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# Factors influencing student's academic achievement in mathematics. A case of Kafa zone Tello Woreda Oda primary school

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# ABSTRACT

This study investigated the factors that influence the academic achievement of students in mathematics in Kaffa Zone Tello Woreda Oda primary school. The target populations for this study were 318 grades 5-8 students. This population was sampled using stratified sampling techniques and sample size was 160 students. The data was collected using questionnaire and interview from the student and by questionnaire from teachers. The data collected were analyzed using descriptive statistics and multiple linear regression models by using Statistical Package for Social Science (SPS-version 20). The finding of this study indicates students' academic achievement of mathematics, math-test anxiety and learning resources of mathematics. The significant relation of academic achievement with the predictor variables accounts for 56.8% of the variance. This indicates that the prominent factors for academic achievement of mathematics were students' attitude towards mathematics, studying system of mathematics, math-test anxiety and learning resources of mathematics. The other factors which investigated by a descriptive statistics were parents educational background, parents occupation, and teacher related factors such as teachers attitude towards the subject, teachers methodology and teaching strategies.

**Keywords:** Academic achievement, Attitude towards mathematics, Studying system, Math-test anxiety, Learning resources, Multiple linear regression

**Abbreviations:** CV: Coefficient of Variation; NCTM: National Councils of Teachers of Mathematics; MOE: Ministry of Education; SD: Standard deviation

# INTRODUCTION

# **Background of the Study**

Mathematics and human life are connected. Mathematics is a subject which depends on a number and numbering is one part of human life and knowledge. It plays a predominant role in everyday life of human being. Different individuals raised the utility of mathematics for each individual and the societies as a whole. Mathematics plays a key role in shaping how individuals deal with the various spheres of private, social, and civil life (Walshaw, 2009).

Mathematical ability is crucial for the economic success of societies (Lipnevich et al., 2011). In developed country, the value of it plays the vital role in science, technology, business, agriculture, computer science and other fields highly. And also, in looking of developed country, mathematics is one which opens the human mind for better understanding and conclusion. The study of mathematics belongs in a classical education but know the purpose of it is not clear for each individual learners and the society in currently.

# Statement of the Problem

Mathematics has a great role in science and technology. According to Firew Abebe (2014) problems related to learning Mathematics are common phenomenon among students around the world. This holds true in Ethiopian context too; there is number of factors that influence students' mathematics achievement positively or negatively. According to Nor Fadilah (1992) some prominent factors that contributed to difficulties in learning mathematics are students dislike in mathematics that they may have stem from psychological incidences such as fear endurance, perseverance and other associated factors. But on this studies the achievement of students in mathematics will be influenced by various factors, such as teachers teaching methods, teaching commitment, teachers' attitude, learning resources, studying methods of students, time management and students attitude towards learning mathematics.

# **Objective of the Study**

**General objective:** The main objective of this study is to determine the factors that influence students' academic achievement of mathematics.

**Specific objective:** The specific objective of this study is:

- To investigate the relationship between students attitude, studying system, test anxiety, learning resources with academic achievement of students in mathematics.
- To identify dominant factors that affect student's mathematics achievement.
- To identify factor's related to teachers that affect the students' achievement in mathematics.

# Significance of the Study

The output of this study will be expected to have the following significances:

- It will create awareness for mathematics teachers to choose the effective teaching strategies to teach mathematics at primary levels.
- It is used to increase students' mathematics achievement atprimary level.
- Maximize the interest and performance of students towards learning mathematics discipline.
- Able to utilize mathematics for solving societal problem.

#### Scope of the Study

In Ethiopian context, most of the researchers conduct their research at the students of cities or towns of the zones. But they didn't consider the students at rural. The students at cities have more facilities than students at rural. This study will conduct in SWE, Kaffa Zone Tello woreda Oda primary school. The students at Oda primary school are from rural and most of their parents are farmers. Hence, the study will also restricted to some determinants that influence students' mathematics achievement related to students, teachers and parents.

## Limitations

This study was limited to Oda primary school which was found in Kaffa Zone Tello Woreda town. The subjects of

this study were also limited to only grade 5-8 learners. Secondly, the time period for conducting the study seems very short because of the internet connection problems in our college to search current references for the research.

# LITERATURE REVIEW

The main purpose of this chapter is to cite out in to related topic and studies that written by researchers related to the factors influence academic achievement of students in mathematics.

#### Academic Achievement

Academic achievement is a combination of ability and effort, presumably ability being equal to those with higher motivation, more effort and will, who achieve higher grades. Academic achievement is the accomplishment or acquired proficiency in the performance of an individual in a given skill or body of knowledge. Academic achievement means "knowledge attained and skill developed in the school subjects usually designated by test scores or by marks assigned by teachers or by both".

# **Students Attitude toward Mathematics**

Attitudes are defined as the overall positive or negative evaluation of the behavior. Comparing mathematics attitude links to mathematics performance across the U.S. and Belarusian samples allowed us to test the strength of the attitude and achievement relationship across different cultures and the structure of mathematics attitudes in countries where students' hold differing levels of negative attitudes toward mathematics. Attitude as a concept is concerned with an individual's way of thinking, acting and behaving. It has very serious implications for the learner, the teacher, the immediate social group with which the individual learner relates, and the entire school system. Attitude toward mathematics is just a negative or positive disposition towards mathematics. Pupils, feelings are important and strongly affect the amount of work, effort put forward and the learning that is acquired. Thus attitudes determine the effort a student is likely to put in his learning of a subject (Mohamed, 2010). When students fail to enjoy mathematics lesson, they develop a negative attitudes subject. This eventually leads to low achievement in the subject (Wekesa, 2013). Children who develop more positive competence-related beliefs and values for activities they believe are appropriate for their gender tend to seek more engagement of such activities in the future (Adeleke et al., 2013). Learners fail to the belief that, mathematics is naturally difficult. This implies that the learners believed that mathematics was by nature difficult and there was no nothing they could do to pass (Tahie and Chirche, 2013).

#### **Time Management in Studying Mathematics**

Time management is key academic success. Students around the world learn this sooner or later. The students

are not necessary those who are smarter, but those who use their time effectively. According to as cited Lokein in Lawrence, effective time management refers to the use of particular techniques such as "to-do" lists or deliberating planning activities or to participate in training with purpose of learning to master and use such a technique. In a review literature of study conducted by Xolani, there is no significance link between student time management skill and academic achievement.

# **Test Anxiety of Students**

Math test anxiety most often appears initially as a "mental block" on a particular problem-often one that the student "knew" how to do moments before the test. Worry over the original problem can lead to more generalized worry and negative self-talk, which can sabotage the students overall test performance (Test Anxiety, Wikipedia).

Students with math test anxiety have reported tension and the inability to manipulate numbers, formulas principles in exam time. Mathematics anxiety has consistently been proven to be debilitating on mathematics achievement. Mathematics tests/examinations need enough time, proper seats and attractive to minimize anxiety of students and possibility of failure. The test administers should have to facilitate comfortable test condition for students at exam time. According Ali as cited in Groudlund, the guiding principle in administering any class room test was that all pupils must be given a fair chance to demonstrate their achievement of the learning outcomes being measured. This implies that the test maker administer should provide the physical and psychological environments that are conducive to the testes/examinees, and also control factors that might otherwise interfere with valid measurement include adequate space with comfortable seats and proper lighting and ventilation. The temperature should be comfortable and the entire environment should be quite to foster concentration. The psychological environment is equally very important; students may not be at their best if they are under severe tension, anxiety, or threat during examination. As cited Barrows et al., in Getachew found that students' level of anxiety can cause the students' academic performance and test anxiety prevent students' ability to focuses on academics which influence grades. Also Tota et al., found that anxiety and fear of students cause poor performance.

#### Learning Resources

The picture of reality provided by existing learning material has not fully touched the lives of students related to basic social mathematics students living in downtown area have not been able to apply basic mathematics concepts in their daily lives and do not have good foundation on it. The problem that often occurs is the application of mathematical concepts in real life actually is solved with a simple concept. In the design of learning systems, teaching materials facilitates to achieve the learning objectives. The determination of learning resources must be in accordance with the characteristics of students and regional characteristics. The development of learning tools is important for educator to make learning more effective, efficient, and competence available. Learning materials based on contextual teaching and learning will be a good solution to increase students' achievement on mathematics (Mohammad Anang Taufik et al., 2019). Instructional resources can refer to any resources used by teachers and students within or beyond classrooms, while learning resource differentiates the resources used by students with the purpose of learning from those resources used by teachers for teaching, although there is always some overlap. Generally speaking, learning resources are the objects facilitating learners' learning, as the mediator presenting and passing knowledge in addition to teachers' instruction. Therefore, learning resources play an important role in both self-study and didactical situations (Yi Wang, 2018).

#### **Teacher's Commitment in Teaching Mathematics**

Mathematics teachers' commitment in teaching mathematics is basic for positive attitude formation in students. Birku, found that teacher were not satisfied with their job due to insufficient rewards, poor recognition, promotion, advancement, further education and transfer opportunity. The consequences of these factors were teachers' low internal motivation, low morale and commitment. Also as cited Tyree in Birku found that teachers' commitment as transmitting knowledge and value involved teachers' willingness to exert the efforts to provide effective teaching to show greater enthusiasm to teach the subject matter and as a consequence to devote extra time to students as person's as well as the subject tough. According to Musau et al., the finding of the study suggests that teachers' qualification and experience does not significantly influence the students' academic performance in science, mathematics and technology subject. Thus, the student' performance may be improve by other factors such as career growth of the teachers which may lead to teachers' satisfactions resulting in being more committed to the teaching job. Wekesa, in his study suggests that teachers experience affects the academic achievement in the subject. This illustrate that teachers experience is an important human factors that should be taken in to consideration while implementing the strategies to enhance the performance in the subject. Teachers were not satisfied with their job due to poor recognition, promotion, insufficient rewards, advancement, further education and transfer opportunity. The consequences of these factors were teachers' low internal motivation, low morale and commitment.

The positive attitude of mathematics teachers towards teaching mathematics is important for academic achievement of students. According Mensah et al., in their study stated that teacher attitude toward teaching mathematics is seen as important factor in the formation of students attitude towards the learning of the subject. Therefore mathematics teachers can positively influence students" attitude toward mathematics by demonstrating positive attitude toward the teaching the subject in the class. Mensah found that a significant relationship was found between teachers and students attitude towards mathematics. According to Wekesa, the study found that a high percentage of teachers never wanted teaching career. It also found that half of students perceived mathematics teachers as have a positive attitude towards learning activities.

Mwenda et al., in the study stated that the creation of positive attitude towards mathematics a very important strategies that needs to be done to enhance students" performance in the subject.

# **Mathematics Teachers Teaching Strategies**

Motivating students is one strategies of teaching mathematics for success of academic achievement of students. According to Aifred, motivating students to be receptive is one of the most important aspects of mathematics instruction and a creative calm aspects of the common core state stands. Effective teachers should focus attentions on the less interested students as well as the motivated ones. Furthermore, teachers of mathematics must understand the basic motives already present in their learners. The teachers can then play on these motivations to maximize engagement and enhance the effectiveness of the learning process. Mensah at al., explain that positive reinforcement creates room for formation of positive attitude for mathematics. And by no means is students' observation of teachers' behavior especially in relation to mathematics among the least of the factors that influence their attitude toward mathematic. As cited Amazato et al., in Kylie Sweeting found that teaching strategies which are considered to facilitate positive attitudes in students are being adopted in many mathematics method causes in order to model these effective strategies and producing positive attitudes with pre service teachers. Also as cited Darlinng et al., in Berry III found that cause of the achievement gap one was low teacher expectations others includes the lack of teacher training, understanding of diversity, and mathematical content knowledge. In addition, they

contended that not enough time is allotted for mathematics instruction and lack emphasis on basis on basic skill, which causes may students under achieve. Groulus et al., giving students both opportunity to discover and invent new knowledge and an opportunity to practice what they have learned improves students' achievement. In a study conducted in Nairobi at the secondary schools, as cited Team of mathematics teachers in Ali the major finding indicated that variation in mathematics performance was found to be significantly influenced by the type of teaching method. The inductive teaching method was found to be superior to the traditional approach, especially with respect to achieving higher order cognitive skills. Mwenda et al., found that using variety of teaching method as significant in boosting in performance in mathematics. As cited Miheso in Monmed, notes that no single teaching method can be the method of choice for all occasions. According to Wekesa, the majority of the mathematics teachers were ineffective and inefficient in their teaching methods and strategies; they hardly prepared and used critical professional record like the lesson notes.

# METHODOLOGY

# **Description of the Study Area**

The study was conducted in South West Ethiopia, Kaffa Zone Tello Woreda Oda primary school. Oda was the town of Tello Woreda and located on the South East of Bonga at 45 kilometres. Oda primary school was also located East of Oda town around 1 kilometres far from the main road.

# Sample Determination and Sample Size

The sample size determination for this study was proportionate stratified random sampling formula: This was

$$n=(N_h/N) \times n_h$$

Where,

 $n_h$ =Sample size for  $h^{th}$  stratum

N<sub>h</sub>=Sample size for h<sup>th</sup> stratum

N=Size of the entire population

n=Size of the sample

So, the sample taken for this study was showed in the following Table 1.

Table 1: Sample size.

Grades	Sex	Total population	Number of sample
5 <sup>th</sup>	Male	19	10

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	Female	20	10
6 <sup>th</sup>	Male	45	23
	Female	33	17
7 <sup>th</sup>	Male	58	29
	Female	60	30
8 <sup>th</sup>	Male	35	16
	Female	48	25
Total		318	160

# **Model Description**

Multiple linear regression equation models are given by;

 $Y_{i} = \beta_{0} + \beta_{1} x_{1i} + \beta_{2} x_{2i} + \beta_{k} x_{ki} + \varepsilon_{i}$ 

Where, i=1,2,3.....n

Y<sub>i</sub> is dependent variable

 $x_{1i}$ ,  $x_{2i}$ , ...,  $x_{ki}$ , are predictors variables

The parameters  $\beta_0$ ,  $\beta_1$ ,  $\beta_2$ ,..... $\beta_k$ , are called regression coefficient and  $\epsilon_i$  is residual term which provides for random variation in Y not explained by the x variable

# Hypothesis test

A statistical hypothesis is a formal way of writing a prediction about a population. Every research prediction is rephrased into null and alternative hypotheses that can be tested using sample data. While the null hypothesis always predicts no effect or no relationship between variables, the alternative hypothesis states your research prediction of an effect or relationship. The hypothesis for this study was:

# **Null hypothesis**

 $H_0=\beta_1=\beta_2=\beta_3...$   $\beta_{k-1}=0$ , (all X's have no effect on the academic achievement of students)

# Alternative hypothesis

H<sub>1</sub>: At least one  $\beta \neq 0$  whilst p<0.05.

#### **Test statistics**

$$\frac{\frac{R^2}{k}}{\frac{1-R^2}{n-k-1}}$$

Where,

k number of independent variables

R<sup>2</sup>=Coefficient of determination

n=Number of sample size

#### **Decision rule**

 $H_0$ : Rejected p-value less than 0.05 level of degree of accuracy at F-value.

 $H_1$ : Accepted p-value greater than 0.05 level of degree of accuracy at F-value.

# Test hypothesis for individual parameter

**H**<sub>0</sub>: There is no statistically significant difference between independent variables (attitude towards mathematics, studying system of mathematics, math test anxiety, learning resources) and academic achievement of students in mathematics.

**H**<sub>1</sub>: There is statistically significant difference between independent variables (attitude towards mathematics, studying system of mathematics, math test anxiety, learning resources) and academic achievement of students in mathematics.

# **RESULTS AND DISCUSION**

The data obtained from 160 students of Oda primary school students and 3 teachers were analyzed, presented, interpreted and discussed regarding the factors that influence academic achievement of students in mathematics. The descriptive statistics and regression analysis were used to analyze the collected data. The quantitative data was analyzed using Statistical Package for the Social Sciences (SPSS) (version 20).

# Socio-economic and Demographic Related Factors

From Table 2, 45% of respondents were males and 55% were females. The mean score of the achievement of male students of grade 5<sup>th</sup> was 66 with SD=14.4 and CV=21.8%; the mean score of grade 6<sup>th</sup> was 63.4 with SD=13.9 and CV=21.9%; the mean of grade 7<sup>th</sup> was 63.2 with SD=4.6 and CV=14.5%; mean of grade 8<sup>th</sup> was 67.2 with SD=6.2 and CV=9.5%. This shows that grade 8<sup>th</sup> male students have relatively higher mean, lower SD and lower CV as compared to other grades. The grade 8<sup>th</sup>

male students' score was more consistent than the other grade level of male students of this study. And also, the mean score of the achievement of female students in grade 5<sup>th</sup> was 65.04 with SD=7.5 and CV=11.53%; the mean score of grade 6<sup>th</sup> was 60 with SD=14.66 and CV=24.44%; the mean score of grade 7<sup>th</sup> was 68 with SD=9.1 and CV=13.3%; mean score of grade 8<sup>th</sup> was 58.6 with SD=11.98 and CV=20.4 %. From these grade

females students, grade 7<sup>th</sup> female students have higher mean, lower SD and lower CV as compared to other grades of this study. Therefore, grade 7<sup>th</sup> female students' result was more consistent as compared to other grades female students.

**Table 2:** Statistical description of achievement based on age and gender.

Variables	Categories	Ν	%				20	015 E.C	first sen	nester n	hath res	ult			
			-	Grade	e 5 <sup>th</sup>		Grad	<b>e 6</b> <sup>th</sup>		Grad	<b>le 7</b> <sup>th</sup>		Grad	<b>e 8</b> <sup>th</sup>	
				x	SD	cv	x	SD	сv	x	SD	cv	x	SD	сv
Gender	Male	72	45	66	14.4	21.8	63.4	13.9	21.9	63.2	9.2	14.5	67.2	6.4	9.5
	Female	88	55	65.04	7.5	11.53	60	14.7	24.5	68	9.1	13.3	58.6	11.9	20.4
Age in	<17	146	91.3	65.52	11.6	17.7	67.2	16.6	27.7	68.5	10.8	15.5	66	14.7	22.2
year	17-30	12	7.5							-			53.59	3.4	6.34
	>30	2	1.3							-			56.4	2.5	4.4

From the Table 3, 15.6% of students' father was not educated and 30.6% of their father was attended elementary education. And also, 38.1% of their father was attended the high school education and 15.6% of the students father was attended college and above. In grade 5, the students whose father studied college and above was mean 69.6 with SD 5.6 and CV=8.04%. This is the highest mean, lowest SD and lowest CV. The achievement of students whose father studied in college and above was more consistent than the fathers' of not educated, attended elementary education and high school education. Therefore, in this grade, the students whose father studied college and above was better performance in achievement level of mathematics. The higher the parents' level of education is, the more time they spend with their children in activities related to education, the greater their involvement in school activities is, and the lower the psychological costs of children in coping with educational effort.

Table 3: Statistical description of achievement based on parental education.

Variables	Categories	s N	jories N	%				2015 E	.C first s	emester	mathema	itics resu	ılt			
			-	Grad	e 5 <sup>th</sup>		Grad	le 6 <sup>th</sup>		Grade	ə 7 <sup>th</sup>		Grad	e 8 <sup>th</sup>		
				x	SD	сv	x	SD	cv	x	SD	cv	x	SD	сv	
Educational level of father	Not educated	25	15.6	67.3	6.8	10.1	65.3	13.5	20.6	64.5	3.4	5.2	69.5	11.8	17	
	Elementary	49	30.6	55.3	10.8	19.5	58.5	8.8	15	63.2	6.8	10.7	65.5	13	19.8	
	High school	61	38.1	55.5	12.6	21.5	67.6	5.8	8.5	65.3	12.8	19.6	54.4	5	9.19	
	College and above	25	15.6	69.6	5.6	8.5	65.8	18.6	28.2	67.9	8.8	13	59.6	13.4	22.5	

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Educational level of mother	Not educated	26	16.3	65.4	9.2	14.1	67.3	5.5	8.1	63.4	7.4	11.6	59.12	6.8	11.5
	Elementary	71	44.4	67.8	8.4	12.4	58.4	6.35	10.8	62.2	4.4	7.07	63.5	15.6	24.6
	High school	42	26.3	54.6	13.2	24.4	65.6	12.6	19.2	64.5	8.6	13.3	64.2	11.4	17.8
	College and above	21	13.1	69.3	4.5	6.4	64.3	15.4	23.9	66.8	2.5	3.74	68.3	6.26	9.16

In grade 6<sup>th</sup>, the students whose father attended high school education was mean 67.6, SD=5.8 and CV=8.5%. This is the highest mean, lowest SD and lowest CV in this grade level. The achievement of students whose father attended high school education was more consistent than the fathers' of not educated, attended elementary education and studied college and above. Therefore, in this grade, the students whose father attended high school education were better performance in achievement level of mathematics. In grade 7<sup>th</sup> and 8<sup>th</sup> the mean of students was closest. There is slightly CV of achievement of students among not educated, attended elementary education, high school education and studied college and above.

And also, 16.3% of students' mothers' was not educated and also 44.4% of their mother was attended elementary education; 26.3% of their mother was attended the high school education and 13.1% of their mother was attended college and above. The students whose mother studied college and above was mean 69.3, SD=4.5 and CV=6.4% in grade 5; mean of 66.8, SD=2.5, CV=3.74% in grade 7 and mean of 68.3, SD=6.26, CV=9.16 grade 8. In grade 5, grade 7 and grade 8, the students whose mother educated college and above have higher mean, lower SD and lower CV as compared to other mothers' educational level. This result was consistent that means the students whose mother studied college and above have highest academic achiever. The students' whose mother not educated was mean 67.3, SD=5.5 and CV=8.1% in grade 6; this was the highest mean, lower SD and lower CV as compared to other three grades of mothers' educational level. Therefore, there was a flactuation of achievement as mothers' educational level in each grade. From literature review Parents' education has highest effect or predicts students' academic achievement in mathematics.

Parents' occupation plays a vital role in academic achievement of students. From the Table 4, 25% of students' father was a merchant, 43.8% of their father was a farmer; 23.1% of their father was employee and 8.1% of their fathers' occupation was others. Most of the Oda primary school students' father was a farmer.

**Table 4:** Statistical description of achievement based on parents' occupation.

Variables	Categories	N	%				2015 I	E.C first	semest	er math	ematics	result			
				Grade 5 <sup>th</sup> Grade 6 <sup>th</sup>					Grade	ə 7 <sup>th</sup>		Grade	ə 8 <sup>th</sup>		
				x	SD	cv	x	SD	сv	x	SD	сv	x	SD	cv
Father's occupation	Merchant	40	25	64.3	3.5	5.4	61.4	15.3	24.8	66	9.61	14.56	65.3	11.8	18.1
	Farmer	70	43.8	62.5	4.9	7.8	60.6	14.2	23.4	58.6	5.54	9.4	61.5	13	21.1

Glob. Res	Glob. Res. J. Educ, January 2025Yesho, et al.							8	3						
	Employee	37	23.1	61.4	15.5	25.2	25.2 64 5.6 8.7 67.8 2.44 3.5 49.2						49.2	1.74	3.5
	Others	13	8.1	56.7	12.3	21.6	62.3	9	14.4	57	3.8	6.6	59.5	6.7	10.7
Mother's occupation	Merchant	27	16.9	61.6	3.28	5.3	58.6	12.5	21.3	59.6	9.9	16.6	61.4	7.4	12.1
	Farmer	58	36.3	68	8.5	12.5	64.5	6.8	10.54	60	9.44	13.6	68.6	12.6	18.4
	Employee	32	20	63.5	4.4	17.7	61.6	13.5	21.9	69.3	2.5	3.6	63.5	9.52	14.9
	Others	43	26.9	54.6	12.9	23.6	59.6	12.5	20.977	59.5	8.58	14.4	56.2	5.42	9.6

In grade 5, the mean of the achievement of whose father a merchant was 64.3, with SD=11.8 and CV=5.4%. Relatively, whose father a merchant was higher mean, lower SD and lower CV as compared to fathers' occupational levels. This implies that the students whose father a business man was relatively a better performance.

In grade 6, the mean whose father an employee was 64 with SD=5.8 and CV=8.7%. Relatively students' whose fathers an employee was higher mean, lower SD and lower CV as compared to fathers' occupational levels.

In grade 7, the mean whose father an employee was 67.8 with SD=2.44 and CV=3.5%. Relatively students' whose fathers an employee was higher mean, lower SD and lower CV as compared to fathers' occupational levels.

In grade 8, the mean of the achievement of whose father a merchant was 65.3 with SD=5.91 and CV=18.8%. In this grade, the mean and SD were high relative to the other occupational levels but it lacks consistent as compared to the others.

The most significant finding with regards to the relationship between parents' occupation and students' image of mathematics may be with regards to students whose parents are involved in mathematics-related occupations.

Mother occupation is very important for the achievement of students. From the Table 4, 16.9% of the students' mother was a merchant, 36.3% was a farmer, 20% was an employee and 26.9% was in the other occupation. The highest mean score of students in grade 5 was 68 with SD=8.5 and CV=12.5%. This indicates that the students whose mother was a farmer have relatively better performance in academic achievement. There is variability in SD and CV. The higher mean with higher SD and lower CV or lower SD and higher CV indicates that there is lack of consistency for the achievement of students for each occupation.

And also, the highest mean score of students in grade 6 was 64.5 with SD=6.8 and CV=10.54%. Relatively students' whose mothers a farmer was higher mean, lower SD and lower CV as compared to mothers' occupational levels. The higher achiever is a student whose mother was a farmer.

In grade 7, the highest mean score was a student whose mother was an employee. The mean was 69.3 with SD=2.5 and CV=3.6%. Relatively students' whose mothers an employee was higher mean, lower SD and lower CV as compared to mothers' occupational levels. The higher achiever is a student whose mother was an employee.

In grade 8, the highest mean score was a student whose mother was a farmer. The highest mean here was 68.6 with SD=12.6 and CV=18.4%. This implies that the students whose mother a farmer was the better performance in academic achievement. But there is a lowering or highering of SD and CV in each occupation. This indicates the achievement was lack consistent. Parents' with high ranking occupational status might have enough income which can be used to provide the needed materials and support for their children in order to arouse their interest in mathematics than their counterparts in low ranking occupation whose major obligation is to provide shelter and food for the family. This review literature may be for a single and for urban students. In general, there is a variability of mean, SD and CV in achievement of mathematics for each grade and for each parent's occupation. The student whose parent was a farmer achieve high in one grade and the student whose parent was merchant or an employee achieve high in other grade. There is a fluctuation of achievement in each grade for each occupation of parents.

From the Table 5, 77.5% of the students have educated elder siblings and 22.5% have no educated elder siblings. And also, 23.15% get academic support from their siblings and 50% didn't get a support from their siblings. Sibling influences on mathematics achievement. But in in grade 5, the students who have no educated siblinsssgs have mean 68.6, SD=3.28 and CV=4.78%. It

has the higher mean, lower SD and lower CV. Thus, the students who have no elder siblings achieved highest relative to the students who have educated elder siblings.

**Table 5:** Statistical description of siblings support in mathematics.

Vari Cate N		te N % 2015 E.C first semester mathematics result													
able s	gori es		-	Grad	e 5 <sup>th</sup>		Grad	le 6 <sup>th</sup>		Grad	e 7 <sup>th</sup>		Grade	e 8 <sup>th</sup>	
				x	SD	cv	x	SD	cv	x	SD	cv	x	SD	cv
Have	Yes	124	77.5	65.3	11.6	17.8	65.6	6.5	9.9	62.5	6.04	9.66	58.5	4.1	7.1
educated elder brother/ sister?	No	36	22.5	68.6	3.28	4.78	62.5	13.4	21.4	64.3	5.98	9.3	65.2	16.3	24.9
Do	Yes	37	23.1	64.5	12.2	18.9	63.6	13.6	21.3	62.4	3.78	6.05	57.6	5	8.68
you get academic support?	No	80	50	67.4	7.68	11.4	61.4	9.4	15.3	65.4	7.74	11.8	65.66	20.2	30.8

# Student Related Factors on Achievement of Mathematics

The attitude based items for this study were like doing mathematics, hating learning mathematics, difficultness of mathematics, interest to develop math skills, usefulness of mathematics, creativity and memorization of mathematics, the use of math skill to other subjects, practice to hold the concept and motivation to work hard in mathematics. These items are statistical described by using likert five point scales. These likert point scales are strongly agree=1, agree=2, undecided=3, disagree=4 and strongly disagree=5. The interpretation of the scores a value between 2.5 and 3.4 meant of medium attitude: on the other hand, a value between 3.5 and 5.0 meant a positive attitude while a value between 2.4 and 1.0 meant a negative attitude (Githua, 2013). From Table 6, the mean of likert point scale was between 2.5 and 3.4, which indicates negative attitude towards mathematics. The Coefficient of Variation (CV) showed that there is a 59.8% a variation of students in responding likert point scales on each item of the attitude. Therefore, the students of Oda primary school have a negative attitude towards learning of mathematics. When students fail to enjoy mathematics lesson, they develop a negative attitudes towards the subject and eventually leads to low achievement in the subject.

Most of the students believe that mathematics is difficult by nature. Learners fail to the belief that mathematics is naturally difficult. This belief also leads to the failure of the achievement in mathematics. Thinking the difficultness of it influences on the achievement of students and in class room learning. It does not give a pleasure and enjoyment in learning. This showed that most students not happier in mathematics periods than in any other subject periods. Students were happy that they had the chance to explain mathematics to their classmates and they meet their own expectations even though it was difficult, it was an important skill to learn as a future teacher.

Table 6: Descriptive statistics on attitude, studying system, test anxiety and learning resource.

N	Mean	Std. deviation	CV		
Statistic	Statistic	Statistic	Statistic		

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Students attitude towards mathematics	160	2.39	0.43	59.83%
Studying system of mathematics	160	2.3	1.431	62.20%
Math test anxiety	160	2.2	1.415	64.30%
Learning resources	160	2.23	1.401	62.82%
Valid N (list wise)	160			

#### **Statistical Model Analysis**

**Multiple linear regression statistical analysis:** The multiple linear regression models are an extension of a simple linear regression model to incorporate two or more explanatory variable in a prediction equation for a response variable. Multiple linear regression modeling is now a main stay of statistical analysis in most fields because of its power and flexibility.

to Tabochnick and Fidell, state that normality distribution was between skewness or kurtosis of dependent variable. Skewness and kurtosis that are closer to zero, statistic tables indicates normal distribution of dependent variable Therefore, skewness and kurtosis Table 7 shows that normal distribution of dependent variable. Moreover, the Q-Q plot Figure 1 indicated that dependent variable is normally distributed over the imaginary line. Thus, normality assumption satisfied.

# **Tests for Assumptions**

**Normality assumption:** Assumption of normality depends on skewness, kurtosis and Q-Q plot. According

Table 7: Skewness and kurtosis of academic achievement.

	Ν	Skewness		Kurtosis		
	Statistic	Statistic	Std. error	Statistic	Std. error	
Achievement of students	160	0.289	0.192	-0.794	0.381	
Valid N (list wise)	160					



**Figure 1:** Normal Q-Q plot of students' mathematics achievement.

The data is distributed normally without forming any pattern. Normality assumption refers that the error term should be normally distributed. Therefore, the normality of residuals with the Q-Q plot of was checked. The Q-Q plot indicates that in this multiple linear regression analysis there is no tendency in the error terms. Moreover, the Q-Q plot Figure 1 indicated that dependent variable is normally distributed over the imaginary line. Thus, normality assumption satisfied.

**Test of linearity assumption:** To check linearity assumption the graph of P-P plot of dependent variable with independent variables was given by Figure 2. This shown that residual point was linearly distributed over the imaginary line. Keith, states that the residuals magnify the departure from linearity. If there is no departure from linearity the researchers were expect to see a random scatter about the horizontal line. Therefore linearity assumption satisfied.

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Normal P-P Plot of Regression Standardized Residual



**Figure 2:** Normal p-p plot of regression standardized residual.

**Test of equal variance:** According to Keith, statistical software scatter plots of residuals with independent variances are the method for examining the assumption. Thus, no systematic pattern or clustering of residuals suggests equality of variance. Therefore scatter plot graph satisfied assumption of equality of variance (Figure 3).

Table 8: Values of variance inflation factor.



#### Figure 3: Scatter graph

Table 8, showed that, all Variance Inflation Factor (VIF) is less than 2. According Keith if VIF less than 10 no problem of multi-co linearity. The Variance Inflation Factor (VIF) is greater than 0.10 and less than 10. Therefore non-multi-co linearity assumption met.

Variables		Correlations Co-linearity statistics			
_	Zero-order	Partial	Part	Tolerance	VIF
Students attitude towards mathematics	0.03	0.043	0.038	0.984	1.016
Studying system of mathematics	0.133	0.206	0.189	0.809	1.236
Math test anxiety	-0.102	-0.178	-0.162	0.955	1.047
Learning resources	-0.028	-0.131	-0.118	0.854	1.171

**Model fitness:** From Table 9, the multiple linear regression models with four predictors has an R squared value of 56.8% of variation in academic achievement of students. From this model summary of R value show that 0. 757 correlations between the predicted value and the observed value of the achievement of students. From the values of adjusted R-squared we can observed that the explanatory power of regression model that contain

different numbers of predictors. Since in R square there is a relationship between a dependent variable and the set of independent variables. This means that the independent variables explain 56.8% of the variation in the dependent variable.

Table 9: Model summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.757 <sup>a</sup>	0.568	0.202	1.107

Note: a Predictors: (Constant), students attitude towards mathematics, time allocation to mathematics, math test anxiety, learning resources.

**Hypothesis 1:**  $H_0:\beta_1=\beta_2=\beta_3=....=\beta_{k-1}=0$  (all have no effect on the academic achievement of students).

**H**<sub>1</sub>: At least one  $\beta \neq 0$ , whilst p<0.05.

**ANOVA:** Table 10 represents the p-value (p=0.000) for the F (3.691) is less than 0.05. Based on Null hypothesis;  $H_0$ :  $\beta_1=\beta_2=\beta_3=....=\beta_{k-1}=0$  and alternative hypothesis;  $H_1$ : At least one  $\beta \neq 0$  whilst p<0.05 with hypothesis decision rule  $H_0$  reject for p-value greater than 0.05 level of degree of accuracy, Bahrain et al. This means that at least one of the independent variables is a significant predictor of the dependent variable. Therefore, the null hypothesis is rejected and then the alternative hypothesis is accepted. For this reason the multiple linear regression models is fit.

# Test hypothesis for individual parameters in the model

 $H_0:$  There is no statistically significant difference between independent variables (attitude towards mathematics,

Table 11: Result of output linear regression.

Model

time allocation to study mathematics, math test anxiety, learning resources) and academic achievement of students in mathematics.

**H**<sub>1</sub>: There is statistically significant difference between independent variables (attitude towards mathematics, time allocation to study mathematics, math test anxiety, learning resources) and academic achievement of students in mathematics.

**Coefficients:** From Table 11 all the independent variables are statistical significant. All have positive coefficients for each independent variable. Thus, for every 1% increase in the student's attitude towards mathematics, math test anxiety, studying system of mathematics and learning resources there is an increase of 4.68%, 4.39%, 3.36% and 3.16% in the predicted value of the academic achievement.

t

Standardized

				Coefficients		
	_	В	Std. Error	Beta		
1	(Constant)	2.653	0.475		5.586	0
	Students attitude towards mathematics	4.686	0.07	0.279	3.743	0
	Studying system of mathematics	4.39	0.13	0.333	3.005	0.003
	Math test anxiety	3.364	0.129	0.437	2.829	0.005
	Learning resource	3.167	0.091	0.168	1.829	0.04
		Note: a. Depend	lent variable: Achieve	ement of students		

**Unstandardized Coefficients** 

The statistical model given here is:

 $Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4$ 

Where,

Y is the academic achievement of students

x<sub>1</sub>: Students attitude towards mathematics

x<sub>2</sub>: Studying system of mathematics

x<sub>3</sub>: Mathematics test anxiety

x<sub>4</sub>: Learning resource

#### β<sub>0</sub>: Y-intercept

 $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  are the coefficients which indicates the vertical change of the academic achievement of students.

When we take the mean of five point likert scale values, which is 3.5, then the assumption of one students result becomes,

Y=2.653+4.68(3.5)+4.39(3.5)+3.364(3.5)+3.167(3.5)

Y=57.5

Sig.

This, Y-value indicates the achievement score of one student which is closest to the R-square value. For the hypothesis, the p- value less than 0.05. Therefore, the null hypothesis, H<sub>0</sub>: There is no statistically significant difference between independent variables (attitude mathematics, time allocation to towards study mathematics, math test anxiety, learning resources) and academic achievement of students in mathematics is rejected and hence H1: There is statistically significant difference between independent variables (attitude towards mathematics, time allocation to studv mathematics, math test anxiety, learning resources) and academic achievement of students in mathematics is accepted. From review literature, students' interest in learning mathematics contributes significantly in the prediction of students' academic achievement (Kpoiovie, et al., 2014), this is also the same to this study. But according to Xolani, there is no significance link between students studying system and academic achievement. Therefore, there is a significant different between academic achievement and studying system of mathematics.

#### **Background Information of Teachers**

The teachers' who have taught grade 5-8 in Oda primary school were males. From these 33.3% of them were ages below 30 years and 66.6% of them were ages between 30 and 40 years old. And also, 33.3% of the teachers were below 10 years of experience and 66.7% of them were between 10 and 20 years of experience of teaching mathematics in primary schools. Experience is major factor that determines the proper teaching-learning of mathematics. Experienced teachers usually try to identify the prior knowledge of the students and try to match to the current instructions. Teachers experience affects the academic achievement in the subject Experienced teachers have mathematics. better pedagogical knowledge so that they can adapt to meet the learning styles of individual students. Teachers' experience and educational qualifications were the prime predictors of students' academic achievement which is the direct consequence of effective teaching-learning (Table 12).

Table 12: Description statistics of teachers' back ground information.

Items	Categories	f	%
Gender	Male	3	100
	Female	-	-
Age of teachers	Less than 30 years	1	33.3
	30-40 years	2	66.7
Teaching experience	Less than 10	1	33.3
	10-20 years	2	66.7
	Above 20 years	-	-
Teachers qualification	Diploma	1	33.3
	First degree	2	66.7
Teachers commitment in	Yes	3	100
leaching mathematics	No	-	-
Teachers commitment in	Yes	3	100
teaching tutorial	No		
Choice of teachers in joining	Yes	3	100
university/conege	No	-	-
Do you think society	Yes	2	66.7
appreciates your work?	No	1	33.3

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Do you think students	Yes	2	66.7
appreciate your work?	No	1	33.3

# **Attitude of Teachers towards Mathematics**

The categories of the item given for the teachers were 5-likert scales. These are, strongly agreed, agree,

undecided, disagree and strongly disagree. But that put on the table was only the teachers responded (Table 13).

Table 13: Statistical description of teachers' responses on attitude towards mathematics.

Items	Categories	f	%
Mathematics is difficult	Strongly agree	1	33.3
subject by hature	Undecided	1	33.3
	Disagree	1	33.3
Teaching mathematics not	Disagree	2	66.7
need resource	Strongly disagree	1	33.3
Mathematics is essential for daily life	Strongly agree	3	100
More practice enhances understanding of mathematics concept	Strongly agree	3	100
Mathematics is an interesting	Strongly agree	2	66.7
Subject	Agree	1	33.3
I feel nervous when teaching	Strongly agree	1	33.3
maun	Agree	2	66.7
Mathematics is easy to teach	Strongly agree	2	66.7
	Agree	1	33.3
I like solving mathematics	Strongly agree	2	66.7
problem	Agree	1	33.3
Mathematics is challenging to teach	Strongly agree	3	100

From the Table 13 all teachers strongly agree that mathematics is challenging to teach. But, 33.3% of teachers responded that mathematics is difficult subject by nature and 33.3% suspected about its difficultness in nature. From this, 33.3% of teachers responded that mathematics is not difficult in nature. So, the difficultness of mathematics in nature is difference according to each individual teacher. All teachers who participated on this study feel nervous when teaching mathematics. On the item of teaching mathematics need resources, 66.7% of

the teachers disagree and 33.3% strongly disagree about it. This indicates that majority of teachers need resources in teaching mathematics. From the respondents 33.3% strongly agree 66.7% agree about that mathematics is interesting subject. All respondents strongly agree about mathematics is essential for daily life and more practice enhances the understanding of mathematical concepts. But, 66.7% strongly agree and 33.3% agree on that they like solving mathematical problems. When the teacher likes solving mathematical problems, he/she simply understand the concepts and impart it to the students in simple way. Mensah found that a significant relationship was found between teachers and students' attitude towards mathematics. This result basically shows that majority of teachers' attitude towards mathematics is not negative rather than a misconception like mathematics is not needs resource. The students learning to be in life, using different resources such as charts graphs and models etc. were advisable. In otherwise, expected objectives cannot be succeeded.

# Teachers' Methodology and Strategy of Teaching Mathematics

The categories of the item given for the teachers were 5likert scales. These are, strongly agreed, agree, undecided, disagree and strongly disagree. But that put on the table was only the teachers responded (Table 14).

Table 14: Statistical description of teachers' response on methodology of teaching.

Items	Categories	f	%
I think cooperative work in groups is good for effective learning	Strongly agree	3	100
I rarely arrange the students	Strongly agree	1	33.3
group work	Agree	2	66.7
Problem solving method of teaching offers students'	Strongly agree	1	33.3
opportunities for quick progress	Agree	2	66.7
I discuss worksheet problems with students	Strongly agree	3	100
There is a lack of time to	Strongly agree	2	66.7
my classroom teaching	Agree	1	33.3
Active learning method of teaching will create problems	Strongly agree	2	66.7
in my classroom management	Agree	1	33.3
I believe students learn more	Strongly agree	1	33.3
individually than in groups	Agree	2	66.7
It is difficult to cover the prescribed work if students	Strongly agree	2	66.7
ask many questions	Undecided	1	33.3
I think students have negative attitudes towards active	Strongly agree	1	33.3
learning	Agree	1	33.3
	Disagree	1	33.3
The amount of content that needs to be covered prevents	Strongly agree	2	66.7
the use of active learning in the classroom	Undecided	1	33.3
I use lecture method to help students to develop critical	Strongly agree	2	66.7
thinking skills	Agree	1	33.3

I believe that teaching at	Strongly agree	1	33.3
generally lecturer method	Agree	2	66.7
I always involve my students	Strongly agree	2	66.7
	Agree	1	33.3
l always help my students to	Strongly agree	1	33.3
and strategies in the teaching learning of mathematics	Agree	2	66.7
I think mathematics teachers	Strongly agree	2	66.7
and strategies during mathematics class	Agree	1	33.3
Lack of classroom space and	Strongly agree	2	66.7
group work	Undecided	1	33.3
	Strongly agree	2	66.7
I actively involving learners in highest level of thinking	Agree	1	33.3
I actively involving learners in	Strongly agree	1	33.3
lowest level of thinking	Agree	2	66.7
I promote peer learning and	Strongly agree	2	66.7
oreate synergy	Agree	1	33.3
I help pupil who learn well by modeling others	Strongly agree	2	66.7
modeling others	Undecided	1	33.3
l promote self confidence in mathematics	Strongly agree	2	66.7
mationalios	Agree	1	33.3
I provide opportunity for targeted questions	Strongly agree	1	33.3
	Agree	2	66.7
l foster independent learning skills in my teaching learning	Strongly agree	2	66.7
process	Agree	1	33.3
I allow learners to progress at their own rate	Strongly agree	2	66.7
	Agree	1	33.3
I am Interested to teach word	Strongly agree	2	66.7
	Agree	1	33.3

From the Table 14 all of teachers in Oda primary school think that cooperative work is good for effective learning

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and they rarely arrange the students in to groups and discuss work sheet problems with their students. In

learning of mathematics, students were more effective when they learn individual than in groups. The role of teachers should be changed to guiding and facilitating the teaching learning process rather than providing ready-made knowledge. Collaborative learning which learners work together usually in small groups on a shared activity and with a common goal has been widely recommended in recent times as a strategy to enhance mathematics learning for all students.

And also, most teachers' agreed that problem solving method of teaching create a problem in a class room. Because of lack of time to actively involve students in their class room and it is difficult to cover the prescribed work when the students ask many questions. Active learning indicates that involving the interaction of the student with his class mates.

Also, they agreed that wideness of the content prevents the use of active learning in the class room and the students' negative attitude towards active learning process is the challenges of implementing the active learning methods. Mostly lack of class room space and large number of students in the class prevents group work and involve students' in the class room activities. According to a study conducted in Nairobi at the secondary schools' team of Mathematics teachers, 2013, the major findings indicated that teaching-learning of mathematics was found to be influenced by the type of teaching methods and the interactive teaching method or the active learning method was found to be superior to the traditional approach specially with respect to achieving higher order skills.

Most teachers also involve learners in highest level of thinking, lowest level of thinking, promote peer learning strategy and create synergy in teaching learning process. They help the students who learn well by modeling for others; promote self confidence in mathematics and provide opportunity for targeted questions. The teachers also foster independent learning skills in their teaching learning process and allow learners to progress at their own rate and interested to teach word problems in their lesson. Using different mathematical learning styles and multiple intelligences for learning mathematics is relatively new approach to learn mathematics for understanding.

From Table 15, 38.8% of students strongly disagree and 30% of the students disagree about the item that their teachers explain mathematics easily. Teacher plays a great role in learning of mathematics in class room and for the academic achievement of students. When teacher didn't explain the mathematical concepts in simple way, it is difficult for the students to understand the main concepts. This way leads for the failures of academic achievement. And also, 38.8% of the students disagree, 19.4% of students strongly disagree and 19.4% of students strongly agree on the item that mathematics teacher can arouse their interest for mathematics. So, the highest percent of students responded that their teachers cannot arouse their interest for mathematics. On the item of mathematics teacher facilitates active participation during the instruction, 30% of students strongly agree, 18.1% of students agree and 25.6%strongly disagree and 24.5% of students disagree about the item. The percent of students who responded strongly agree and agree was 48.1% and strongly disagree and disagree was 50%. In class room teaching, the teachers' role was leading the students towards active participation in his/her class room instruction. Learning mathematics was a science of solving application problems. Most of applications need independent learning and the teachers' role was facilitating the learning mathematics. Mathematics teachers should teach in a way that enables students to learn mathematical concepts, principles and problem solving skills. In this cause the teacher is expected to adapt the learning environment so that each learner is able to develop and use different learning strategies and methods that are suitable for him or her.

Table 15: Students response on teacher teaching strategy of mathematics.

Items	Categories	f	%
My teacher explains	Strongly agree	39	24.4
manomation outly	Agree	10	6.3
	Undecided	1	0.6
	Disagree	48	30
	Strongly disagree	62	38.8
My mathematics teacher can	Strongly agree	31	19.4
mathematics	Agree	28	17.5

	Undecided	8	5
	Disagree	62	38.8
	Strongly disagree	31	19.4
My mathematics teacher	Strongly agree	48	30
during the instruction	Agree	29	18.1
	Undecided	3	1.9
	Disagree	39	24.4
	Strongly disagree	41	25.6
My mathematics teacher encourages me if I have difficulties with mathematics	Strongly agree	43	26.9
	Agree	22	13.8
	Undecided	2	1.3
	Disagree	53	33.1
	Strongly disagree	40	25
My Mathematics teacher	Strongly agree	33	20.6
works and give feedback	Agree	23	14.4
	Undecided	14	8.8
	Disagree	47	29.4
	Strongly disagree	43	26.9

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# CONCLUSION

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Based on the result of the study, the researchers investigated the factors that influence students' academic achievement of mathematics in Oda primary school. The finding of this study shows the relationship between students' attitude towards mathematics, studying system of mathematics, mathematics test anxiety and learning resources with academic achievement of students in mathematics. This relation was found by using multiple regression analysis and it was statistical significant which means the p-value less than 0.05. From the finding, also the R-squared value 0.568 indicates that the relationship between independent variables (students' attitude towards mathematics, studying system of mathematics, mathematics test anxiety and learning resources) and dependent variable (academic achievement of students in mathematics) were 56.8%. Depend on the R-squared value the dominant factors for the academic achievement of students of mathematics in Oda primary school were students' attitude towards mathematics, students studying system of mathematics, mathematics test

anxiety and learning resources. The remaining relations which holds 43.2% was parents socio-economic and demographic related factors such as parents' education, parents' occupation and teacher related factors. The teacher related factors were teacher commitment in teaching mathematics, teachers teaching methodology and teaching strategy and teachers attitude towards teaching mathematics the factors that influence the academic achievement of students in Oda primary school.

# RECOMMENDATIONS

Based on the basic findings the researchers would like to recommend the following points which require the attention:

- Mathematics teachers have to work hard in changing the perception of students that mathematics is a subject hard to understand.
- Teachers and parents should try and build selfconfidence in their students as it could boost student's

interest in learning and improve their attitude towards the subject mathematics.

• The college and the concerned bodies should cooperate with each school administrators, school community and the society by supplementing the school with a necessary materials and training the society to foster elementary students' mathematics achievement.

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