20.2% of the respondents replied as strongly agree & agree that distance from home to has an effect on Mathematics achievement. Concerning item 6 of the Table 15, majority 30% & 21.5% of the respondents replied as strongly agree & agree that our Mathematics teacher gave a tutorial class for female students. Finally 26.3% & 30.4% of the respondents replied as disagree & strongly disagree that our teachers have low attitude towards female student's ability on Mathematics. Generally, as majority of the respondents responded that factors presented in Table 15 do have impact (but with different degree) on female students' academic performance.

### 3. Student-Related Factors/Persona factors

Student-related factors such as motivation, self-esteem, aspiration, perception of students on academic performance of female students' as good as male students and level of classroom participation of female students were considered and some of them were discussed below. As different literatures show that perception of students has correlation with their academic performance. In line with this, Engin (2009) argued that student feelings with achievement have positive effect on actual academic achievement. Regarding to this, student respondents were asked about their perception on performance of female students in academia as good as their male counter parts. The data obtained on this issue has presented in the next figure.

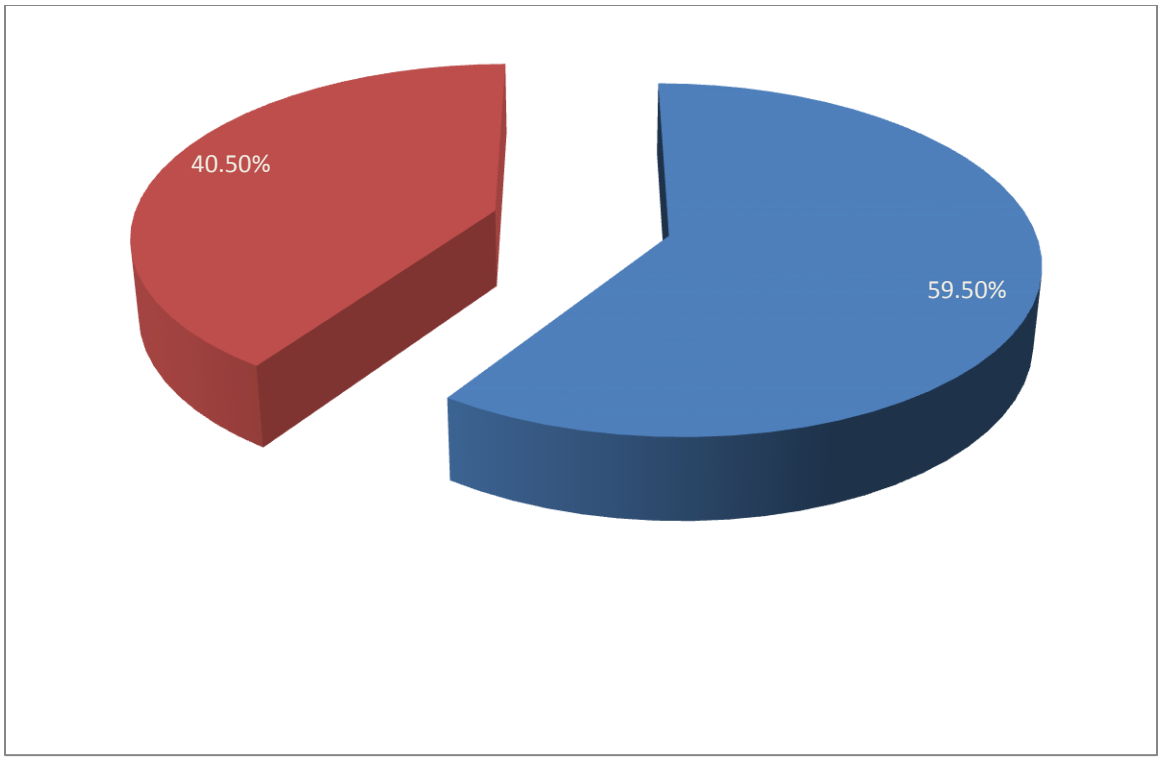


**Figure4.4**: Perception of students on female students' performance in academia as good as male students

As indicated in figure 4.4, 59.5% of them perceived that female students are capable of performing in academia as good as male students. The remaining, 40.5% respondents perceived that female students are not capable of performing in academia as good as male students. In terms of perception, majority students perceived that female students are capable of performing in academia as good as males. The next table shows the levels of classroom participation of female students while they were learning Mathematics.

**Table 16: The level of classroom participation of female students (students' response)**

| Responses | Frequency | Percentage (%) |
|---|---|---|
| Very high | 38 | 15.4 |
| High | 29 | 11.7 |
| Medium | 51 | 20.6 |
| Low | 69 | 28 |
| Very low | 60 | 24.3 |
| **Total** | 247 | 100 |

As indicated in Table 16, 28% of the respondents answered that the level of classroom participation of female students is low, 15.4% and 11.7% of the respondents responded that the level of class room participation of female students is very high and high respectively. Similarly, 24.3% and 20.6% of the respondents replied that the level of classroom participation of female students is very low and medium respectively. Hence, one can understand that majority of the respondents labeled that the level of classroom participation of female students as low.so one can conclude that low participation of female students in Mathematics has an effect on their achievement.

**Table 17: Level of impact of different student related factors on female students' academic performance**

| Factors (Items) | Strongly agree | Agree | No opinion | disagree | Strongly disagree |
|---|---|---|---|---|---|
| Thinking about family and related issues | 73(29.5%) | 64(26%) | 36(14.6%) | 40(16.2%) | 34(13.7%) |
| Engaging income generating activities | 70(28.3%) | 67(27.1%) | 45(18.2%) | 35(14.2%) | 30(12.2%) |
| Assuming that Mathematics isn't necessary for social students | 47(19%) | 53(21.5%) | 39(15.8%) | 50(20.2%) | 58(23.5%) |
| Spending time with my friends | 45(18.2%) | 47(19%) | 53(21.5%) | 56(22.7%) | 46(18.6%) |
| Studying Mathematics gives happiness | 63(25.5%) | 70(28.3%) | 44(17.8%) | 32(13%) | 38(15.4%) |

As observed in Table 17, item 1, 29.5 % and 26% of the respondents replied as strongly agree & agree respectively that female students thought about their family while they are learning Mathematics respectively. As the responses to item 2, 28.3% and 27.1% of respondents replied as strongly agree & agree respectively that majority of the students engaged in income generating activities. Regarding item 3 of the Table 17, 23.5% of the respondents replied as strongly disagree that Mathematics isn't necessary for social

students. Item 4 of the same Table 17, 22.7% of the respondents replied as disagree that female students spent time with their friends İn line with this, Lawson (2011) cited in Sara et al (2017) stated students at school face various peer pressure that affect their life either in positive or negative way. Finally Item 5 of table17, 28.3% of the respondents replied as agree that studying Mathematics gives them happiness. From this Table, one can understand that factors such as thinking about family and related issues and engaging in income generating activities significantly affect female students 'academic performance. The results of descriptive statistics summarized as follows:

The finding of this study indicated that the major Socio Economic Status (educational background, occupation and monthly income) of parents' and unpleasant home environment were out of school factors that causes female students' Mathematics achievement test variation. In addition to this, females those who had well educated parents and high income family scored a good grade in Mathematics achievement test. Personal factors, home related factors and school related factors were also found to be significantly predictors of female students' Mathematics achievement in Adihaki Preparatory School. Moreover, the data analysis in chapter four indicated that female students with positive self-esteem, positive attitude or motivation to study or learn Mathematics subject would increase their Mathematics achievement test. More over one of my informants who was a counselor at Adihaki Preparatory School mentioned that:

I have counseled some female students in our school. So to tell you frankly, they didn't have any motivation and courage to attend their class. Instead the students are highly attracted by the modern social media Technology Such as game, tiktok, face book etc. In addition they don't set goal for their further educational attainment. (C 1, 28th November 2017). Similarly, the following responses of two principals of Adihaki Preparatory School mentioned that:

## Principal 1

Our Mathematics teachers are very well qualified and eager to assist their students even at the weekend in their free time .They set schedule for Tutorial class, make up, special classes in advance which are clearly Stated in their annual plan. However, most of the students had not Willingness to attend the class. (P1, 24th November 2017).

## Principal 2

In our school most of the students did not give respect to their teachers and some teachers have no enough skill and experience how to handle class room management. Most of the time, we have meeting on conflict management between teachers and pupils. This is the result of poor interaction between teachers and students. Consequently it affects students' achievement. (P2, 24th November 2017).

## Student 1

I live with my parent and I am busy helping them in different domestic works such as, supporting my little brothers and sisters in studying them, helping my mother in all home related activities. Besides, I keep shop for hours and feel exhausted to study my own lesson when I back home. For this reason, I fade up to attend my class properly. (S 1, 26th November 2017).

## Student 2

Oh! The School is not comfortable enough to learn because it is not only school but also it is IDP center. As a result, when I enter the gate, I don, sense I am in class. There is shouting, I see smoke from different directions coming to our classroom. I see many children and elders suffering from starvation. As a result, I couldn't tolerate and despair my future. In addition to this, there is no service of library, laboratory, toilet, and cafeteria and sport field at all. These all cases forced me not to attend class regularly. (S 2, 26th November 2017) In addition to this, my informant teachers from the school stated that:

## Teacher 1 from Grade 11

In our school most of female students live with their relatives and their relatives emphasize on domestic works than their education, that is why most of my female students come to class without doing their homework and when I asked the reason, they replay that I live with my relatives and I work domestic chores Exhaustively then I fill tried to do my homework. (T 1, 20th November 2017).

## Teacher 2 from Grade 12

Most of our students in our school didn't have any motivation and courage to learn Mathematics because of different factors. First they gave up by the current situation of the country. Secondly, they assume that they will not join to a university because they see the least score of many female students of the National Examination in recent years. So**,** all in all the students have a very low attitude towards Mathematics, (T2, and 20th November 2017).

Therefore, from the above interview response, one can deduced that personal factors was one paramount variable that can influence female students' Mathematics achievement at Adihaki Preparatory School. The students didn't have moral and courage to learn Mathematics, they were rather busy in habits of modern social media technology Such as game, tiktok, face book etc Similarly, Burstein (1992) in a comparative study of factors influencing Mathematics achievement found out that there is a direct link between students' attitudes towards Mathematics and students outcomes. He also found that 25% in England and 26% in Norway accounted for variation in students' attitude towards Mathematics. The findings of this study for personal factors were consistent with the pervious findings. The other dominant out school factor was home related factors which influences female students Mathematics achievement negatively. This includes unattractive home environment like, parents unpleasant approach towards their daughters, quarrelsome and unwillingness to facilitate school materials, which negatively influence their daughters' school performance in general and Mathematics performance in particular. Next, the school environment was also the other factor that influences the achievement of female student in Mathematics. It was not comfortable for the learning and teaching processes because of different factors. The main factor was that, it was a home of IDP center, consequently all the school facilities were destructed and this condition highly influences the females in the academic performance of Mathematics

# CHAPTER FIVE

## DISCUSSION OF FINDINGS

The study used a causal relation research design to examine factors influencing female students' Mathematics performance at Adihaki Preparatory School. The researcher dominantly used a variety of data collection methods, including achievement tests, questionnaires, and interviews. The discussion was elaborated the results obtained from simple descriptive statistics for out of school factors (home related, socio-economic factors), personal factors and school related factors on female students Mathematics achievement test. The results of the study also showed that female students' Mathematics achievement has significantly affected by these factors. Under out of school factors, the results of the study revealed that family size, family income and occupation, parent's educational level, domestic workloads affects female student's Mathematics achievement. Under school-related factors, the findings of the study showed that the school lacks basic school sanitation facilities; the school environment is not conducive for female students, the school providing tutorial class for female students but not strengthened. Under student-related factors, the result of the study revealed that motivation, perception, aspiration, self-esteem and the level of classroom participation of female students is low.

Female students were also engaged in different activities & they thought about their families while they were learning Mathematics. One of the basic questions of this study was to examine the effect of out of school factors on female students' Mathematics achievement test. The result of data analysis revealed that the major socio-economic status (education, occupation and monthly income) of parents' was the most dominant out of school variable to affect female students' Mathematics achievement test in Adihaki Preparatory School. More specifically it could be seen that female students who have well educated mothers scored better than females of illiterate mothers. Socio economic status (estimated by family annual income and level of education) was intricately related with parenting style and had paramount potential in influencing child's

school achievement Girsburg & Bronstein (1993) as cited in Yonas (2007). Another possible explanation was that female students, who had literate mothers, score better than those with illiterate mothers. More specifically, mothers' education was slightly affecting female students' Mathematics achievement in Adihaki Preparatory Schools than fathers' education. It was seen from Table 7 in chapter four females who have literate mothers scored more than those who have literate fathers. This indicated that, female students' whose fathers were diploma and above scored an average of 48.68 on Mathematics achievement test, whereas, females whose mothers were diploma and above scored 49.74 grades in Mathematics achievement test.

From qualitative data through interview home environment is one of the out of school influential factors that negatively affects female students' Mathematics achievement at Adihaki Preparatory School. This was consistent with the findings of previous study. Similarly, Tilaye (1999) indicated that the quarrelsomeness of the home environment (for instance, between father and mother, between father and child etc.) could also create a serious emotional disturbance among students in the form of tension, anxiety, fear or instability in their lives which in turn are hindrances to their concentration in classes or school work in general. Mekasha (2000) also indicated that factors that affect female students could be lack of study time both at home and School which highly influences Mathematics achievement since it consumes much time to study and master concepts.

The other factor on female students' Mathematics achievement was in-school factors. These includes the unavailability of well-equipped library, qualification and experience of teachers and teacher-pupils' interaction, shortage of latrines, school guidance and counseling. To bring better school performance these things should be facilitated within the school environment. The absence of these things could negatively influence female students' Mathematics achievement as indicated above. One can also deduce that personal factors were one paramount variable that can influence female students' Mathematics achievement at Adihaki Preparatory School. Similarly, Burstein (1992) in a comparative study of factors influencing Mathematics achievement found out that there is a direct link between students' attitudes towards Mathematics

and students outcomes. He also found that 25% in England and 26% in Norway accounted for variation in students' attitude towards Mathematics. The findings of this study for personal factors were consistent with the pervious findings.

# CHAPTER 6

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 6.1 Summary

The primary objective of this study was to investigate the main factors that affect female students' Mathematics achievement both in school and out of school factors, personal factors in Adihaki Preparatory School. To achieve this objective the following basic research questions were formulated for investigation.

1. What are the specific home-related factors that affect female student Mathematics achievement in Adihaki Preparatory School?

2. How do personal factors, such as motivation and self-efficacy, contribute to the variation in Mathematics achievement among female students?
3. What in-school related factors, like teacher quality and classroom environment, significantly impact female student performance in Mathematics?
4. What is the relationship between out-of-school factors, such as parental involvement and community support, and female student success in Mathematics?
5. To what extent do the socioeconomic variables of parents, such as education, occupation, and income, influence the Mathematics performance of their daughters?

## 6.2 Conclusions

The following conclusions were made from the study which investigated on female students' performance in Mathematics in Adihaki Preparatory school. Family size, domestic workloads, quarrelsome among families, attitude of parents towards educating their daughters are some of the specific home-related factors which influences female students achievement in Mathematics. The variation in female students Mathematics achievement was accounted by variability in personal factors like motivation, self-esteem, aspiration, perception and expectation etc. School environment, qualification and experience of teachers, Interaction of teachers with pupil, Instructional leadership of

schools, Availability of guidance and counseling are some of the in-school factors which influences female students achievement in Mathematics.

The findings of this study also indicates that the major socio economic status (education, occupation and income) of parents' were out of school factors that significantly affect female students' Mathematics achievement in Adihaki preparatory School. Parents' positive attitude and community support towards child's education is important in determining school attendance and academic achievement of the child. Favorable attitude towards schooling and education enhances parental involvement in children's present and future studies. Often, the affluent parent will have access to educational resources for his/her child directly or indirectly. It is more likely that these parents will have higher regards for education, set educational goals for the child and/or be models.

## Suggestions for further research

Highlight gaps in the current study or areas that require additional investigation. They aimed to encourage continued exploration of the topic. They also aimed at other researchers and academics who may be interested in building upon the work. So some of the suggestions are listed below.

- Similar studies should be carried out in other urban schools and in rural schools to ascertain if the case will be true for them as they have been for Adihaki Preparatory school, Mekelle-Tigray. So the Tigray region education bureau should work on this issue.

- The male-dominated classroom is sometimes not a positive environment for the girl child. There are few female Mathematics teachers; the number of boys in some classroom is also more than that of girls. This male dominance could be intimidating and also could prevent the females from sharing their personal women-related difficulties which could be preventing them from engaging actively in academic activities. Therefore MOE and NEAEA of Ethiopia and Tigray may identify, train and deploy female

mathematics teachers across schools in the country and in the region so as to increase the presence of female teachers who teach the subject. This will address the male dominance in the classroom and also enable female students to freely express themselves on personal women-related issues that tend to affect their levels of academic engagement.

- ❖ Girls are expected to get married before their eighteenth birthday as prescribed by their religion and culture. So concerned bodies should aware for the societies to address the problem.

## 6.3. Recommendations

Based on the findings of the study, several recommendations can be made to address the factors affecting female students' Mathematics achievement at Adihaki Preparatory School:

- **Address Socio-economic Barriers:** The study found that socio-economic variables, such as parents' education, occupation, and income, significantly influence female students' math achievement.
    - **Recommendation:** Implement programs to provide financial assistance or resources to families in need. These could include scholarships, subsidies for educational materials, or support for parents to pursue further education or training.
- **Enhance the Home Learning Environment:** Out-of-school factors, particularly home-related factors, play a vital role in students' academic success.
    - **Recommendation:** Develop initiatives to educate parents on the importance of creating a supportive home learning environment. Offer workshops or resources on how to engage their daughters in math-related activities, provide homework assistance, and foster positive attitudes towards Mathematics.

- **Address Personal and Motivational Factors:** Students' individual characteristics, such as motivation, study habits, and self-esteem, can impact their math achievement.
    - **Recommendation:** Provide counseling and mentoring programs to address students' personal challenges and build their confidence in Mathematics. Offer study skills workshops and strategies to improve their learning habits.
- **Improve the Quality of Instruction:** In-school factors, including teacher quality and instructional practices, are crucial for student learning.
    - **Recommendation:** Invest in professional development for math teachers to enhance their pedagogical skills and content knowledge. Provide them with access to updated resources and training on effective teaching strategies for Mathematics.
- **Create a Positive School Climate:** A supportive and inclusive school environment can foster student engagement and academic success.
    - **Recommendation:** Implement strategies to promote a positive school climate that values diversity and encourages girls' participation in STEM fields. Address any potential gender biases in the classroom and create a safe and supportive learning environment for all students.
- **Collaboration and Partnerships:** Effective interventions require collaboration among various stakeholders.
    - **Recommendation:** The Education office of Adihaki Sub-City and School Principals should work closely with parents, teachers, community organizations, and other stakeholders to implement these recommendations. Establish partnerships with local universities or businesses to provide additional support and resources.

By addressing these factors and implementing these recommendations, Adihaki Preparatory School can create a more equitable and supportive learning environment that empowers female students to excel in Mathematics.

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# Appendices

## Appendix A

**Mekelle University**

**College of Natural and Computational Science**

**Department of Mathematics**

Mathematics Achievement Test For Grade 11

**I. <u>Write true if the statement is correct and false if the statement is not correct</u>**

1. The union of two sets A and B is the set all elements common to both sets A&B
2. If set A={0,1,2,3} then 3∈ $A$
3. If A∩ $B = \emptyset then the two sets are dijoint.$
4. If $x \in (A \cap B) then x \in B$
5. If x is divisible by 6 then it is divisible by 3.
6. Two or more natural numbers that have a GCF of 1 are called relatively prime
7. The sum of an irrational and a rational is always is an irrational number
8. The number $^{5}/_{8}$ $is found between the numbers\ ^{1}/_{2}\ and\ ^{3}/_{4}.$
9. A composite number is natural number that has exactly two distinct factors 1 and itself.
10. If $A \subseteq B then A \cap B = A$

<u>II CHOOSE THE ANSWER</u>

11. Which one of the following is true?

A. For any set A ,A∪ $\emptyset = AC.\ \ for any set A, A \cup A = A$

B. If A⊆ $B then A \cup B = BD. all of the abouve$

12. Which one of the following is well defined set?

A. The set of good teachers in your school.

B. The set of all students in your class.

C. The set of beautiful girl in your class.

D. The set of interesting cats in mekelle city.

13. If n $(A \cap B) = 8\ and n(A/B) = 6\ then n(A) =$____

A. 2 B. 8 C. 14 D. 11

14. The sum of roots of equation $2x^2$ + 14x +24=0 is

A. -12 B. 12 C. 16 D. 10 E. 7

15. Which one of the following set is empty set?

A. The set of rational number between 2 &3

B. The set of natural number less than 3.

C. The set of integral multiple of 7 between 9 and 14.

D. The set of integers between -1 and 1

16. If set A= {1,2,3} then which one of the following is true?

A. 2⊆A B. {3}⊆A C. {1,2,3}⊂A D. ALL

17. Three coffees and two makiato cost a total of birr 60, two coffees and four mekiates cost a total of birr 80, then find the cost of single makiato?

A. 15 B. 12 C. 10 D.8

18. If 9x+1= 81 then find value of x

A. 2 B. 3 C. 1 D. 0

19. If A is sub B then which one of the following is always true

A. $A \cup B = A$ $B.\ \ AUB = B$ $C. A \cap B = B$ $D. A' \cap B' = B'$

20. The rationalizing factor of $\frac{5}{1-\sqrt{2}}$ $is$ $A.\frac{1+\sqrt{2}}{1-\sqrt{2}}$ $B.\frac{1+\sqrt{2}}{2}$ $C.\frac{\sqrt{2}}{1-\sqrt{2}}$ $D.\frac{1+\sqrt{2}}{1+\sqrt{2}}$

21. Which of the following is finite set?

A. The set of whole number

B. The set of natural number b/n land 10

C. The set of rational number

D. The set of natural number

22. If the GCF (60,x) and LCM (60,X) = 180, then x is equal to:-

A. 90 B. 36 C. 144 D. 48

*23. Which one of the following is true?*

*A. The sum of two irrational numbers is irrational*

*B. The quotient two irrational numbers is irrational*

*C. The product of two irrational numbers is not always irrational*

*D. The set of rational number is closed under division*

*24. If the sum of 5 consecutive integers is 30 then what is he LCM of the numbers?*

*A. 840 B. 150 C. 6720 D. 1680*

*25. What is the simplest form o f* $\sqrt{6\frac{1}{4}}$*?*

*A.* $3\frac{1}{2}$ *B.* $^{5}/_{2}$ *C.* $^{7}/_{4}$ *D.* $^{11}/_{2}$

*26. The simplified form of* $(\sqrt{r^2+1}-\sqrt{r^2-1})(\sqrt{r^2-1}+\sqrt{r^2+1})$ *is*

*A.* $6\sqrt{2}$ *B.* 1 *C.* 2 *D.* $^{r+1}/_{2r}$

*27. Which one of the following is not prime number?*

*A. 2 B. 111 C. 41 D. 67*

*28. If a=* $(2+\sqrt{5})$ $b=(2-\sqrt{5})$*then find* $a+b$

*A. 4 B. -1 C. 7 D. 0*

29. $10^{9}\times 10^{-7}\times 7=$ ____*A. 2700 B. 2000 C. 700 D. 7*

*30. Any set A is sub set of itself. A. TRUE B. FALSE*

*31. Given that set A has 15 elements and set B has 12 elements then find the maximum possible number of elements in* $A\cap B$

*A. 15 B. 12 C.7 D. 27*

*32. If n (A) =5 and n (B) =2 then which one of the following is necessarily true?*
*A.* $B\subseteq A$ *B.* $A\cup B)=A$

$C.n(A/B)=3$ *D. n (B/A) =0 then* $(A\cap B)=B.$

*33. How many elements do a set contains if it has 32 subsets?*

*A. 7 B. 2 C. 3 D. 5*

34. The number of proper subset of A={ 2,3,4} will be

A.4 B. 7 C. 8 D . 1

35. If A= {-3, 5}, and B= {6,7}, then AXB is

A. {-3,6), (-3,7), (5,6),(5,7)}  B. {-3,6), (-3,7), (6,7),(6,5)}

C. {6-, 3), (7,-3), (7, 5),(5,7)}  D. All

36. The zero of f (x) = $x^2$-x-30 are

A. 6 and -5 B. -6 and 5 C. -6 and -5 D. -3 and 2

37. The solution set of /2x-1/ >2 is equal to

A. {1/2, 3/2} B. {-1/2, 3/2} C. {-3/2,-1/2} D. none

38. If x=2 and y=4, then the value of /3x-2y/ + /x+y/ is equal to

A. 4  B. 5  C. 10  D. 8

39. Determine the value of "a" and "b" if x-3 is a common factor of the polynomials f(x) = $x^3$+a$x^2$+bx-5 and g(x)= 2a$x^3$-b$x^2$-2x-3

A. a= ,b=-5 C. a=0, b=2

B. a= -1, b= -2 D. a= , b=3

40. Suppose Birr 3000 is invested at 5% compounded continuously how log will it takes the amount to grow to birr 7000?

A 30/4 years  B. 17 year  C. 21 year  D. 7 year

**Mekelle University**

**College of Natural and Computational Science**

**Department of Mathematics**

**Mathematics Achievement Test For Grade 12**

I**. Write True if the statement is correct and False if the statement is not correct.**

1. The sum of two polynomial function is found by multiplying the coefficients of like terms
2. For any two polynomial function f and g the degree of f(x).g(x) is m.n if m is the degree of f(x) and n is degree of g(x).
3. $F(x)=-3x^2+2x+1$ is decreasing function
4. The domain of linear f unction is the set of all real number
5. The solution set of $12x^2-5x-3<0$ is $(-3, \frac{4}{3})$

II. **Choose the best answer from the given alternatives**

6. Three coffees and two makiato cost a total of birr 60, two coffees and four mekiatoes cost a total of birr 80, then find the cost of single makiato?

   A.15 B. 12 C. 10 D. 8

7. For the polynomial function $f(x)=\frac{5+3x^4-6x^3+x^7}{3}$ find the leading coefficient. A. 1 B. -2 C. -6 D. $\frac{1}{3}$

8. Which of the following is the remainder when $3x^3+2x^2-x-4$ is divided by x-2
   A. -18 B. 14 C. 18 D. -26

9. When p(x) $=ax^3-x^2+bx+3$ is divided by x-1 and x-2, the remainders are 4 and 9 respectively. What are the values of a&b respectively?

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

10. The solution set of (x+1) (x+4) <0 is :

    A.$(-\infty,-1)$ B. $(-4,\infty)$ C. (-4,-1) D. $(-\infty,-4)$

11. The solution set of $x^2-x-6\geq 0$ is:

A. {x: x∈-2≤ $x$≤3 U (3, ∞)}  C. (-∞,-2] U [3,∞)

B. {x: x∈-2≤ $x$ ≤3}  D. {x: x ∈(-∞,-2) U -2≤x≤3}

12. The degree of the polynomial function given by f(x)= (3x+1) ($x^2$-5) (1-x) is equal to; A)2 B) 5 C) 4 D) 3

13. Which one of the following is TRUE about the polynomial function f(x)= $x^4+3x^2-2x^6+4$

A. Its degree is 4  C. Its leading term is-$2x^6$

B. Its leading coefficient is 1  D. Its constant function is -2

14. If the vertex of the parabola represented by the graph of the equation f(x)=$2x^2 + bx + c$ *is at* $(\frac{3}{2},\frac{1}{2})$,then the value of b is…….

A.3 B. -6 C. 5 D. -5

15. If f(x)=2x and g(x)=$\frac{1}{x+1}$ *then which of the following is true*

A. fg(1)=1 B. fg(1)=$\frac{5}{2}$ $C.\frac{f}{g}(1)=\frac{1}{4}$ $D.(f+g)(x)=2$

16. What is the domain of f (x) =$\frac{1}{\sqrt{1-x}}$ ? A. $(-\infty,1]$ B. (-∞, 1) $C.[1,\infty)$ $D.R/\{1\}$

17. Which one of the following is decreasing function?

A. f(x) =$x^2$-4x  C. f(x) = $\sqrt{1-x}$

B. f(x) =$x^2$ +1  D. f(x)=$x^2$+3x-4

18. If -2 is the zeros the function f(x)=$x^2$+kx+8 then find value of k

A.6 B. 9 C. 4 D. 8

19. If a and b are zeros of $x^2$+3x+2=0 then $a^2$+$b^2$ equal to ____

A.5 B. 8 C. 12 D. -5

20. The solution set of the inequality $x^2$-4x+4≥ 0 is;

A. {2} B. R C. ∅ $D.(-\infty, 2)$

21. Which one of the following order pair of relation contains function?

A.(1,2),(2,3),(3,4),(4,5) B. (4,3),(2,2),(-3,4),(-3,-3)

C.(1,2),(2,3),(1,3),(4,5) D. (1,-1),(1,6),(4,2), (2,-3)

22. What is the vertex of f(x)= $-x^2$-2x+17

A. (-1, 3) B. (2,-4) C,(-1,22) D.(-1,18)

23. If p(x)=$\frac{8-3x^3+4x^4}{4} - 3x^4 + 5x^2$ *then the coefficient of* $x^4$ *is*

A.$-3/4$ $B.5$ $C.-3$ $D.-2$

24. At what value of x does the graph of the equation y=(x+2)(x-6) crosses the x-axis?

A .0 B. -2 or 6 C. 2 or -6 D. -3

25. The curve $y=x^2$ is shifted so that its axis of symmetry is the line x=1 and its orthogonal axis is y=3

A.$x^2$-2x+4 B. $2x^2$+3x+4 C. $x^2$+4x+1 D. $x^2$+3x+1

26. What is the solution set of $-x^2$-8x-12≤ 0

A. $(-\infty, -6)$ $B.(-\infty, -6) \cup [-2, \infty)$ $C.[-3,5]$ $D.[-\infty, 3) \cup [4, \infty)$

27. P(x)=$x^3 - 2x^2 + 3bx + 10$ *is divided by* $x - 3$, *the remainder is* 37 *then find value of* $b$?

A.3 B. 5 C. 7 D. 2

28. When the polynomial f(x) =$ax^3+bx^2-2x+8$ is divided by x-1 and x+1 the remainders are 3 and 5 respectively. Find value of a and b.

A.1 and -4 B 2 and 3 C. 1and -1 D. NONE

29. What is the positive zeros f(x)=$x^2-16$

A .2 B. 4 C. 0 D. 8

30. Which one of the following is the factor of f(x)=$x^3 + 2x^2 - 5x - 6$?

A. x+2 B. x-3 C. x+1 D. x-1

31. If log2 = x and log3= y, then log12 is

A. x+2y B. 2x+y C. x+y D. 2x+2y

32. The solution set of 3-log$x^2$=logx for x>0 is

A. 100 B. 10 C.8 D.9

33. The value of x for $(2x - 1)^3$= 27 is

A. 3 B. 2 C. 1 D. 0

34. Which of the following is not a rational number?

A. $\sqrt{2}$ x$\sqrt{8}$ B. 2. C. ($\sqrt{3}$ +1) (1+$\sqrt{3}$ ) D. ($\sqrt{2}$ + 1) ($\sqrt{2}$ -1)

35 If x=0.212112 …. And y= 0.12122122… then x + y is equal to

A.1/3 B.1/9 C. 2/3 D.2/9

36. If the product of roots of the equation k$x^2$+ 8x+3=0 is 1 then what is the value of k is;

A.4 B.-3 C. 2 D. 3

37. The sum of two numbers is 11 and their product is 28, find the numbers

A. 7 and 2 B. 11 and 6 C. 4 and 7 D. 1 and 4

38. Which of the following is true about the graph of f(x) =$log_2^x$?

A. It's decreasing function

B. its domain is the set of all real number

C. It includes the point (1, 0)

D. The x-axis is the asymptote of its graph

39. If f(x) and g(x) be any two polynomials, then which of the following is false?

A. f(x) + g(x) is polynomial

B. f (g(x)) is polynomial

C. f(x) – g(x) is polynomial

D. f(x)/g(x) is polynomial

40. The solution set of $log_3^{x+6}$ - $log_3^{x-2}$ = 2 is

A.3 B.-3 C. 4 D.6

# Appendix B

**መቐለ ዩኒቨርስቲ**

**የተፈጥሮና ቀመር ሳይንስ ኮሌጅ**

**ብ11ን 12ን ክፍሊ ደቂ ኣንስትዮ ተምሃሮ ዝምላእ ናይ ፅሑፍ መሕትት**

**ዝኽበርክን ተምሃሮ**

**ናይዚ መሕትት ዓላማ ኣብ ዓ/ሓቂ መሰናድኦ ቤት ትምህርቲ ዘለዋ 11ን 12ን ክፍሊተምሃሮ ብሒሳብ ትምህርትን ውፅኢታዊ ከይኾና ዝገብር ኣብገዛ□ኣብቤት ትምህርቲ ከባቢን ካብ ባዕለን ዝመፁ ፀገማትን ዘርኢመረዳእታ መሰብሰቢ እዩ□**

**ናይዚ መረዳእታ ምሽጥራውነቱ ብጣዕሚ ዝተኽልከለን ንማንም ሰብ ኣሕሊፍካ ዘይወሃብን እዩ።ስለዚተምሃሮ እትፈልጥኦን እትሪኢኦን ኣብገዛኽንን ኣብ ቤትትምህርትኽን ከባቢን ከምኡ እውን ናይ ባዕለይ ፀገም እዩ ኢልክን ትሓስበኦን ነገር ኩሉ ብግልፅን ብዘይ ምንም ፍርሓትን ካብዚ ንታሕቲ ብዝቐረበ መሰረት ንኽትምልሳ ብትሕትና ይሓትት።**

1. **ሽም ምፅሓፍ ኣየድልን**
2. **ኣብቲ ሕቶ ንኒ ዝቐረበ ሳንዱቕ ውሽጢ ናይ ራይት(√) ምልክት ተጠቐማ**
3. **በይዛኽን ፅሑፍ ንዘድልዮ ሕቶ ብፅሑፍ መልሳ**

**ንምትሕብባርክን ኣቐዲመ የመስግን።**

**ክፍሊ ሓደ ናይ ግሊ ኩነታት ዘርኢ መረዳእታ**

1. **ናይ ቤት ትምህርቲ ሽም**
2. **ክፍሊ 11 □ 12 □**
3. **ዕድመ □**
4. **ምስ መን ትነብሪ ( ትቕመጢ)**

**ምስ ኣቦይን ኣደይን □**

**ምስ ኣቦይ ጥራሕ □**

**ምስ ኣደይ ጥራሕ □**

**ምስ በዓል ገዛይ □**

**ምስ ካሊእ ዘመድ ወይ መፅበዩ □**

**ካሊእ እንተሃልዩ _____**

5. ናይ ቤተሰብኪ ት/ቲ ኩነታት እንታይ ይመስል?

| | ኣቦ | ኣዶ |
|---|---|---|
| - ዘይተማህረ/ረች | ☐ | ☐ |
| - ናይ መጀመርያ ደረጃ (1-8) ዝወደአ/ኣት | ☐ | ☐ |
| - ናይ ካልኣይ ደረጃ (9-12) ዝወደአ/ኣት | ☐ | ☐ |
| - ዲፕሎማን ልዕሊኡን | ☐ | ☐ |

6.ናይ ቤተሰብ ናይ ስራሕ ኩነታት እንታይ ይመስል ?

- መንግስቲ ሰራሕተኛ ☐
- ነጋዴ ☐
- መዓልታዊ ሰራሕተኛ ☐
- ካሊእ እንተሃልዩ ግለፂ ☐

7. cብ ገዛኽን ዝነብር በዝሒ ሰብ ክንደይ ዝኣክል እዩ?

- ትሕቲ1- 4 ☐
- ካብ 5- 6 ☐
- ልዕሊ 7 ☐

8. ካብ ቤት ት/ቲ ምስ ተመለስኪ ንወላዲኺ ትሕግዚ ዶ?

እወ ☐ ኣይሕግዝን ☐

9. ንሕቶ«8» መልሲኺ እወ እንተኾይኑ ኣብ መዓልቲ ክንደይ ሰዓት ?

- ን 4 ሰዓት ☐
- ን 3 ሰዓት ☐
- ን 2 ሰዓት ☐
- ን 1 ሰዓት ☐

10.ንሕቶ«8» መልሲኺ እወ እንተኾይኑ ኣበየናይ ዓይነት ስራሕ ኢኺ ትሕግዚ?

- ህፃውንቲ ብምሕብሓብ ☐
- ናይ ገዛ ስራሕ ብምስራሕ ☐
- ኣብድኳን ብምስራሕ ☐
- ካሊእ እንተሃልዩ ይግለፅ ☐

11. ወርሓዊ ኣታዊ ቤተሰብኪ ክንደይ ዝኣክል እዩ?
- ካብ 2000 - 4000 ብር ☐
- ካብ 4000 - 8000 ብር ☐
- ካብ 8000 -20,000 ብር ☐
- ልዕሊ 20,000 ብር ☐

12. ሒሳብ ክትማሃሪ ከለኺ ዘለኪ ተሳትፎ እንታይ ይመስል?

-ብጣዕሚ ልዑል ☐ -ማእኸላይ ☐ በጣዕሚ ትሑት ☐

-ልዑል ☐ -ትሑት ☐

13. ኣብ ቤት ት/ትኽን ናይ ደ/ተን ደ/ኣን ሽቓቕ ነኺበይኑ ድዩ? እወ ☐

ኣይኮነን ☐

14. ቤት ት/ትኽን ናይ ደ/ኣ መነፃፅሂ ክፍሊ ኣለዎዶ? እወ ☐ የብሉን ☐

15. ናይ ቤትኽን ት/ት ቤተ መፃሕፍቲ እኹል ዝኾነ ናይ ሒሳብ መጣቐስቲ

መፅሐፍቲ ኣለዎዶ? እወ ☐ የብሉን ☐

16. ቤት ት/ትኽን እኹል ዝኾነ ፔዳጎጂ ማእኸል ኣለዎዶ? እወ ☐ የብሉን ☐

**ክፍሊ ክልተ፡- <u>ደ/ኣ ተምሃሮ ብሒሳብ ት/ቲ ውዕኢታዊ ከይኾና ካብ ባዕለን ዝመፅእ ፀገም ዘርኢሓበሬታ</u>**

**በይዛኺ ቀሊሎም ብዘለዉ ዓ/ነገራት ምስምስምዕማዕኽን ዘይምስምዕማዕኽን በዚምልክት (/) ተጠቒምኪ ግለፂ ።**

| ብጣዕሚ ይስማዕማዕ (ብይስ) | ይስማዕማዕ (ይስ) | ኣይወሰንኩን (ኣይወ) | ኣይስማዕማዕን (ኣይ) | ብጣዕሚ ኣይስማዕማዕን (ብኣይ) |
|---|---|---|---|---|

| ተ.ቁ | መሕተት | ብይስ | ይስ | ኣይወ | ኣይ | ብኣይ |
|---|---|---|---|---|---|---|
| 2.1 | ሒሳብ ት/ቲ ከም ሸኽሚ ስለዝሪኦ ካብ ቤት ት/ቲ ወፃኢ ክሰርሑ ኣይደልን | | | | | |
| 2.2 | ኣብ ሒሳብ ት/ቲ ልክዕ ከም ኣወዳት ይሳተፍ እየ | | | | | |
| 2.3 | ካብ ቤት ት/ቲ እንተወፅየ ኣብ ክንዲ ሒሳብ ዘፅንዕ ምስ ኣዕርኽተይ ይዞር | | | | | |
| 2.4 | ናይ ሒሳብ ት/ቲ ክ/ግዜ ኩሉ ግዘ ይከታተል እየ | | | | | |
| 2.5 | ደ/ኣ ናይ ሒሳብ ት/ቲ ክእለትና ከም ደ/ተ እዩ ኢልና ንኣምን | | | | | |
| 2.6 | ብዙሕ ውስብስብ ዝኾነ ናይ ሒሳብ ሕቶታት ይሰርሕ እየ | | | | | |
| 2.7 | ካብ ሒሳብ ወፃኢ ካልኦት ት/ቲ ይኽእል እየ | | | | | |
| 2.8 | ሒሳብ ት/ቲ ንቑፃሊ ህይወተይ ኣይጠቕመንን | | | | | |
| 2.9 | ንቑፃሊ ስረሐይ ፅቡቕ ናይ ሒሳብ ፍልጠት ክህልወኒ ይደሊ እየ | | | | | |
| 2.10 | ሒሳብ ኩሉ ግዜ የፅንዕ እየ | | | | | |
| 2.11 | ኣዕርኽተይ ሒሳብ ስለዘይምቕዎም ምስኦም ክዘር ይመርፅ | | | | | |
| 2.12 | ሒሳብ ፈሊመ ኣየፅንዕን | | | | | |
| 2.13 | ሒሳብ እናተማሃረኩ ስለ ገዛ ይሓስብ | | | | | |
| 2.14 | ሒሳብ ዝባሃል ት/ቲ ክሰምዕ ኣይደልን | | | | | |
| 2.15 | ኣብ ዝተፈላለየ ስራሕቲ ስለዝፅመድ ሒሳብ ንኽፅንዕ ግዘ ይሓዕረኒ | | | | | |
| 2.16 | ደ/ተ ተምሃሮ ከበድቲ ሕቶታት ሒሳብ ከምዝሰርሑ ደ/ኣ ተማሃሮ ‘ውን ከምዝሰርሓ ይኣምን | | | | | |
| 2.17 | ሒሳብ ከፅንዕ ከለኹ ሓንስ ይፈጥረለይ | | | | | |
| 2.18 | ሒሳብ ንኽፅንዕ ዝመኽሩኒ ሰባት ይፈትዎም እየ | | | | | |
| 2.19 | ተወሳኺ መጠናኽሪ ሒሳብ ት/ቲ ንከመሓይሽ ጥቕሚ የብሉን | | | | | |
| 2.20 | ሶሻል ት/ቲ ንምፅናዕ ስለዝወሰንኩ ሒሳብ ት/ቲ ኣይጠቕመንን | | | | | |

**ክፍሊ፡-3ᵗʰ <u>ኣብ ገዛ ከባቢዝርኣዩ ን ደ/ኣ ተማሃሮ ብሒሳብ ት/ቲ ውዕኢታዊ ከይኾና ዝገብሩ ዐገማት ዘርኢ ሓበሬታ</u>**

**በይዛኺ ቀኒሎም ብዘለዉ ዓ/ነገራት ምስምስምዕማዕኽን ዘይምስምዕማዕኽን በዚምልክት (√ ) ተጠቒምኪ ግለፂ ።**

| ብጣዕሚ ይስማዕማዕ (ብይስ) | ይስማዕማዕ (ይስ) | ኣይወሰንኩን (ኣይወ) | ኣይስማዕማዕን (ኣይ) | ብጣዕሚ ኣይስማዕማዕን (ብኣይ) |
|---|---|---|---|---|
| | | | | |

| ተ.ቁ | መሕተት | ብይስ | ይስ | ኣይወ | ኣይ | ብኣይ |
|---|---|---|---|---|---|---|
| 3.1 | ናይ ወለደይ ት/ቲ ደረጃ ኣብ ሒሳብ ት/ቲ ውዕቸታውነት ተዕዕኖ ይፈጥረለይ | | | | | |
| 3.2 | ወለደይ ደ/ኣ ሒሳብ ብደንቢ ከምዘይኽእላ ይኣምኑ | | | | | |
| 3.3 | ወለደይ ኣብ ካሊእ ት/ቲ ከምዘበረታትዑኒ ኣብ ሒሳብ ት/ቲ ዕቡኞ ውዕኢት ከምዕእ ኣየበረታትዑኑን | | | | | |
| 3.4 | ወለደይ ሒሳብ ት/ቲ ቸ ጥኞሚ ከም ዘለዎ ኣፍልጠ የብሎምን | | | | | |
| 3.5 | ወለደይ ንደ/ኣ ሒሳብ ምምሃር ከም ግዘ መጥፍ<u>ኢ ገይሮም ይሓስብዎ</u> | | | | | |
| 3.6 | ኣደይ ሒሳብ ከዕንዕ ከለኹ ስራሕ ክሕግዛ ትመርዕ | | | | | |
| 3.7 | ኣብ ገዛና ዘሎ በዝሒ ነባራይ ስድራ ኣብ ሒሳብ ት/ቲ ካብ ደ/ተ ኣብ ደ/ኣ ዕንቅፋት ይፈጥር | | | | | |
| 3.8 | ወለደይ ደ/ኣ ናብ ት/ቲ እንተሊእኽናየን ብ ደ/ተ፤ብ መ/ራንን ብ ኻልኦትን ይጥቃዓ እየን ኢሎም ይሓስቡ | | | | | |
| 3.9 | ወለደይ ብሒሳብ ት/ቲ ዝተማሃሩ ደ/ተ ካብ ደ/ኣ ዝሐሸ ናይ ስራሕ ዕድል ይረኽቡ ኢሎም ይኣምኑ | | | | | |
| 3.10 | ኣብ ሒሳብ ዕቡቅ ምስራሕ ንወለደይ ምንም ኣይኮነን | | | | | |
| 3.11 | ሒሳብ ት/ቲ ኣብ ህይወተይ ውሽጢ ምንም ከምዘይጠቕመኒ ወለደይ ነጊሮምኒ | | | | | |
| 3.12 | ወለደይ ሒሳብ ት/ቲ ንቑፃሊ ይጠቅመኪ ኢሎም ስለዝሓስቡ ካልኦት ዓይነት ት/ቲ ንኽዕንዕ የበረታትዑኒ | | | | | |
| 3.13 | ወለደይ ኣብ ክንዲ ሒሳብ ት/ቲ ኣዕንዒ ምባል ናይሒሳብ ት/ቲ ኣፀጋምነት ይነግሩኒ | | | | | |

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|---|---|---|---|---|---|---|
| 3.14 | ኣደይ ደ/ኣ ተምሃሮ ውስብስብ ናይ ሒሳብ ሕቶ ከምዘይስርሑ እያ ትሓስብ | | | | | |
| 3.15 | ወለደይ ብተደጋጋሚ ናብ ቤት ት/ቲ እናመፁ ስለ ሒሳብ ት/ቲ ሓበሬታ ይረኽቡ | | | | | |
| 3.16 | ናይ ወለደይ ወርሓዊ ኣታዊ ኣብ ሒሳብ ት/ቲ ፅልዋ የሕድረለይ እዩ | | | | | |

**ክፍሊ፡-4<sup>ተ</sup> <u>ኣብ ቤት ት/ቲ ኣከባቢ ንደ/ኣ ተማሃሮ ብሒሳብ ት/ቲ ውፅኢታዊ ከይኾና ዝገብሩ ፀገማት ዘርኢ ሓበሬታ</u>**

**በይዛኺ ቀጢሎም ብዘለዉ ዓ/ነገራት ምስምስምፅማዕኽን ዘይምስምፅማዕኽን በዚ ምልክት (√ )ተጠቒምኪ ግለፂ ።**

| ብጣዕሚ ይስማዕማዕ (ብይስ) | ይስማዕማዕ (ይስ) | ኣይወሰንኩን (ኣይወ) | ኣይስማዕማዕን (ኣይ) | ብጣዕሚ ኣይስማዕማዕን (ብኣይ) |
|---|---|---|---|---|

| ተ.ቁ | መሕተት | ብይሰ | ይሰ | ኣይወ | ኣይ | ብኣይ |
|---|---|---|---|---|---|---|
| 4.1 | ናይ ቤት ት/ትና ቤተ መፃሕፍቲ እኹል ዝኾነ ናይ ሒሳብ መጣቐስቲ መፅሐፍቲ ብዘይምህላዉ ኣብ ሒሳብ ት/ቲ ፅልዋ ይፈጥረለይ | | | | | |
| 4.2 | ናይ ቤት ት/ቤትና ናይ ኣወዳትን ናይ ኣጓላትን ሽቓቕ ነኪበየኑስለዘይኮነ ኣብ ሒሳብ ት/ቲ ፅልዋ ይፈጥረለይ | | | | | |
| 4.3 | ሒሳብ መምህርና ኩሉ ግዜ ገዛፅዮን ክፍሊፅዮን ይህብ | | | | | |
| 4.4 | ካብ ገዛይ ናብ ቤት ት/ቤቲ ዘሎ ርሕቐት ኣብ ሒሳብ ት/ቲ ፅልዋ ይፈጥረለይ | | | | | |
| 4.5 | ሒሳብ መ/ርና ዝህበና ክ/ፅዮን ገዛፅዮን ይእርም | | | | | |
| 4.6 | ቤት ት/ትና ናይ ደ/ኣ ናይ ንህና ማእኽል ስለዘየለ ኣብ ሒሳብ ት/ቲ ፅንቅፋት ይኾነኒ | | | | | |
| 4.7 | ሒሳብ መ/ራንና ን ደ/ኣ መጠናኽሪ ት/ቲ ይህቡ | | | | | |
| 4.8 | ናይ ቤት ት/ቲና መማኽርቲ ንደ/ኣ ተምሃሮ ስለ ሒሳብ ት/ቲ ምኽሪ ይህቡ | | | | | |
| 4.9 | መ/ራነይ መጠናኽሪ ት/ቲ ንክህቡ ድሌት ኣለዎም | | | | | |
| 4.10 | ሒሳብ መ/ራን መጠናኽሪ ት/ቲ ንደ/ኣ ምሃብ ግዜ ከምዘባኽን ይግምቱ | .. | | | | |

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|---|---|---|---|---|---|---|
| 4.11 | ኣብ ቤት ት/ትና ፅብቐ ዝኾነ ናይ ተምሃሮን መ/ራንን ርክብ ኣለ | | | | | |
| 4.12 | ቤተ መፅሓፍትና ሰዓት ገደብ ስለዘለዎ ክኣቱ ኣይደልን | | | | | |
| 4.13 | ቤት ት/ትና ንሒሳብ ዝኾውን እኹል ፔዳጎጂ ማእኸል ብዘይምህላዉ ኣብ ሒሳብ ት/ቲ ዕንቅፋት ይኾነኒ | | | | | |
| 4.14 | ሒሳብ መ/ራን ንሒሳብ ት/ቲ ብሞዴል ተሓገዞም ከምህሩ ድሌት የብሎምን | | | | | |
| 4.15 | ሒሳብ መ/ራንና ናይ ደ/ኣ ልዑል ውፅኢት ሒሳብ ት/ቲ ስለዘይፅበዩ ንደ/ተ ጥራሕ እዮም ዘተኹሩ | | | | | |
| 4.16 | ናይ ቤት ት/ትና መምህራን ደ/ኣ ኣብ ሒሳብ ዘለወን ክእለት ትሑት እዩ ኢሎም ይ<u>ኣምኑ</u> | | | | | |

**ክፍሊ:5ተ <u>ኣብ ዓ/ሓቂ መሰናድኡ ቤት ት/ቲ ን ደ/ኣ ተምሃሮ ብሒሳብ ት/ቲ ውፅኢታዊ ከይኾና ዝገብሩ ሓደ ሓደ ተወሰኽቲ ፀገማት ዘረኢ ቅጥዒ</u>**

ቀፂሉምን ዝቐረቡ ሕቶታት ዝረኣየ ኪ ሓሳብ ኣብቲ ባዶ ቦታ ሜልሲ:

1. ኣብ **ቤት ት/ትን ኣብ ገዛን አካባቢ** ዘለዉ ተ□ሰኽቲ **ፀገማት**

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2. **ኣብ ሒሳብ ት/ቲ** ፅቡቐ ይሰርሕ ኢልኪ ዶ ትሓስቢ? እወ ☐ ኣይሰርሕን ☐

ፅቡቐ ኣይሰርሕን እንተይልኪ ካብ ገዛን **ቤት ት/ትን** ወፃኢ ውፅኢታውን ከይኾውን ዝገብሩኒ ናይ ባዕለይ **ፀዅም** እንተሃልዩ:

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**4. ነዚ** መፅናዕቲ □□ቐም እ□ እትብልዮ ከሊእ ሓሳብ □□ ርኢዮ እንተሃልዩ:

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**Appendix C**

**Mekelle University**

**College of Natural and Computational Science**

**Faculty of Mathematics and statistics**

# Interview Guideline questions for school principals, councilors, Mathematics teachers and some selected female students.

## Interview for School principals

1. Is the interaction between mathematics teachers and female students can influence their achievement? How?

2. Do you think your school library has available and have relevant materials to your students?

3. Are there enough well qualified mathematics teachers in your school?

4. Does your school have facilities to respond to girls need? ( for example, separate toilet, providing instructional material, etc)

5. Does your school have any especial program that contributes for female students' mathematics achievement?

## Interview for Guidance and Counselor

1. Do female students get guidance and counseling service for their academic achievement difficulties in mathematics?

2. From your counseling experience how do you explain female students' attitude towards mathematics?

4. If female students' attitude to mathematics is negative do you think that it is emanating from home and school environment only?

5. How can you explain female students' interaction with their mathematics teaches? Is there any relation with teacher experience and his student interaction?

6. From your experience what portion of your school female students set the goal for their future? If not what is the reason behind?

## Interview for Mathematics Teachers

1. Do you think that female students in your school are motivated to learn and study mathematics? If not can you mention some of the reasons?

2. How can you explain the female students' participation both in class room learning activity and doing their project or assignment in their home or library?

3. What proportion of your female students doing homework and class work properly? If not what are the barriers?

4. Can you mention or suggest possible solutions to alleviate the problem that female students face in your school?

**Interview for Students**

1. How often your mathematics teacher provides homework and class work?

2. How often your teachers check your homework?

3. Have you done your homework properly?

4. Is there any problem that influences your study and doing homework in your home?

5. How often you study in your school library? If no, why ?

6. Do you think your school facilities such as (library, laboratory, pedagogical center, toilet, etc.) seem well coming nature for female students?

**Codes of interview Participant**

P1-Principal of Adihaki Preparatory School

P2-Principal of Adihaki Preparatory School

C1-Guidance and councilor of Adihaki Preparatory School

T1- Mathematics Teacher from grade 11

T2- Mathematics Teacher from grade 12

S1-Student from grade 11

S2-Student from grade 12

## Table of specifications

**Table of specification for achievement test of female students in Mathematics for grade 11.**

| No | content | knowledge | comprehension | application | analysis | *total* |
|---|---|---|---|---|---|---|
| 1 | set | 7 | 7 | 2 | 3 | 19 |
| 2 | Exponential function | - | - | 1 | - | 1 |
| 3 | Polynomial function | 1 | - | - | - | 1 |
| 4 | Absolute value | 1 | 1 | - | - | 2 |
| 5 | Quadratic equation | 1 | - | - | - | 1 |
| 6 | Real numbers | 6 | 4 | 3 | 1 | 14 |
| 7 | Linear equation | 1 | - | 1 | - | 2 |
| | total | 17 | 12 | 7 | 4 | 40 |

**Table of specification for achievement test of female students in Mathematics for grade 12.**

| No | content | knowledge | comprehension | application | analysis | *total* |
|---|---|---|---|---|---|---|
| 1 | polynomial function | 4 | 7 | 1 | 2 | 14 |
| 2 | Quadratic equation | 2 | 2 | 1 | 2 | 7 |
| 3 | Quadratic inequality | 1 | 3 | - | 1 | 6 |
| 4 | Linear equation | - | 1 | 1 | - | 2 |
| 5 | Composition function | 1 | 1 | - | 1 | 3 |
| 6 | Relation and function | - | 1 | | - | 1 |
| 7 | logarithm | 1 | - | 2 | 1 | 3 |
| 8 | Quadratic function | 1 | 1 | - | 2 | 4 |
| | total | 10 | 16 | 5 | 9 | 40 |

## Classroom Observations

Classroom observations of female students' during Mathematics lessons for grade 11 and 12 in selected classes.

| Sections | Number of female students in each class | Female students during observation | Time in min | No exercise | No text book | participations |
|---|---|---|---|---|---|---|
| 12A | 38 | 33 | 20 | 5 | 19 | 5 |
| 12C | 21 | 15 | 30 | 7 | 9 | 3 |
| 12G | 38 | 32 | 25 | 15 | 20 | 7 |
| 12H | 48 | 37 | 15 | 12 | 28 | 2 |
| 11A | 45 | 39 | 20 | 6 | 18 | 8 |
| 11D | 38 | 31 | 30 | 8 | 25 | 5 |
| 11E | 45 | 41 | 20 | 14 | 31 | 7 |
| 11G | 43 | 36 | 25 | 16 | 16 | 2 |