Attitude, Self-efficacy and Motivation of Students as Predictors Mathematics Achievement in General Secondary Schools in East Wollega Zone, Oromia Region

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A Thesis Submitted to the Department of Psychology in Partial Fulfillment of the Requirements of a Master Degree in Educational Psychology

Dedication

This thesis is dedicated to my brother Gemeda Afeta, my mother Zewuditu Nemera, my father Afeta Duressa and my wife Belainesh Tesema. Their wisdoms, patience, and encouragements have made all the difference throughout my career and my life.

Declaration

I, the undersigned, declare that the thesis on Attitude, Self-Efficacy and Motivation of Students as Predictors of grade 10 Mathematics Achievement in general Secondary Schools in East Wollega Zone, Oromia Region is my own work and that the sources I have used are indicated and clearly acknowledged in the references.

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Letter of Approval

Jimma University School of Graduate Studies

This is to certify that the thesis prepared by Lemessa Afeta Duressa entitled: "*The Attitude, Self-efficacy and Motivation of Students as Predictors of grade 10 Mathematics Achievement in general Secondary Schools in East Wollega Zone, Oromia Region''* and submitted in partial fulfillment of the requirements for the degree of Master of arts in Educational Psychology fulfils the regulations of the University and meets the accepted standards with respect to originality and quality.

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Acronyms and abbreviations

ATLSEM--Attitude towards Learning, Self-Efficacy and Motivation

CEBS -College of Education and Behavioral Sciences

CDM- Correlational Design Model

EGSECE- Ethiopia General Secondary Education Certificate Examination

GPA- Grade Point Average

MoE- Ministry of Education

NAE- National Assessment of Examination

NSSS- Natural Science at Secondary School

SDT- Self Determination Theory

SPSS- Statistical Package for Social Sciences

WEO- Woreda Educational Office

ZEO—Zone Educational Office

Abstract

The study investigated students' attitudes, self-efficacy and motivation as predictors of grade 10 mathematics achievement. To achieve the objective, 398 students were taken from grade 10 students of Dange, Jangir, Ano, Gute and Ifa Secondary Schools in East Wollega, Oromia Region using systematic random A questionnaire contained items on attitudes, self-efficacy and motivation in learning mathematics was administered. First semester grade 10 mathematics' score results were also obtained from the record office of the sampled secondary schools. SPSS version 20 software computer program was used to analyze the collected data. Pearson's product moment and multiple-regression analysis were employed to see the relationship among variables and how well the predictor variables predicted Mathematics achievement, respectively. The results revealed that the attitude, self-efficacy belief and motivation had statistically significant relationship to mathematics achievement in general, $r.776$ *F= (3,394), 198.673, P<0.00.* 60.2 *% of the variance in mathematics achievement is explained by the linear combination of attitudes towards learning, self-efficacy and motivation. Attitudes towards learning, self-efficacy and motivation in learning mathematics predicted significantly mathematics achievement, B. 420, B.354; B.143, t=8.5697, t=6.972 and t=3.063, respectively, p=<0.05. On the basis of these results, it was recommended that principals, supervisors, teachers, parents and educational practitioners should give due attention to students' attitude towards, self-efficacy and motivation in learning mathematics in secondary schools.*

Key-terms*: attitude towards learning, self-efficacy, motivation and mathematics achievement*

CHAPTER ONE

INTRODUCTION

This research thesis has five parts: introduction, review of related literature, research design and methodology, data analysis and discussion, summery and recommendation. Under the introduction part background of the study, statement of the problem, basic research questions, objectives of the study, significance of the study and delimitation, limitation and organizational of the study were presented.

1.1. Background

Education is often regarded as the most determinant factor for socio-economic development and progress of the countries. It is obvious that no country has achieved developmental goals without successful education and training programs (Gomez Zaccarelli, Schindler, Borko & Osborne (2018). Scientific knowledge, through technology, has a lot of practical application because the life that we live today is very different from those of a thousand or even fifty years ago. The knowledge we gain from science education can help us understand the purpose of science and mathematics of world and live in it successfully.

Mathematics is used as a foundation upon which nearly all natural science and some social science fields of studies are built. It is also more closely related to one's daily life as compared to other subjects. Except one's mother tongue there is no other subject it is more closely related to daily life as mathematics. For that matter, mathematics is a very important required course in secondary school. That is why recommendations of different studies suggested and stressed (Amunga & Musasia,2011), its importance for students to be proficient in this subject because, it plays an important role in career choices and professional development and also under achievement in mathematics limits ones opportunities in competitive professional courses at all tertiary levels.

The importance of mathematics in the world is not deniable. There is a general consensus among educators that mathematics is an important and useful subject for development in every country. The use of mathematics has been with man even before the introduction of formal education (Sambo cited in Muhammad& Ibrahim, 2014).

In Ethiopia, mathematics is a prerequisite for admission into university and college. It is used as a language for science and technology (MoE, 1994). Indeed, the Government of Ethiopia has recently designed a strategy through which 70% of the university enrollment would be in science and technology which promote strong mathematics knowledge ((MoE, 1994).

However, in Ethiopia, the challenge facing today is not only providing equitable access to its growing students participation, but also to ensure that education is effective in supplying students with the necessary skills (mathematics problem solving skill) to fully contribute to the development of the society and the economy National assessment of examination (NAE, 2010). To realize this, it necessitates improving the effectiveness of the learning process which requires positive attitude towards mathematics, promoting students' self-efficacy in mathematics and increase students' motivation in mathematics education. As various studies indicated the above factors are important in predicting mathematics achievement (Hannula, Di Martino, Pantziara, Zhang, Morselli & Goldin, 2016).

Attitude is defined as a mental set or charter readiness to respond and the psychological basis of attitudes their permanence, learned nature and evaluative character (Moenikia & Zahed-Babelan, 2010). In the context of mathematics, attitude should be viewed as a predisposition to respond in a favorable or unfavorable way to mathematics (Ibid).

It is also a fairly stable emotional tendency to respond consistently to some specific object, situation, person, or category of people. According to Sarwar, Bashir, and Alam, (2010) attitude has three components: cognitive core, affective values and behavioral action tendencies. The cognitive aspect of attitude consists of beliefs and ideas that a person has about the attitude object. The affective component includes the feelings of like and dislike toward any object and the behavioral aspect consists of intentions to respond in a particular way toward the object.

Zacharia and Barton (2004) extended to explain that attitudes behavior that associate with critical thinking such as belief, opinion, value, behavioral intention, and behavior. The interaction of the affective variables helped to predict the attitudes of a student possessed

(Ibid). The above researchers have been summarized three reasons for continuing to study attitudes. First, attitudes are enduring and seem to remain relatively stable over time. Second, attitudes are learned (students are not born liking or disliking schooling). Third, attitudes are related to behavior, that is, students' actions reflect their feelings toward objects and issues.

Attitude from the psychological point of view refers to the inner most feeling and outlooks of an individual about things in their environments. Accordingly scholars state that attitudes don't have their origin in the object themselves because our attitude can change while their objects remain constant (Levitan & Verhulst2016).

The development of attitude is influenced by many factors including emotional association, expectation of reward or punishment, a desired to emulate the attitude of people we respect and admire a need to establish some degree of consistency between what we say, what we believe and what we do. However, attitude is not directly observable but indirect from observable responses and behaviors which reflect a pattern of beliefs and emotions (Asirat. 2017).

When students build positive attitudes towards Mathematics achievement they, become engaged in learning and are motivated to excel in the subject because they value it, enjoy it and interested in the subject and can predict Mathematics achievement (Deci, Van der & Ryan, 2015).

However, on the contrary, in a meta-analysis of 113 primary studies involving elementary and secondary school children, Ma and Kishor (1997) found that attitude towards Mathematics and achievement in Mathematics were positively and reliably correlated, but not had a strong relationship.

Self-efficacy is an individual belief or confidence that they can successfully achieve at a designated level on academic task or attain specific academic accomplishment.Self-efficacy in mathematics is a belief on the mathematics achievement. Self efficacy is evolved from the works of Albert Bandura (1997), who theorized that one's beliefs about his/her capabilities are strongly related to the way he/she behaves and learns. In

line of Bandura's (1986) social cognitive theory, self-efficacy plays a major role in human learning.

Previous studies have shown a positive correlation between students´ self-efficacy and their academic achievements in mathematics (Mousoulides & Philippou, 2005). They investigated the relationship between student's self-efficacy and mathematics achievement and found out those students with higher self-efficacy obtained higher grades than students with low self-efficacy.

Additionally ,various studies have demonstrated that students who have high levels of academic self-efficacy have good feelings, behaviors, and positive thinking; can motivate themselves for actions and act accordingly; strive for achievement; persist longer when they encounter difficulties and until they get the solution; believe that failure is a temporal problem which they can manage; and attempt and use all possible ways to handle troubles and maintain their task of actions; are not frightened and challenged by difficult assignments and tasks rather they consider them as an opportunity for learning and mastery (Pajares, 2002).

However, other research findings report on the contrary. Reynolds and Weigand (2010) examined that the relationships between self-efficacy and academic achievement with a sample of 164 undergraduate first year students and found out that self-efficacy was not significantly related to academic achievement.

Motivation is the drive or desire of the student to engage in learning for its own sake. It is as an orientation towards a goal. This orientation may be positive, negative or ambivalent. Motivation provides a source of energy that is responsible for why learners decide to make an effort how long they willing to sustain an activity, how hard they are going to pursue it, and how concerned they feel to the activity (Middleton, Tallman, Hatfield & Davis, 2015).

Additionally, it has received much attention from many researchers with different psychological and philosophical perspectives in different fields of study especially in psychology and education due to its significant effect on students' learning, persistence and academic achievement. It has been operationally defined from the perspective of

different theoretical approaches over the past decades (Asirat, 2017). According to Self Determination Theory (SDT), motivation is categorized in to three; intrinsic motivation, extrinsic motivation and amotivation (Deci and Ryan, 2000). Intrinsic motivation means a behavior impacted by a person's interest and curiosity and thereby not impacted by external factors (Guay, 2010). Extrinsic motivation refers to a behavior influenced by external factors, such as good grades and higher social status. Amotivation means absence of motivation; individuals who lack motivation conduct tasks without knowing the aim and have difficulties to understand the interaction between their behavior and its outcome (Ryan & Deci, 2000).

On the other hand, Reynolds and Weigand (2010) found out that motivation was not significantly correlated to academic achievement, as measured by Grade-Point-Average (GPA). They explained this odd finding by supporting that the GPA as the sole measure of academic achievement may have influenced the power of motivation to predict academic achievement. In addition, the study argues that motivation may be related to academic achievement, but its effect may be more long term and not evident when using such a short-term indicator.

Based on the aforementioned fact, the objective of the study was to investigate attitudes, self-efficacy and motivation of students as predictors of grade 10 mathematics achievement in selected public secondary schools of East Wellega Zone and forwarded some recommendations depending up on the findings.

1.2. Statement of the problem

Mathematics is one of the compulsory subjects given almost in all levels of education. As it is a basic knowledge it has to be taught and learned well. However, it is in every area of our world and facilitates our lives, National and international trends showed that success in this subject is lower than other disciplines (Gok & Sılay, 2008). This evidence indicated that science and mathematics education are in a state of crisis even in developed world (Tyler, 2007; Manoah, 2011). In Ethiopian, secondary school; students' achievement in mathematics is also very low (Asfaw, Otore, Ayele, & Gebremariam, 2009; Atnafu, 2010; Tuge, 2008).

In line with this, Tuge (2008) explained learning mathematics in secondary schools of Ethiopia is not producing competent mathematics students. Many mathematicians in Ethiopia and other parts of the world have often expressed grief that majority of students do not understand mathematical concepts or do not see why mathematical procedures work or do not know when to use a given mathematical technique.

Concerning this point, there seems a gap between what ought to be and what exists in reality to bring in the intended outcomes of the students in mathematics achievement. Mathematics achievement currently plays high value, sustainable success in a global economy, demands worker with advanced thinking and problem solving skills.

However, in Ethiopia, problem of mathematics concept understanding is widely observed in high school students (Tuge, 2008). This problem could be associated with problem of students' beliefs in mathematics (Leder, 2002). In recent years much concern has been expressed about students' reluctance to continue the study of mathematics, science and technology beyond the compulsory years (Ibid).

Many studies have been conducted on mathematics achievement by different scholars with different examples in different countries and most of their findings reported a positive significant relationship with mathematics achievement. For instance, previous studies have shown a positive correlation between students´ self-efficacy and their academic achievements in mathematics (Mousoulides & Philippou, 2005).

However, some research found out self-efficacy and mathematics achievement had negative or have non-significant relationship (Reynolds & Weigand, 2010). This indicated that the relationships between self-efficacy and mathematics achievement with a sample of 164 undergraduate first year students found that self-efficacy was not significantly related to academic achievement.

From the above findings it can be seen that different researchers studied the relation and prediction of attitude, self efficacy or motivation separately on student's mathematics achievement. However, students' mathematics achievement should be approached taking together these important non- cognitive factors into consideration. The research findings were also inconsistent in reporting how those variables influenced and related to students'

mathematics achievement. Therefore, further studies were needed to fill the gaps. The current study tried to address the prediction focusing on how attitude, self-efficacy and motivation relate and predict students' mathematics achievement on public secondary schools of East Wollega Zone, Oromia Region.

In addition, no study has been conducted on the attitude, self-efficacy and motivation of students as predictors of mathematics achievement in East Wellega Zone of Secondary Schools. So the researcher initiated and motivated to study this research to fill these gaps too.

Based on the above facts and assumptions, the present study aimed to investigate how attitude, self-efficacy and motivation (ATLSEM) predicted mathematics achievement of 10^{th} grade students in East Wollega Zone.

Consequently, the study addressed the following four basics research questions:-

1. How does student's attitude relate to mathematics achievement in selected general secondary schools?
2. How does student's self-efficacy relate to mathematics achievement in selected general secondary school?
3. Is there a significant relationship between students' motivation and mathematics achievement in selected general secondary schools?
4. How well attitude, self-efficacy and motivation in mathematics predict student's mathematics achievement in selected general secondary school of students?

1.3. General objective

The general objective of this study was to investigate attitude, self-efficacy and motivation of students as predictors of grade 10 mathematics' achievement in selected public secondary schools in East wellega zone.

1.3.1. Specific Objectives

The specific objectives of this study were;

- To explain how student's attitude relate to mathematics achievement in selected general secondary schools.

- To examine how student's self-efficacy relate to mathematics achievement in selected general secondary schools.
- To identify whether there is a significant relationship between students' motivation and mathematics achievement in general secondary school students or not.
- To analyze how attitude, motivation and self-efficacy of students predict mathematics achievement in selected general secondary school.

1.4. Significance of the study

The study had both theoretical and practical significance. With respect to theoretical significance the findings of the study is supplied information on the relationship of attitudes, self-efficacy and motivation towards learning to achievement in mathematics. With this; school principal, teachers, students, parents, government and other concerned bodies may get necessary information. With respect to practical significance, the study may help educational leaders and policy makers to examine and evaluate the relevance of students' beliefs, students' motivation and attitude towards mathematics so that they could get information to design immediate remedial actions. The findings may serve as a bridge for other researches to conduct an in-depth study in a wide scope.

1.5. Delimitation of the Study

The study was delimitated conceptually on attitude, motivation, and self-efficacy of students as related to students' mathematics achievement, since these variables are important predictors of mathematics achievement as previous studies indicated their studies. It is also important for students to associate with critical thinking, value, behavioral intention and received much attention in many researchers with different psychological and philosophical perspective in different field of study, especially psychology and education significant predictors on students learning, persistence and academic achievement. Due to this the researcher delimited on attitude, motivation, and self-efficacy of students' as predictors' on mathematics achievement in grade 10 in government secondary schools. The study could not assess all secondary schools exist in East Wellega Zone due to shortage of time, budget, and facilities. Therefore, the researcher preferred to delimit the scope of the thesis to only five selected secondary

schools out of the total fifty (50) secondary schools in the zone in order to manage the size of the study.

1.6. Limitation of the study

The study was intended to predict the attitude towards learning, self-efficacy and motivation in selected general secondary schools in East Wollega Zone, Oromia Region .It is obvious that research works can‘t be totally free from limitation. For this matter, limitations might be observed in this study. According to Simon and Goes, (2013) limitations are matters and occurrence that arise in a study which are out of the researcher’s control. Accordingly, some of the school principals are over burden by routine office and personal activities to provide and prepared conducive environment to get our participant in order to collect data on time, lack of local research in the area, financial problems to cover large areas, time constraints and absence of transportation were some of the limitations. These problems elongates the time for data collection more than the expected plan. In addition the limitation of this study could be the fact that the findings cannot be generalized for all schools in East Wollega Zone because, as indicated from the above limitation the study focused only on five selected secondary schools.

1.7. Variables

This study had two types of variables; these were independent variables and dependent variable. So the main independent variable in the study was the following;

i) **Independent variables**: attitudes towards, self-efficacy and motivation
ii) **Dependent variable**: mathematics achievement

1.8. Operational definitions

Attitude: the view/feeling of students towards learning of mathematics

Discipline; it refers to the subjects (academy) that students learned at grade ten.

Mathematics Achievement:- refers to students grade 10 first semester result in mathematics.

Mathis self-efficacy: refers to students' belief of their capability to achieve mathematics at grade ten.

Motivation it refers to students interesting to achieve mathematics at secondary schools

Public secondary high school: respondents who are enrolled in the current academic year in at least one of the classes from grade 10 during the data collection period and were attending the class.

Predictors; it refers to attitude, self-efficacy and motivation that effect or explained mathematics achievement.

CHAPTER TWO

REVIEW RELATED LITERATURE

2.1. Introduction

The objective of this section is to review related literature of attitudes of students learning, self-efficacy and motivation of students on Mathematics achievement. The review investigated various researches findings and views relating to students achievement in the mathematics pertaining to attitude, self-efficacy and motivation.

2.2. Definition of Attitudes

Attitude represents an individual's degree of positive or negative views (likes or dislikes) of a particular person, place, and event attitude towards objects. These views are made up of clusters of personal beliefs about the attitudes that are acquired mainly through personal experiences, scientific idea and psychological object (Maria de & Lourde, 2012). It is also defined as a mental set or disposition, readiness to respond and the psychological basis of attitudes their permanence, learned nature and evaluative character (Moenikia & Zahed-Babelan, 2010).

It is clear that one of the main objectives in education is the advancement of desirable attitude in the students' knowledge, skill and value of learning experience to advance their attitude. Thus, it is necessary to understand the definition of attitude towards mathematics achievement (Atnafu, 2014). Atnafu point out that, teachers are required to develop attitudes in the student's toward learning and students develop positive attitude toward mathematics achievement. Mata, Monteiro, Peixoto (2012) founded out that attitudes have correlated with positive feeling with some psychological object or they have well favorable towards the learning. On the contrary sides, negative attitudes associated with negative emotional disposition. The disposition of these emotions has an impact on students' behavior to consider the usefulness of mathematics, and do not enjoy math people who have opposite of that object have negative feeling towards learning.

2.2.1. Attitude formation

Attitudes are psychological orientations developed as a result of one's experiences which influence a person's view of situations, objects people and how to respond to them either positively or negatively or favorably or unfavorably (Moenikia & Zahed-Babelan, 2010).

The social learning theories by Bandura (1986), postulate that individuals acquire attitudes through observing, imitating and modeling the behaviors of others. They, therefore, form through direct experience with models, object or issues or ideas we interact with. Students are learnt attributes which affect their behavior (Bandura, 1997). Another research has indicated that people behave in accordance with their positive under the conditions of attitudes that as a result of personal experience; that one is expecting a favorable outcome or popular or successful (Zimmerman, 2007). A student can develop positive attitude towards Mathematics because he or she learns to associate positive experiences or events with it. In addition to this academic competence is creating positive attitude for mathematics achievement (Amare.2001).

2.2.2. Attitude and Mathematics Achievement

Amare (2001) indicated that enhancing attitudes toward mathematics are significant in the students' competence and toward learning in to the subject. The attitude towards math should be considered as a predisposition in either a favorable or an unfavorable way to mathematics achievement (Moenikia & Zahed-Babelan 2010) Value/usefulness of mathematics has been used as one component of attitude towards mathematics (Mulugeta, 2010). By having a positive attitude towards mathematics, the students will feel that mathematics is important so that they will try to improve their mathematics learning achievement.

Most research on attitudes points to the fact that, attitude plays a crucial role in learning and achievement in mathematics and predict the student's success in the subject (Zan and Martino 2007). It enhances their ability and willingness to learn the subject, work on a variety of assigned tasks and their persistence in the tasks available. In general, attitudes towards mathematics predict academic achievement and how they approach mathematics tasks and lead them into either productive or non productive activities.

In the context of mathematics, attitude should be viewed as a predisposition to respond in a favorable or unfavorable way to mathematics (Moenikia and Zahed-Babela (2010) Studies showed a linkage between attitudes to success in mathematics. It is important to develop a positive attitude towards mathematics because there is a correlation between students' attitude towards mathematics and their mathematical results (Bilican, Demirtasli and Kilmen, 2011; Chiesi and Primi, 2009; Dumas 2009; Marchis, 2011).

In many cases, students have been found to approach mathematics as procedural and rule-oriented. This prevents them from experiencing the effectiveness of Mathematics and many approaches that could be used to develop competence in the subject (Mensah, J. K., Okyere, M. and Kuranchie, A. 2013). When students have positive attitudes towards mathematics they would achieve mathematics and reflect better a significant relationship between attitudes and achievement (Nicolaidou & Philippou, 2003).

A study with secondary school students also showed that those with better academic achievement exhibited more positive attitudes towards math than those with low academic achievement (Langat, 2015). These results were established in wider research, concerning math on attitudes among the secondary school students of nine countries, developed, by Lipnevich (2011) in a study developed with USA and Bielo -Russian middle school students highlighted the importance of attitudes in predicting academic achievement

Additionally, Zan and Di Martino (2007)) indicated that high achievement related to positive attitude towards math, but such an attitude could not predict stronger achievement. However, the authors emphasized that the role of teachers and schools in changing attitudes stating that, math achievement could be improved by better teaching methods, more motivated students or better course books, which could predict improve attitudes towards math achievement.

Hemmings and Kay (2010) in their studies of secondary school students founded that, there is a positive correlation between attitude and mathematics achievement. The result indicated that there is relationship between attitudes and mathematics achievement

Some researchers have, however, demonstrated that the correlation between attitude towards mathematics and mathematics achievement was rather weak and could not be considered to be practical significance. In a meta-analysis of 113 primary studies involving elementary and secondary school children, Ma and Kishor (1997) found at that attitude towards Mathematics and Mathematics achievement was positively and reliably correlated but not strong. This indicated that the correlation was not statistically significant (Mata et al, 2012).

2.3. Definition of Self-efficacy

Self-efficacy is defined as one's belief in the capability to realize their achievements. It reflects one's persistence and confidence in successfully achieving a specific task (Bandura, 1997). Self-efficacy is narrowly defined as one's conviction or belief about his or her ability or literacy of pursuing achievements successfully It measures or evaluates individual's capability in succeeding in specific tasks (Pajares & Miller, 1997) and it is concerned with judgments about capabilities (Pajares & Schunk, 2002; Pajares &Miller,1997). Pajares and Miller stated that mathematics self-efficacy is regarded as students' conviction of their capability to solve mathematics problems or to be successful in mathematics achievement.

In line with this, Self-efficacy is an important concept in social cognitive theory, which has been widely recognized as one of the most prominent theory about human learning Many researchers, including Bandura, have demonstrated that self-efficacy affects human motivation, persistence, efforts, action, behavior, and achievement (Bandura,1986). Additionally, researchers have indicated that higher self-efficacy is predictive of higher performance (Pajares & Miller, 1997).

2.3.1. Self-efficacy theory

Self-efficacy is one's belief, or perception, about one's capability to perform at a certain level on a task. This theory clearly articulates the constructs of self-efficacy and also posits how self-efficacy could be formed and modified in confidence to achieve mathematics. According to Bandura, (1986) some behavior changes mediated through modification of the model itself, through role modeling, use of reinforcement and rewards and sometimes through persuasion. In order for an individual to attempt a modeled

behavior, he must value the observed outcome and perceive it as successful (Schunk 2002; Zimmerman, 2007).

The theory clearly articulates the constructs of self-efficacy and also posits how self-efficacy could be formed and modified in a classroom level. According to self efficacy theory students' self efficacy is developed as students interpret their exposure with respect to mastery experiences, vicarious experiences, verbal persuasion and physiological (Barry & Zimmerman, 2000)

Performance/mastery accomplishment is the experience students perceived from a specific activity in the past; and successful performance of the activity enhances a sense of self-efficacy while unsuccessful accomplishments initiate the formation of self-efficacy belief. (Zimmerman, 2011) Performance experience is the very important aspect of self-efficacy belief and contributes a lot for students' self efficacy belief and academic achievements. If students have a history of good performance in a certain subject, then they will develop belief that they will be a good performer in that particular subject in the future (Usher & Pajares, 2006).

Performance experiences could be enhanced to learn and challenging the complex behavior to small achievable goals, establishing small goals, making an individual's effort and make confidence in progress manner.

2.3.2. Self-efficacy and Mathematics Achievement

Efficacious students are confident of their ability to achieve actions needed to tackle ambiguous, unpredictable and stressful situations. Tang and Neber (2008) claimed that self-efficacy represents the learners' subjective belief in their own competence for high domain specific achievements. In other words, self-efficacy is a self-assessment belief concerning ones' ability to master a task, whether easy or difficult, and to produce positive outcomes. According to Palacios and Arias (2014), self-efficacy can influence a student to choose what kind of activities to get involve in activity that needs more cognitive skills will attract higher self efficacious students, but students who have low sense of efficacy tend to avoid it.

Bandura (1986) expected that high level of self- efficacy promote positive attitudes. Students who are convinced that they lack the ability competence to succeed or control the outcome of their learning experiences will not make an effort to engage or excel in mathematics achievement. Student beliefs about their competence and their expectation for success in mathematics have been directly linked to their levels of engagement as well as their emotional states that promote or interfere with their ability to be academically successful (Shekel, 2009). Mathematics self efficacy is considered as a strong predictor of mathematical achievement (Pajares & Miller, 1997). How efficacious students feel when they are learning mathematics, which is considered as the conceptual forerunner to consistency mathematics learning that has been found to increase Mathematics performance (Nicolaidou & Philippou, 2003).

Self-efficacious students are more successful in performing academic tasks and are more inclined to challenge themselves with difficult tasks and they are motivated to employ various strategies for task achievement. They are also more accurate in mathematical calculations and display higher persistence in mathematics achievement compared to their low-efficacious counterparts (Dempsey & Tweed, 2018). They showed that, there is a significant relationship between self efficacy and mathematics achievement and strong relationship between the two variables.

A substantial body of research shows that predictive value of self-efficacy beliefs and students' academic achievement across all areas and levels of students' challenges the problems (Brown & Lent, 2006; Pajares & Urdan, 2006). According to this research, students who are more confident in their capabilities tend to work harder, solve problems more efficiently, monitor their progress regularly, and hence, achieve better than their able peers who do not have high self-efficacy. On the other hand, motivating failure will have a negative impact on one's self-efficacy (Brown & Lent, 2006).

According to, Bandura's (1997,) social cognitive theory, which posits that self-efficacy, has a significant and positive direct effect on the academic achievement of students. There is evidence that self-efficacious students participate more readily, work harder, persist longer, and have fewer adverse emotional reactions when they encounter difficulties than do those who doubt their capabilities.

In line of the above literature, self-efficacy is an important role in the development of motivation of the learner and in the creation of support conditions during the learning, when it is found that a positive correlation exists between self efficacy and persistence and motivation (Pintrich & Schunk, 2002) it lets the students' feel more secure and less anxious that can influence strongly the student's capacity to cope with anxiety, to cope with a hostile learning environment, to present academic achievement and to use analytic thinking. (Bandura, 1997).as Bandura found that a correlation exists between high self efficacy and a profound approach to learning mathematics. In line of the above discussion was supported by Broussard and Garrison (2004) which self-efficacy has high contribution to increase the interest and the motivation of students for learning and improving the mathematics achievements.

In addition, as noted by Pajares (1996), a person with a well developed sense of self-efficacy believes strongly in his or her capacity to carry out a task, invests effort in the activity, persists in the face of difficulty and has an optimistic outlook, whereas an individual with a low level of self-efficacy has little confidence in his/her capacity to carry out a task which can result in avoidance of difficult tasks, low aspirations, weak commitment to achieve and a pessimistic outlook, in general.

According to Pajares (1996) self -efficacy plays a prominent role by energizing students to set high goals, influencing the amount of effort to be invested, and helping students to confidently identify effective learning strategies to be used and time to be spent in studying the course materials, in particular Shekel'(,2009). also noted that students with a high sense of self-efficacy beliefs study harder and persist longer when they approach difficulties, whereas students who have low self-efficacy beliefs perform worse at learning tasks, tend to avoid difficult tasks, and do not certainly regulate their learning behaviors. Therefore, self-efficacy was a significant and positive effect (i.e., direct or indirect) on the academic achievement.

Bandura (2006).Stated that there was relationship between academic achievement and self-efficacy is to develop the strength of personal capacity. it means that capacity guide the search for challenge (students excel, with a high self-efficacy, they cope with more challenging tasks, and always are found in an advanced stage from the point of view of

quality and quantity of exercises with which they cope, by comparison to their colleagues in the classroom to maximize the capacity of the students encourage them to think creatively and in a non-routine fashion and show them that it is possible to work hard.

However, contrary findings have been reported by a few empirical studies. For example, Reynolds and Weigand (2010) examined that, the relationships between self-efficacy and academic achievement with a sample of 164 undergraduate first year students from a large predominantly white university in the north eastern United States founded that self-efficacy was not significantly related to academic achievement, May explained this inconsistent finding by supporting that the Grade-Point-Average (GPA) as the sole indicator of academic achievement may have affected the power of academic self-efficacy to predict academic achievement because the effect of academic self-efficacy on academic achievement may be more long term and not evident when using such a short-term measure.

2.4. Definition of Motivation

Motivation is the drive or desire of the student to engage in learning and achieve for its own sake. It is also motivation as an orientation towards a goal. This orientation may be positive, negative or ambivalent. Motivation provides a source of energy that is responsible for why learners decide to make an effort, how long they willing to sustain an activity, how hard they are going to pursue it, and how concerned they feel to the activity (Dempsey & Tweed (2018).

Again motivation is a potential to direct behavior that is built into the system that controls emotion. Student potential is manifested by their emotion and behavior as well as cognition. Hannula et.al.(2016) stated motivations are reasons individuals have for behaving in a given manner and situation. They exist as part of one's achievement structures, one's attitudes and they determine whether or not one will engage in a given pursuit.

Researchers and academicians alike have been increasingly focused on the topic of motivation in the past years. According to Green (2002) motivation is primarily the individual’s state that drives and maintains behavior and on the basis of self-

determination theory, motivation is divided in to two primary kinds, namely intrinsic and extrinsic motivation (Deci & Van, 2015). Intrinsic motivation refers to an innate, interest of an individual and the inherent pleasure to examine and master his internal and external environment whereas extrinsic motivation refers to behaviors motivated by the desire to engage and to achieve external rewards or social demands (Ibid).

2.4.1. Motivation Theory

Human learning is a complex phenomenon, and motivation is an essential part of it (Sikhwari, 2004). Various theoretical approaches have been used to define and operational motivation. Areepattamanil and Freeman (2008) declared that researchers have used a variation of motivational approaches, such as self determination theory, expectancy-value theory the goal theory and the self-efficacy theory (Zimmerman, 2007; Bandura 1986) to examine the relationship between academic motivation and mathematics achievement. In this study, motivation will be viewed within the context of the self determination theory (Deci & Ryan, 2000). This theoretical perspective has been used in a considerable number of research studies recently in the field of education (Deci & Ryan, 2000). The self-determination theory indicated that there exist three types of motivation, namely intrinsic motivation, extrinsic motivation and amotivation.

Intrinsic motivation refers to actions performed because people want to perform them, and for which they do not need external incentives (Deci & Ryan, 2000). It indicated that intrinsic motivation entails a drive to experience a sense of competence and intended academic achievement. Again it is an innate, interest of an individual and the inherent pleasure to examine and master his internal and external environment to motivate and masters the task.

2.4.2. Motivation and Mathematics Achievement

Achievement motivation orients students toward directed learning, persistence at task, developing new skills and cognitive strategies for solving problems. It also leads to emphasis on self-improvement and development using self-referenced standards. The reason for this is that achievement motivation has achievement goals, and thus students work hard and exert maximum efforts to reach the intended goals. It widely accepted that

achievement motivation plays a crucial role in affecting mathematics achievement of students at different levels of education (Deci & Ryan, 2000).

Additionally, Broussard and Garrison (2004) stated that learning mathematics requires highly motivated students because it requires reasoning, making interpretation and solving problems in mathematical issue and concepts. The challenges of mathematics learning for today's education are that it requires disciplined study, concentration and motivation. To meet these challenges learners must be focused and motivated to progress their achievement. Broussard and Garrison (2004)) examined the relationship between motivation and mathematics achievement .Learner's motivation can show vast differences as the function of the learning situation and their evaluation in mathematics class. So one of the key points is to motivate students intrinsically, and this leads to autonomy and increase their achievement.

In a more recent study, Areepattamanil (2014) examined that students' motive to learn mathematics increased their learning motivation to challenge mathematics tasks. This indicated that high engagement to mathematics learning increase mathematics achievement as well as high motivation increase mathematics achievement.

In addition to this students motivations tend to focus on learning mathematics such as understanding and mastery of mathematical concepts. (Zimmermman, 2000) posits that students high mathematics achievement to find easier, tended to enjoy doing mathematics more, and considering mathematics more useful than did students in lower ability tracks

Motivation had a significant and positive effect on the mathematics achievement of students in higher education institutions.(Pajares, 1996). As noted by Mills, Pajares, and Herron (2007) individuals with high motivation have the capacity to set high personal and achievable task are concerned for personal achievement rather than the rewards of success, and desire job-relevant feedback rather than attitudinal feedback. In addition, motivation guides students toward learning and understanding, developing new skills and cognitive strategies for solving problems, and leads to focus on self-improvement using self-referenced standards because academic motivation enables students to set achievement and thus students work hard and exert maximum efforts to reach to intended

activities and associated with greater persistence at task despite adverse situations and a correspondingly greater likelihood that one will succeed in problems solving.

On the other hand, Reynolds and Weigand (2010) found that academic motivation was not significantly correlated to academic achievement, as measured by Grade-Point-Average (GPA). They explained this odd finding by supporting that the reliance on GPA as the only measure of academic achievement may have influenced the power of academic motivation to predict academic achievement and academic motivation may be related to academic achievement, but its effect may be more long term and not evident when using such a short-term indicator.

2.5. Theoretical Frame work

A theoretical framework indicates the researcher's assumptions and beliefs. Mohseni and Omrani (2016) mentioned that a theoretical framework is a conceptual model of how one theorizes or makes logical sense of the relationships among several factors that have been identified as important to the problem. A theoretical framework to predict which questions are to be answered by the research, and how empirical procedures are to be used as tools to answer the questions,

Furthermore, Mohseni and Omrani (2016) indicated that in essence, a theoretical framework attempts to integrate key pieces of information, especially variables, in a logical manner, and thereby conceptualizes a problem that can be tested. The theoretical framework clarifies the important concepts in this study. It enabled the reader to understand the concepts and the assumptions of the researcher. The three concepts that was discussed and placed into context in this study were self-efficacy, motivation and attitude towards mathematics achievement and how well this reliably predicted students' mathematics achievement.

2.6. Conceptual frame

As the research explored attitude, self-efficacy, and motivation of students as predictors of grade 10 mathematics achievement, it is therefore, utterly important to illustrate the relationship between the three variables: attitude, self-efficacy and motivation. In order to

reveal clearly how the variables relate to each other, their relationship reflected in the conceptual framework as shown below:

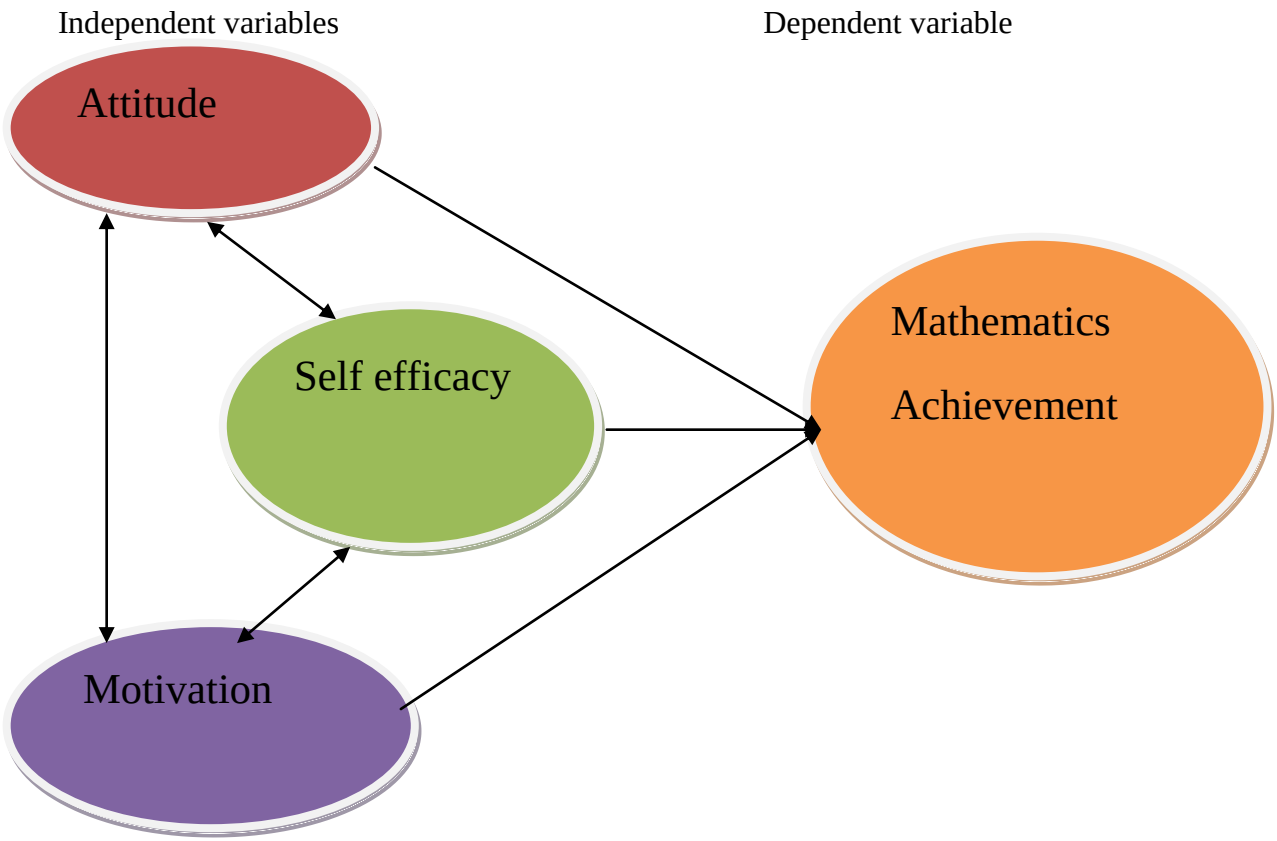

Figure 1: A Hypothesized Integrated Non-Cognitive Model of mathematics Achievement adopted from Lillian (2012)

Conceptual framework of the present study: Conceptual framework of the present stud discus how motivational theory and the self-efficacy theory relate to math achievement.

2.6.1. Self-efficacy theory

In order to explain the relationship between self-efficacy and mathematics achievement the self-efficacy theory can be used. According to Bandura, self-efficacy is defined as "an individual's belief or conviction that they can successfully achieve at a designated level on an academic task or attain a specific academic goal" (Feltz *et al.* 2007). Bandura

stated that self-efficacy played a role in determining how individuals felt, thought and motivated themselves, which then ultimately affected the behavior and the outcome.

On the basis of this theory, the present research assumes that when one's self-efficacy towards mathematics achievement is high, he/she tends to put greater effort into studying the subject, which eventually results in a good grade. To put it in details, it means that when a student possesses a high self-efficacy towards mathematics, it means that he/she has confidence in mastering the subject. With such a positive self-efficacy, this will simultaneously affect the student's behavior. Since the student thinks he/she is capable of doing well, this will lead to a series of favorable behaviors. For example, the student attends all the lectures and works hard on this subject. Derived from such favorable behaviors, it is expected that the student is likely to achieve a good result in the subject.

On the contrary, when one's self-efficacy towards academic achievement is low, he/she is less likely put great effort into the subject, which eventually results in a low grade. To put it in details, it means that when a student possesses a low self-efficacy towards the subject, it means that he/she does not have confidence in mastering the subject. With such a negative self-efficacy, this will at the same time affect the student's behavior. Since the student thinks he/she is incapable of doing well in mathematics, this will lead to a series of unfavorable behaviors. For example, the student refuses to attend the lectures and works hard on this subject. Derived from such unfavorable intended behaviors, it is expected that the student is less likely to obtain a good result in the subject.

2.6.2. Motivational theory

First and foremost, the motivational theory can be used to explain the relationship between attitude and mathematics achievement. Different researches were carried out and the results revealed that when students considered learning activities as meaningful and relevant, this could help increase their intrinsic motivation (Cooperman 1994, & Seifert and O'Keefe 2001, cited Elliot *et al.* 2005,). On the basis of these researches, it can be assumed that students' attitude towards an academic subject plays a role in affecting their intrinsic motivation, like effort to challenge difficult tasks. Therefore, the theory can be applied in the present study: when students possess a positive attitude towards learning mathematics (e.g. the subject is meaningful and relevant to their

academic studies and future career), they are more likely to put more effort into studying the subject. On the contrary, when students possess a negative attitude towards learning (e.g. the subject is meaningless and irrelevant to their academic studies and future career), they are less likely to exert extra effort into studying the subject

The motivational theory used to explain the relationship between attitude and motivation.Wlodkowsk and Ginsberg (2017) stated motivation can make a very important contribution to foster strong positive relationship with attitude and significantly related positive dispositions and the best predictors of academic achievement. This study was carried out and revealed that when students considered learning activities as meaningful and relevant their motivation could be increase and challenge their tasks. On the basis of these studies, it can be assumed that positive attitude towards an academic subject plays a role in motivating their activities. Therefore, the theory can be applied in the present study: when students possess a positive attitude towards mathematics achievement (e.g. the subject is meaningful and relevant to their academic studies and future career), they are more likely to put more interest into achieving the subject, and the reciprocal is true.

In order to explain the relationship between self-efficacy and attitude, the self- efficacy theory can be used. According to Bandura (1986) self-efficacy is defined as "an individual's belief or conviction that they can successfully achieve at a designated level on an academic task or attain a specific academic task. When self-efficacy of students enhanced, it would be improved positive attitude towards learning and students motivated towards further learning on academic achievement

On the basis of this theory, the present research assumes that when one's self efficacy towards mathematics achievement high, he/she tends to put greater effort into achieving the subject, which eventually results in a good academic achievement. To put it in to context, it means that when a student behave a high self-efficacy towards mathematics achievement it means that he/she has confidence in challenging the problems. With such a positive self-efficacy, this would be simultaneously enhancing the student's behavior. Since the student thinks, he/she is capable of doing well; this would lead to increase their favorable behaviors (Condition). Bandura (1986) stated that, self-efficacy is a mufti-

dimensional construct which influences people's performance directly or indirectly through its effects on other predictors such as motivation, self-regulation, attribution and emotion.

Additionally, to explain the relationship between self-efficacy and motivation, Bandura (1986) stated that self-efficacy played a role in determining how individuals motivated to themselves, which then ultimately affected the behavior and the outcome. Several researchers note that high self-efficacy play a crucial role in affecting high motivation and achievement of individuals occurred (Bandura, 1977; Pajares, 2002). To this idea Sakiz (2011) stated that self-efficacy had significantly and positively related to motivation in a study conducted in a sample of junior college students in Istanbul.

Based on the above discussions, the present study aimed and identified the predictor's attitude, self-efficacy and motivation on mathematics achievement. In particular, the current study investigated the predictors of attitude, self-efficacy and motivation on the mathematics achievement of 10th grade students in East Wollega Zone.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter explained how the research was carried out. This includes research design, population, sample size, sampling techniques, instruments of data collection, procedure validity and reliability checks of the instruments, methods of data analysis and ethical consideration.

3.1. Research Design

Since the study was intended to explain students' attitude towards learning, self-efficacy and motivation of students as predictors of grade 10 mathematics achievement in selected general secondary school in the East Wollega Zone, Oromia Region, correlational research design was used. The data gathered in cross-sectional methods. The design was suitable for this study since it helped the researcher to establish a relationship between two or more variables. It allowed the researcher to predict the direction and strength of the relationship between the variables (Gupta, 2008), (Creswell, 2012).

The purpose of correlation research design in this study was to figure out how to independent variables relate to dependent variable and to show how well the independent variables (attitude, motivation, and self-efficacy) predicted the dependent variable (mathematics achievement). Therefore, a correlation research design was used in order to establish the relationship between the two variables that obtained from relatively large number of respondents (Creswell, 2012).

3.2. The Study Population

Best and Kahn (2006) defines population as any group of individuals that has one or more characteristics in that of interest to the researcher. So the target populations of the study were students in general secondary schools in East Wollega Zone. The total numbers of grade 10 students are 19054; males constituted 10567while females are 8487.

3.3. Sample size and Sampling techniques

The target population is the actual list of sampling units from which the sample is selected (Creswell, 2011). Accordingly, the target population was based on 2017/2018

year second quarter report of East Wollega Zone education office. By simple random sampling five schools were selected. .

From 2519 total target population (1335 male and 1164 female**)**, by systematic random 217 males and 181 females, total 398 were selected. According to Mugenda (2003), 10% of the accessible population was enough for correlation study. Gay (2005) supports the same idea by supporting that 20% of a target population is regarded as adequate representative sample for small population (n<1000). In line with this, the researcher intended to use 20 % of students from five schools in different clusters as indicated in the table below which make the total sample size 398.

Table 1; Sample students from the sample schools

Clusters	Name of sampled Schools	No. of students in sampled schools			No. of sampled students of the strata		
		Male	Female	Total	Male	Female	Total
East	Ano	230	165	395	46	33	79
West	Dange	239	191	430	48	38	86
South	Ifa	185	190	375	37	38	75
North	Jangir	285	260	545	57	52	109
Center	Gute	124	98	222	29	20	49
Total		1355	1164	2519	217	181	398

Source; East Wollega Educational Zone, 2010/2018

Sampling techniques were used since the sampling techniques were varying at each phase. Therefore, first Zone was purposelessly selected because the present researcher has been working there, so he could get better cooperation than other areas. Accordingly, 5(29.41%) woredas from 17 woredas and 5 (10%) from 50 secondary schools were selected using simple random sampling system for it provides equal chance for them to be selected as samples of the study. Equal implies that the probability of selection of each element in the target population was the same; that was, the choice of an element in the sample was not influenced by other considerations such as personal preference and it was free from bias. So, the woredas' were Haro-limu, Gidda-Ayana, Gobu-Sayo, Diga and Wayyu- Tuka.

From the five (5) Woredas, five schools were selected by simple random sampling technique (SRS**),** namely Dange, Jangir, Ano, Ifa and Gute secondary schools. Accordingly, to ensure the representative of students, systematic random sampling (SRS) was employed. In systematic random sampling (SRS) the sampling frame was first divided into a number of segments called *i*ntervals. Then, from the first interval, using the SRS technique, one element was selected. The selections of subsequent elements from other intervals were dependent upon the order of the element selected in the first interval. If in the first interval it was the fifth element, the fifth element of each subsequent interval was chosen.

3.4. Instrument

Instrument involves careful selection of adequate and appropriate tool(s) which are administered in order to collect relevant data concerning the objective of the study. Sideman (1991) stated that the selection of the research tools depends up on objective of research and research questions under investigation. The main instrument for collection of data for this study was questionnaires and mathematics achievements 1st semester examination result and taken from the list marks of the record office. The questionnaires were divided into four sections containing different scales and intend to measure attitude, self-efficacy and motivation of students; for scoring, recoding was done for negative items or reverse items it means that. For all sub-scales participants' responses for each item were added to get the total score of each sub-scale (attitude, self-efficacy and motivation).

3.4.1. Questionnaire

Questionnaires are quick and simple way of obtaining rich information from respondents and are easy to classify and quantify, require less time, effort and ingenuity but do not allow the respondents to qualify, develop or clarify their answers (Cooper, 20017);.it is a written instrument that contains a series of questions or statements called items that attempt to collect information on the particular topic. It is a technique that securing answer to questions by using a form which the respondents fill by themselves. Questionnaire was used because it was more efficient way to collect data from respondents. It is not time consuming and more appropriate instrument to collect data

from large number of people at the same time. The questionnaire was first written in English language and translated into local language (Afan Oromo) by language experts for students to reduce language problems and to get reliable and valuable information.

The questionnaire consisted of the following sections: general information, attitude, self efficacy and motivation scales.

The first section contains general questions like school name, Woreda, Zone, sex and age. Section two contains attitude items related towards mathematics achievement. The attitude scale of mathematics was adapted from Lillian (2012) and used to measure student's attitude towards learning. It consists of 15 items in which students rated each item on five point Likert scale (Strongly agree (5), Agree (4), Undecided (3), Disagree (2) and strongly disagree (1)). For example; '*I like learning mathematics more than any other subject*' is a sample from attitude scale.

Section three contains self-efficacy scale. The Self-Efficacy scale belief of mathematics achievement was adapted from Chemers (2001). It used to measure student's self-efficacy in mathematics. The questionnaire in self-efficacy was measured based on 15 items in which students rated each item on five point Likert scale (Strongly agree(5) , Agree (4), Undecided (3), Disagree(2) and strongly disagree(1)) and '*I am sure I can get good grades in mathematics' is* a sample item from self-efficacy.

Section four contains motivation scale. The motivation scale of mathematics achievement was adapted from Vallerand (1992) and used to measure student's motivation in mathematics. The questionnaire, consisted of 18 items in which students rated each item on five point Likert scale (Strongly agree (5), Agree (4), Undecided (3), Disagree (2) and strongly disagree (1)). '*Mathematics is interesting and enjoyable to me*' is one of the items included in this subscale.

3.5. Procedure of Data Collection

To answer the research questions raised, the researcher had gone through series of data gathering procedures. The questionnaire items were initially prepared in view of basic research questions of the study and review of related literature. Then, the items were

validated and reshaped by the advisors and other scholars like language experts before the actual data collection done. Then after, the researcher received the official letters of authorization from Jimma University, Department of Psychology and contacted East Wollega ZEO, then communicated and permission to conduct the study in the selected public secondary schools of the zone. The purpose of the study and the value of the data needed were clarified to the ZEO and WEO heads. The researcher also received other letters from ZEO to the respective WEO and from the sample woredas to public secondary schools. While reached an agreement with those authorized body, the researcher then gone to each group of respondents and introduced the objectives and purpose until reach agreements and make trust with them. Before going to the collection of data through questionnaire, the researchers assigned a person and provided orientation to facilitate the data gathering administration from each sample public secondary schools.

Next to this, the collections of data were undertaken with concerned participants with respective of their consent. Then, the final questionnaires were administered to sample students within the given schedule by close support of researcher representative and under close supervision of the researcher. Finally, the data gathered through different instrument were checked by the researcher himself based on his check- list before leaving the site.

3.6. Pilot testing

According to Orodho (2009), piloting was done by subjecting the data collection instruments to small representative sample, excluded the group to be surveyed. Piloting helped the researcher to improve the instruments by modifying the items found to be ambiguous, unclear or irrelevant. Piloting has been done to improve validity and reliability of research instruments and was carried out by selecting schools randomly. Accordingly, a draft questionnaire had been administered toHaro secondary school which from outside of selected schools. Questionnaires had seen by teachers, principals and experts .The responses had checked with given the information. And they obtained results were used for actual data collection.

3.6.1. Validity and Reliability Checked

Validity is an important term in research that refers to the conceptual and scientific soundness of a research study to which ensuring significant information for the researcher in order to have elicited (content validity). Content validity-instrument adequately covers all the content that it should be with respect to the variables of the study

In order to maintain the validity, the instruments were prepared in accordance with the relevant literature review of how the concept works with the objectives of the study. In addition, the comments from advisors were used so as to make sure whether the instrument looks valid. Also all the instruments were given to graduate students of the department of Psychology. Because they are responsible weather the instruments were validate and accurate to judge in order to address the objective of the study and other researchers. The instruments were also given to school principals, teachers and supervisors who are currently working and teaching in the zone in which the pilot test was carried out and their comments were included.

In addition, the reliability of the instrument was maintained through conducting a pilot test before it was used for the actual data collection. The purpose of pilot test was to alter the instrument, if there was any defect on it and secure the reliability estimate. Accordingly, for more reliability check, the prepared questionnaire which was evaluated and commented by advisors also tested at Haro secondary school taking randomly selected students. The questioners were distributed for 30 students (18 male and 12 female students). The researcher found the coefficient of Alpha (α) of .806 for the all items which is good according to Cohen, Manois and Marrison (2007). These authors suggest that, the Chronbach alpha result that is >0.9 is excellent, >0.8 is good, >0.7 is acceptable, <0.6 is questionable, <0.5 is poor.

The result of this analysis indicated that the internal reliability (Chronbach alpha) for the attitude scale was .785, for self-efficacy scale was .755 and motivation scale was.879 which were highly reliable/ internal consistency (Cohen 2007). In the meantime, five items from attitude scale and three items form self efficacy scale were discarded as the reliability test showed discarding the items increase the reliability of the instruments.

Table below indicated the computed reliability coefficient of the pilot test for the different scales.

Table 2; the computed reliability coefficient of the pilot test.

No	Variables	No of items	Reliability Coefficient
1	Attitude towards learning	15	.785
2	Self-efficacy	15	.755
3	Motivation	18	.879
	Average Reliability Coefficient	48	.806

3.7. Method of Data Analysis

As far as the quantitative data were concerned, the Statistical Package for Social Sciences (SPSS) version 20 software was used for data entry and analysis. After carefully gathered the appropriate data, analysis was done. In order to achieve the objective of the study descriptive such as frequency, percentage, standard deviations and inferential statistics such as Pearson's product moment correlations and multiple regressions were applied. Therefore, to describe the demographic character of respondent's frequency and percentage was employed. To understand whether there is a significant relationship between attitude, self-efficacy and academic motivation and a student mathematics achievement, Pearson product moment correlation was employed. Additionally, to see how well the predictors of independent variables (academic self-efficacy, attitude and academic motivation) predict the dependent variable (mathematics achievement), multiple regressions was used.

3.8. Ethical Consideration

Since the study was aimed to identify the attitude towards learning, self-efficacy and motivation (ATLSEM) of students of public secondary schools in predicting students academic achievements, all process accomplished at the participants voluntarily consent without harming and threatening their personal and schools well being. Furthermore, the researchers created a healthy rapport with respondents expressing their responses. Thus, all communications with students(respondents) were undertaken with open and honest way in considering the research ethical codes issues like anonymity (not use of any

names and address in the final report) and confidentiality (not disclose directly any information to the third party). The researcher told the respondents that the information obtained through the questionnaires were used only for research purpose.

Finally, the researcher also underlined that; their responses will not be used for any other purposes except for this academic research.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter deals with the analysis, presentations and discussion of the major finding as per the existing literature in the area. Additionally, this study was meant to investigate the attitude toward learning, self-efficacy and motivation of students as predictors of grade10 mathematics achievement in general secondary schools East Wollega Zone, Oromia Region. That indicated how Data was presented and analyzed below

4.1. Results

4.1.1. Back ground of the respondents

Three hundred ninety eight students (398) participated in this study. From those, 109 (27.39%) students were taken from Jangir Public Secondary School because, of the largest number of students were registered at the school from the selected schools.,86 (21.61%) students were taken from Dange public secondary school and the rest 79 (19.85%), 75(18.84%) and 49 (12.34%) students were taken from Ano, Ifa and Gute Public Secondary Schools, respectively, as indicated from table below.

Table 3: Frequency and Percentage of the participants in terms of schools

Variable	Categories	Number of students	Percentage%
School	Dange	86	21.61
	Jangir	109	27.39
	Ano	79	19.85
	Gute	49	12.31
	Ifa	75	18.84
	Total	398	100

With respect to sex distribution of respondents, 217 (55%) were males and the rest 181 (45%) students were females as indicated from table below.

Table 4; Frequency and Percentage of the participants in terms of sex

Variable	Categories	Number of students	Percentage%
Gender	Males	217	54.52
	Females	181	45.48
	Total	398	100

With respect to age distribution of respondents 70(18%) were 15 to 17 years old, 18 to 20 years old were 215(54%), 21 to 23 years old were 68(17%) and 24 and above years old were 45(11%) participated on the study. in table 5

Table 5; Frequency and Percentage of the participants in terms of age

Variable	Category	Number of participant	Percentage%
Age	15—17	70	18%
	18—20	215	54%
	21—23	68	17%
	24 and above	45	11%
	Total	398	100%

4.1.2. The Relationship between Attitude towards Learning and Mathematics Achievement

One of the objectives of the research was to find out the relationship between attitude towards learning and mathematics achievement. As indicated in the table 6 below there was a strong positive relationship between attitude towards learning and mathematics achievement, r=*.723, p=.001*. Approximately 56% of the variance in mathematics achievement is explained for by the variance in students' attitude towards mathematics.

Table 6; Pearson's Correlations between attitude towards learning and mathematics achievement (N=398)

Variables		Academic achievement	Attitude
Academic achievement	Pearson Correlation	1	.723**
	Sig. (2-tailed)		.000

**. Correlation is significant at the 0.05 level (2-tailed).

4.1.3. The Relationship between Self-efficacy and Mathematics Achievement

One of the objectives of the research was to find out the relationship between self-efficacy and mathematics achievement. As indicated in the table below there was a strong positive relationship between self-efficacy and mathematics achievement, r=.696, p=.000. Approximately 48% of the variance in mathematics achievement is explained for by the variance in students' self-efficacy towards mathematics**.**

Table 7; Pearson product movement Correlations between self-efficacy and mathematics achievement (N=398)

Variable		Academic achievement	Efficacy
Academic Achievement	Pearson Correlation	1	.696**
	Sig. (2-tailed)		.000

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

4.1.4. The Relationship between Motivation and Mathematics Achievement

One of the objectives of the research was to find out the relationship between motivation and mathematics achievement. As indicated in the table below there was a moderate and positive relationship between motivation towards learning and mathematics achievement, r=*583, p=.000.*Approximately 34 % of the variance in mathematics achievement is explained for by the variance in students' motivation towards mathematics.

Table 8; Pearson product movement Correlations between motivation and mathematics achievement (N=398)

Variable		Mathematics achievement	Motivation
Mathematics Achievement	Pearson Correlation	1	.583
	Sig. (2-tailed)		.000

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

4.1.5. Multiple Regressions Analysis

This section presents the regression analysis for the predictive power of attitude, self-efficacy and motivation (independents variables) on mathematics achievement (dependent variable). To identify the predictor of the independent variables on dependent variable, multiple regressions analysis was used.Before concluded the multiple regression analysis various assumptions were checked. Most of the assumptions were met and indicated in appendix iii**.**

Table 9: ANOVA summery table that show that a collective predictors of attitude towards learning, self-efficacy and motivation in mathematics achievement

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	29606.183	3	9868.728	198.673	.000
	Residual	19571.297	394	49.673		
	Total	49177.480	397			

Table 9 shows that the ANOVA output from regression analysis and represents standardized regression coefficients. As indicated in the table, the model is statistically significant which indicate at least one of the variables predicted students mathematics achievement significantly, F (3,394) = 198.673, p=0.05. .Attitude of students towards mathematics, self efficacy and motivation of students in learning mathematics had a strong positive relationship to mathematics achievements (R.776) and they accounted together about R^2=0.602(60.2 %) of variance in the students' academic achievement in mathematics subject.

Table 10; Collective predictors of attitude towards Learning, self-efficacy and motivation on mathematics achievement in ANOVA table

Variables	B	SE	Beta	T	Sig
Constant	9.373	2.712		3.456	.001
Attitude	.420	.048	.412	8.697	.000
Self efficacy	.354	.061	.328	6.972	.000
Motivation	.143	.047	.130	3.063	.002
R^2=60.2%					
R= .776					

Similarly, from the table 10 indicated that the research attempted to check how well each of the independent variables predicted students' academic achievement in mathematics. Attitude of students towards mathematics predicted significantly mathematics achievements in math that showed ANOVA collective predictors (b=.420, t=8.697, p=0.05); self efficacy belief of students in mathematics predicted significantly students' mathematics achievements in math (b=.354, t=6.972, p=0.05) and motivation of students in mathematics predicted significantly students' mathematics achievements in math (b=.143, t=3.063, p=0.05). From all of the independent variables, attitude of students towards mathematics was the strongest predictor (*B*= .412) and contributed to the highest of the total variance followed by self efficacy (*B*= .328) which accounts for beta value indicated of the total variance and motivation (*B*= .130) which accounts for beta value of the total variance.

4.2. Discussion

The main objective of the study was to investigate the attitude towards learning, self-efficacy and motivation of students as predictors' mathematics achievement in public secondary schools in East Wollega Oromia Region. Thus, the discussion follows along the followings.

Attitude is related to mathematics achievement. From the present research; it is found that attitude is strongly and positively correlated with academic achievement, which provides support to past literature. For example, some research studied that students who possessed a positive study attitude were more likely to demonstrate higher academic

achievement than those who had a less positive attitude towards studies. In addition, the research also showed that 98.7% of the underachievers tended to possess a less favorable attitude towards their studies (Baker, 2010).

These findings also confirmed pervious finding that states attitude towards learning was statistically significant relationship with mathematics achievement whose students have high level of attitude, enthusiasm and positive feeling to the subject (Bandura, 1986) (Schunk,2002).

Similarly, these findings were consistent with other relevant findings Nicolaidou and Philippou, (2003.) Stated that positive attitude towards learning increase hard working and challenges difficult tasks in where students effectively work and they are most likely motivated to work harder, which eventually promote achievement and to the substantial importance of existence of difficult tasks in the mathematics and its significance to mathematics achievement. Students high level of attitude, enthusiasm and positive feeling to the subject. Consequently, attitude was leading to higher mathematics achievement (Zan &Martino, 2007).

The result showed that attitude towards learning (.723), p=0.05. It means that there was statistically significant relation with mathematics achievement of public secondary school students with respect to attitude. This revealed that when students develop positive attitude to learn, they improve and achieve their mathematics achievement. This finding was in agreement with various researches (e.g., Amare, 2001; Zan & Martino, 2007; Hemmings & Kay, 2010; Nicolaidou & Philippou, 2003). They stated that students who have positive attitude towards learning could be a significant relation between and mathematics achievement. In consistence with this, too Langat (2015) showed that those with better academic achievement exhibited more positive attitudes towards math than those with low academic achievement in a study of secondary school students.

On the other hand, the present study disagree with the findings of Ma and Kishor (1997); Mata, et. al. (2012). It indicated that even though students have positive attitude towards learning was statistically significant with mathematics achievement; it was rather weak and could not be considered practical significance.

The variation of the present result study was that of Ma and Kishor (1997) and Mata, et.al. (2012) might be connected with the issue of environment. It means that the knowledge of researcher, how he properly prepared of the exams and one shot of exams may be influence the psychological factors and might be affected the prediction power of the results. Meanwhile, one thing that should be very clear in fact that success in mathematics or academic generally depends on many predictors on academic achievement.

So that the present study combined together investigated on mathematics achievement were issue of psychological factors that predict the view of students and further more the role of teacher on teaching, conducive environment make students enhancement and better learning activity increase attitudes(Pajares, 2002).

The other results revealed that higher self-efficacy students perform better than the lower self-efficacy students or higher self-efficacy statistically correlate with higher mathematics achievements. This means that students who have lower academic achievement cannot be challenge the difficult task rather fears, ignored less participation or negative attitude towards the mathematics.

Academic self-efficacy is correlated with mathematics achievement. The present study demonstrates that self-efficacy and mathematics achievement are positively correlated, which is found to be consistent with most of the existing literature. For example, in a study conducted in the U.S., the researchers examined the effect of self-efficacy on first-year university students' academic achievement (Chemers *et al.* 2001, After analyzing the data collected, it was shown that the higher one's self-efficacy, the better the academic performance he/she could achieve.

The result showed that self-efficacy (r=.696), p=0.05. This indicated that the relationship between self-efficacy and mathematics achievement moderate significant relationship between the two. Accordingly, strive for students to learning mathematics and have good behavior, positive feeling and make confidence independently. So the finding of the result confirmed with the line of the researcher objective.

The study corroborates with that of Bandura, (1986), Schunk,(2002) who stressed that successful students' have significantly higher self-efficacy for mathematics achievement than unsuccessful students.

Similarly, the previous finding report showed that, there is a significant relationship between self-efficacy and mathematics achievement and strong relationship between the two variables (Dempsey &Tweed (2018).

However, inconsistency findings have been reported by Reynolds and Weigand (2010). They examined that, the relationships between self-efficacy and academic achievement on undergraduate first year students found that self-efficacy was not significantly related to academic achievement, because the result of inconsistent finding measured by Grade-Point-Average (GPA), accordingly, might affect the results of the academic achievement and also the type of instrument he used and conducive environment may have affected the power of self-efficacy to correlate academic achievement.

Motivation is correlated with mathematics achievement. The present study demonstrates that motivation and mathematics achievement are positively correlated, which is found to be consistent with most of the existing literature. For example, in a study conducted in the U.S., the researchers examined the effect of motivation on first-year university students' academic achievement (Broussard &Garrison, 2004). After analyzing the data collected, it was shown that the higher one's motivation the better the academic performance he/she could achieve.

This findings revealed that mathematics achievement moderate relationship with student's motivation (r=.583), p=0.05. It means that students in high ability towards mathematics tracks tended to find mathematics easier. The students' tended to enjoy doing mathematics more, and considering mathematics to be more useful than did students in lower ability tracks. This is a potential to direct behavior that it is built into the system that controls emotion and make achievement.

This lends a good support with reference to the position of Amunga and Musasia (2011) that when students express their interest in the subject it initiates the way they react or challenging the task could be increase or motivate. Therefore, due to that interest and the

students' attitude towards a particular subject matters increase. Moreover, the students display good attitude and better understanding in mathematics, then the students are motivated and challenges tasks whatever hindrances come across and challenge.

However, the present finding inconsistency the previous findings with (Aboma, 2009) even though there was a positive relationship between motivation and mathematics achievement, but non-significant. There is of course a difference in the language in which the scales motivation was administered and only measured by GPA may affect. The other problems behind this was that achievement tests score failed to be significant in order to predict academic achievement could be that the exam was one shot exams. Moreover, this exam may lack proper test quality which can hinder their predictive power and as far as the knowledge of the researcher was to be concerned.

Multiple regression of attitude towards learning mathematics, self-efficacy and motivation on mathematics achievement as own in the results, it is found that attitude towards learning, self-efficacy and motivation can significantly predict mathematics achievement. As aforementioned, in a research conducted in Washington, the researcher studied the relationship between students' attitude towards science and the amount of effort they would expend in completing a computer science program. The results indicated that attitude could be regarded as a reliable predictor of achievement (Center for Educational Technologies 2007). Concerning self-efficacy's prediction power on mathematics in a research studying the relationship between one's self-efficacy and health behaviors, it was found that self-efficacy could successfully predict one's attempt in engaging in health behaviors (Conner & Norman 1995).

The multiple regressions revealed that independent variables like attitude towards learning, self-efficacy and motivation of students predict dependent variable (mathematics achievement). It is indicated that when students have positive attitude towards learning they have good feelings, good behavior and value and enjoy increasing their academic achievement in order to success and achieving.

In case of self-efficacy students have to be confident, engage and capability in order to have high self-efficacy to achieve mathematics. On the other hand, students who do not

have confidence and capability reduce their performance. So in this study self-efficacy predict and contribute the power of mathematics achievement. In line of this motivation of students predict mathematics achievement. motivation have power to enhance the strength of the relationship between the input and the output of students that refers to the reasons for directing behavior towards a particular goal, engaging in a certain activity, or increasing energy and effort to achieve the subject.Learning mathematics requires highly motivated students because it requires reasoning, making interpretation and solving problems in mathematical issue and concepts. The challenges of mathematics learning for today's education are that it requires disciplined study, concentration and motivation.

The current study was finding agreement to the previous findings with Ibrahim Demir (2009). A positive attitude towards learning can also be considered important predictors of outcomes. It is also found that direct and indirect effects on mathematics achievement.

On the other hand, inconsistency finding with the present study was that of Reynolds and Weigand,(2010) who stated that motivation and self-efficacy were not statistically correlated and also did not predict academic achievement, similar to this finding also Ma and Kishor, 1997 even though attitude towards learning was to some extent correlate, but not statistically significant and did not strong predictors . However, in the current study from the all variables attitude towards learning was highly positive correlation and the strongest predictors. The reason was depending up on the conditions which influence the power of predictors, the mechanisms of language uses, the level of the respondents and how to treat the respondent independently might be affect the result.

As a result indicated from above discussion, a positive attitude towards learning student can be considered important predictors of outcomes. It is also found that direct and indirect effects on mathematics achievement. The beta-values indicated that the contribution of attitude towards learning in mathematics were strongly predicted their mathematics achievement in learning mathematics than the other predictors variables.

Mathematics is one of the compulsory subjects given for all grade levels. It is also a major criteria to join university and (or) colleges in Ethiopia, however, it is still low achievement in relation to the other subjects, Thus, it was on the ground of this, the

government were supposed to give emphasis on the subject. More over the knowledge of mathematics is obligatory and a prerequisite for advanced study and apply the skills on different course and Natural science at secondary school (NSSS) student were in critical condition on math ability. Even though it was difficult to find out the pinpoint of the major reasons for how achievement on the areas of content, nature of school compound ,view of students perception, capacity of students confidence and their motivation. Students have better awareness on learning mathematics of the usefulness of the subject in their future endurance.

The students' attitude towards learning, self-efficacy and motivation are linked together and combined multiple regressions which indicated that, there is a high relation between independent variables (attitude towards learning, self-efficacy and Motivation) and the dependent variable (achievement in mathematics). Ma and Kishor, (1997) as cited by Nicolaidou and Philippou (2003) students who come to enjoy Mathematics, increase their motivation to learn. This implies that motivation predicts the value of education in mathematics and this leads students to challenge the problems (Amunga & Musasia, 2011). So there is a need to motivate students so as to arouse and sustain their interest in learning mathematics.

The result of a multiple regression at linear analysis shown in the assumptions figure indicated that increasing up wards side and met linear correlation between mathematics achievement and attitude towards learning, self-efficacy and motivation. The coefficients of adjusted independent variables were suggested that strongly predict the dependent variable due to the linear and combined predictors of the three independent variables on the dependent variable. Thus, it can be said that attitude towards learning, self-efficacy and motivation high contribution on the mathematics achievement.

Therefore, the three independent variables like; attitude towards learning, self-efficacy and motivation were the strongest and predictor and Correlations on mathematics achievement. In line of these results, from the three independent variables, attitude towards learning variable is the strongest predictor of student on mathematics achievement..

Generally, in the above discussions the present study indicated that it confirmed and align with what the researcher claimed at objective study. All independent variables met the view of the researcher main objective. In this study all variables have significant relationship and predict mathematics achievement at different level related and predict effectively. Finally, many scholars supported and agreed with the present findings and few of scholars disagree depends up on their findings and their situation available.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The objective of this study was to investigate how well attitude towards learning, self-efficacy and motivation of the public secondary school predict student's academic achievement in grade 10 mathematics. This chapter presented the summary of the findings, conclusion and recommendations of the study.

5.1. Summary of the Research

The main objective of this study was to investigate the attitude towards learning, self-efficacy and motivation of students as predictors' grade 10 mathematics achievements in general secondary school of East Wollega Oromia Region. Moreover, the specific research questions extracted for investigation were: How does student's attitude relate with mathematics achievement in selected general secondary schools? How does student's self-efficacy relate with mathematics achievement in selected public secondary school? Is there a significant relationship between students' motivation and mathematics achievement in selected general secondary schools? How well student's attitude towards learning, self-efficacy and motivation on mathematics achievement in general secondary schools in East Wollega Zone, Oromia Region predict student's mathematics achievement in selected public secondary school of students?

To answer the research questions; data was collected from 398 students of some selected general secondary schools in East Wollega zone of Oromia region. Among those, 217 were males and the rests 181 were females. A questionnaire was contained various scales to collect information from students. The data analysis was carried out by frequency, percentage, correlations, and multiple regressions using the statistical software package for social science (SPSS) 20 versions.

Students who have positive attitude towards learning mathematics, high self-efficacy and high motivation are needed to influence one's willingness to learn and achieve in mathematics regardless of students. As regression analysis indicated for the grade level confirmed that there was statistical significant between independent variables and

dependent variable. In this case the contribution of the independent variables for students to achieve mathematics achievement plays a great role increase their mathematics achievement in which was in line of the researcher claims and objective. In other words the results confirmed with the objective the purpose and align with the basic research questions. The positive value of the coefficients for each predictor indicated that there was a positive relation between the independent and dependent variables. This showed the strengthening and diction of the two variables. An increase in the value of each of these predictors showed an increase in the achievement scores of students. It implied that the more students had positive attitude towards mathematics, the more likely they could achieve.

5.2. Conclusions

The objective of this study was investigated, about attitude, self-efficacy and motivation of students as predictors of grade 10 mathematics achievement in selected general secondary schools in East wellega zone Oromia Region. From the aforementioned discussions, the following conclusions were derived based on the purpose and objective of the study.

Although the results of present study provided support for the investigated predictors' variables, certain limitations should be acknowledged and kept in mind when interpreting the findings.

First, correlational design model (CDM*)* analyses were employed to test the proposed model of mathematics achievement, the current study did not use an experimental, longitudinal design or cross sectional and thus to make clear causality relation. Future research, therefore, should use a longitudinal design and provide more insight into the causal relationships among the variable

Second, it must be acknowledged that there can be several other factors which are likely to predict the mathematics achievement of students because of the complex nature of mathematics achievement in starting from high school classes and the study investigated the effects of other variables. Therefore, it would be important to include some of these factors into the model so as to better predict mathematics achievement. It is important to

be considering like prior achievement or ability as measured by the Ethiopian General Secondary Education Certificate Examination (EGSECE) results, preparatory schools.

Despite of these limitations, focus only on the research questions.

- Regarding the relationship between students attitude towards learning and mathematics achievement were indicated that there was strong relationship and statistically significant between the two variables that r=.723,p=0.05. This revealed that when students show positive attitude towards learning, there is high mathematics achievement in which students that have positive attitude high score and challenges when difficulty encountered and those students who have negative attitude towards learning low achieve. Consequently, they fear, frustration and ignored themselves from schooling.
- Concerning the relationship between self-efficacy and mathematics achievement showed that there was moderate relationship and statistically significant within two variables that r=.696, p=0.05.This revealed that when students have confidence, pertaining and high self-efficacy there is high achievement on their mathematics achievement. This indicated students who have high self-efficacy could be increased on their academic achievement. Due to this student's who have high self-efficacy perform better than students who did not high self-efficacy. As a result students who low self-efficacy could be fear, ignored and less academic performance.
- To assess whether there is statistically significant relation between motivation and mathematics achievement, there was moderate relationship and statistically significant between the motivation and the mathematics achievement that r=.583, p=0.05.. This indicated that when students initiated, interesting engaged and motivated to the academic achievement, there is high motivation and participated to challenge and solve the problems. This shows students' who have high motivation have high achiever than students who have low motivation.
- To identify, how well attitude, self-efficacy and motivation in mathematics prediction power of the student's mathematics achievement in selected general secondary school of students? From finding of mathematics achievement

regression R^2 value identified, R2= .602. This indicated that the three variables independent (attitude, self-efficacy and motivation) of the study have explained mathematics achievement by 60.2% effect

- The beta value of attitude towards learning (.412), it was statistical significance at p=000 on mathematics achievement. So that variable makes the moderate contribution explaining dependent variable.
- The beta value of self-efficacy (.328), it was statistical significance at p=000 on mathematics achievement. So that variable makes the moderate contribution explaining dependent variable.
- Additionally, the beta value of motivation (.130), it was statistical significance at p=000 on mathematics achievement. So that variable makes the positive contribution explaining dependent variable.
- From this study the researcher undertaken. It is the same predictors those the current researcher did not studied or unmeasured to be considered and understandable because, as indicated from multiple regressions analysis the prediction power of the studied variables were R^2=60.2% predicted or explained by the studied variables 39.2% was predicted by the unmeasured variables which the researcher can not included.
- Finally, the results of multiple regression analysis confirmed that all independent variables like, attitude, self-efficacy and motivation were predictors of mathematics achievement, whereas attitude towards learning was the most significant predictor of mathematics achievement among independent variables.

5.3. Recommendations

Based on the aforementioned discussions, research findings and conclusions the following recommendations were made.

- It would be advisable for supervisors, principals, teachers, parents and educational practitioners to give attention to students' attitude, self-efficacy and motivation in secondary schools and during instruction besides the cognitive behavior. Since the variables are important predictors of mathematics achievement.

- Students enable for better knowledge about attitude, self efficacy, and motivation to challenge mathematics task in order to achieve high grade and expanding their knowledge for future career.
- Most of the previous researchers focused their study on physical factors rather psychological factors. So it is better to be recognized and understand focused on the psychological factors of students on academic achievement.
- Experimental study will be studied for the student's attitude, self-efficacy, and motivation in mathematics should be conducted to generate evidence and how these variables predict students' mathematics achievement and information would be used for enhancing students learning in mathematics.
- Enhance students feeling of positive attitude towards learning by arranging varieties of learning activities.
- Make teachers mathematics teaching interesting and attracting to be promoting students attitude towards learning and self-efficacy.
- Students have better awareness on learning mathematics of the usefulness of the subject in their future endurance.
- Positive attitudes towards learning and performing well in mathematics are necessary ingredients in secondary school mathematics education. So, there is a need for students to enhance these positive attitudes.
- Furthermore, an investigation should be carried out how to apply in practice those students' attitudes towards learning, self-efficacy and motivation to enhance and promote secondary school students' on mathematics achievement.

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Appendix I

Jimma University

College of Education and Behavioral Science

Department of Psychology

Questionnaire to be filled by students

The purpose of this questionnaire is prepared for the purpose of conducting a study on 'attitude, self-efficacy and motivation of students as predictors of mathematics achievement in selected secondary schools of East Wollega Zone. To achieve the purpose, your cooperation in completing this questionnaire is highly appreciated. The success of this study by and large depends on your honest and sincere responses to the question items. The data you provide will be kept confidential and will not be disclosed to any third party**.** You are, therefore, kindly requested to provide the required information**.**

Thank you in advance for your cooperation!

Part-I: General personal information.

1. **Name of school_____ Woreda_____ Zone_____**
2. Sex; Male 1 ; ☐ Female 2☐
3. Age in years: 15 -17 ☐ 18- 20 ☐ 21_23 ☐ 24and above ☐

Part II- Use the following abbreviations (x) and values, 5= "SA"= strongly Agree, 4=A=Agree, 3=UD=undecided, 2=DA=Disagree, 1=SD=strongly disagree.

I	Attitudes towards Learning Mathematics	Scales				
		1	2	3	4	5
1	I can challenge most mathematical problems if I invest the necessary effort					
2	I like learning mathematics more than any other subject					
3	I'd proud to be the outstanding student in mathematics					
4	Having good mathematics confidence is important for a well rounded					

	education					
5	I find mathematics concepts easy to understand.					
6	I like mathematics because it is practical					
7	I feel insecure when I have to deal with mathematics problems					
8	Mathematics is difficult than any others subject					
9	Mathematics helps students in learning other subjects					
10	I have always liked to do mathematics no matter how difficult the subject					
11	Mathematics is useful for anyone's life.					
12	I enjoy the struggle to solve a mathematical problem.					
13	Knowing mathematics will help me earn a living					
14	I will need mathematics for my future work					
15	I study mathematics because I known how much is useful for me					
II	**Self-efficacy in Mathematics learning**					
1	I can solve most mathematics problems if I invest the necessary effort					
2	I can always manage to solve difficult problems if I try hard enough					
3	I am not the type of person to do well in mathematics					
4	Mathematics has been my worst subject					
5	I always believed that Mathematics is one of my best subjects					
6	I can belief mathematics is a worthwhile to solve problems					
7	I am a good student in Mathematics					
8	I can solve any exercises with various methods					
9	I am one of the best students in Mathematics					
10	I worry that I will not be able to do well on mathematics tests					
11	I can usually solve any mathematical problem					
12	I can solve any mathematical questions					
13	I believe I am the kind of person who is good at mathematics					
14	I do not feel sure about myself in mathematics test.					
15	I am not so good at Mathematics					
III	**Motivation In Mathematics learning**					
1	I work hard mathematics problems for getting a good scores /grade					

2	I am always interested to learn					
3	When given a choice, I select challenging mathematics and tasks					
4	Time passes quickly when I'm doing mathematics.					
5	Learning mathematics gives me a lifelong opportunity					
6	I enjoy the challenge of learning a new and difficult task in mathematics					
7	External rewards initiated me in order to challenges difficulty tasks.					
8	I feel very confident about my ability to learn mathematics on myself.					
9	The challenge of mathematics problems does not appeal to me.					
10	I pay attention to our teacher until mathematics tasks completed					
11	I learn certain mathematical concepts on my own					
12	Mathematics is interesting and enjoyable to me.					
13	When a question is left unanswered in mathematics period, I continue to think about it afterwards					
14	Internal rewards initiated me in order to challenges difficulty tasks					
15	I think that what I am learning in this period is interesting					
16	I motivated when the teacher request challenging questions and giving mathematics test					
17	I am interested in Mathematics					
18	I enjoy the challenge of learning a new and difficult concept in mathematics					

Apendex II

YuunvarsiitiiJimmaatti

KolleejjiiBarnootaa fi SaayinsiiAmalaa

Dippartimentii Saayikoloojii

Gaaffilee Barattootaan qofaan guutamaan

. Galma gahiinsa barbaachisummaa kanaa, tumsi isin gaaffilee kennaman xumurtaniif galata **Barbaachisummaan** gaaffilee kana kan qopha'aameef dhimma qorannoo **ilaacha, nandanda'aa ofiinii fi kaka'umsa barattootaa dandeettii Herrega isaanii akka agarsiisuun manneen barnootaa sadarkaa 2^{ffaa} Naannoo Oromiyaa Godina Wallaggaa Bahaa keessaatti kanneen filataman irratti**guddaa qabdu. Galmagahiinsa qorannoo kanaa baayinaa fi bal'naan kan irratti hundaa'u amanammummaa fi dhugummaa isin gaaffilee isiniif kennaman deebii kennamu dha. Haaluma kanaan deebii isin nuuf kennitan qaama 3ffaatti osoo hin dabarsiin kaayyooma barbaadameef akka oolu offitti amanamummaan raawwatama Atis, kanaafuu, qajeelummaan, kabajaan gaaffilee isiniif kennaman nuuf guutaa.

Waan nu deggertaniif guddaa galatoomaa!!

Qaama I;-Odeeffannoo dhuunfaa waligalaa

1. Maqaa m/b_____Aanaa_____Godina_____
2. Korniyaa; Dhiira 1; ☐ dhalaa 2 = ☐

Umurii: Wagga 15 __17☐ 18-20 ☐ 21-23 ☐ 24 fi isaa ol☐

Qaama II Gabajewwan kanatti fayyadamii mallattoo (x) jalatti gatii itt kenni. **5=BWG, 4=WG, 3= MH, 2=WH, 1= BWH**

Furtuu= Baayyee walii galla(**BWG**) Walii galla(**WG**) Murteessuu hindanda'u(**MH**)

Walii hingalluu(**WH**) Baayyee walii hingallu(**BWH)**

		Scales				
I	**Ilaalchaalee herrega barachuu barattootaa**	1	2	3	4	5

1	Dhamaatee cimaa yoon taasise gaaffilee herregaa harka caalu hojjechuu nan danda'a.					
2	Gosa barnoota kamiyyu caalaa herrega barachuun jaalladha.					
3	Barataa herregaa baayee cimaa ta'uu kootti nan boona.					
4	Herregaatti offitti amanamummaa gaarii qabaachuun barnoota adda addaaf barbaachiisaa dha					
5	Yaadoolee herregaa hubachuuf kan nama rakkisan miti					
6	Barnoota herreegaa nan jaalla dha sababa hojiidhaan mullatuta'eef					
7	Gaaffilee herreegaa yommuun hojjedhu ofitti amanamummaa hinqabu					
8	Herreegni gosa barnootaa kamiyyuu caalaa cimaa dha					
9	Herreega barachuun gosa barnootaa biraa akka barataniif nama gargaara					
10	Gosni barnoota herreegaa hangam yoo cime iyyuu yeroo hundaa isa hojjechuun jaalla dha					
11	Herreegn ijireenya namaa kamifiyyuu barbaachiisaa dha					
12	Gaaffilee herreegaa furuuf dhamaatee taasisuun na gammachiisa					
13	Herreega beekuun qarshii barbaachiisaa ta'e argachuuf na gargaara					
14	Hojii koo gara fuuladuraaf herreega barachuun qaba					
15	Herreegni hangam barbaachiisaa akka ta'e waan beekuuf isa qo'achuun jaalladha					
II	**Herreega barachuutti gahumsa ofiinii barattootaa**					
1	Gaaffilee herreegaa irra caalaa furuu nan danda'a yoon dhamaatee barbaachiisaa taasise					
2	Gaaffilee cimoo furuu nan danda'a yoon cimsee yaale					
3	Ani nama herreega sirriitti danda'u miti					
4	Herreegni gosa barnootaa jiran keessaa kan na jibbisisu dha					
5	Herreegni gosa barnoota ani baayyee jaalladhu keessaa tokko jedheen yaada					
6	Herreegni gosa barnootaa barbaachiisaa fi dhimma baasu jedhamee amana					
7	Ani herreegaatti barataa dandeettii qabu dha					
8	Gaaffilee herreegaa kamiyyuu karaalee adda addaa furuu nan danda'a					
9	Ani herreegatti barattoota baayyee cimoo ta'an keessaa isa tokko dha					
10	Qormaata herreegaa sirriitti hin hojjedhu jedheen yaadda'a					
11	Yeroo baayyee gaaffilee herreegaa kamiyyuu furuu nan danda'a					
12	Gaaffilee herregaa kamiyyuu salphaatti furuu nan danda'a					

13	Ani herreegatti barataa cimaa dha jedheen of yaada					
14	Ani qormaata herregaa sirriitti deebisuuf ofitti amanamummaa hin qabu					
15	Ani herreegatti baayyee cimaa miti					
III	**Herreega barachuutti kaka'umsa barattootaa**					
1	Qabxii gaarii argachuuf gaaffilee herreegaa ciminaaniin hojjedha					
2	Ani yeroo hundaa barnoota herreegaa barachuuf fedhiin qaba					
3	Gaaffileen filannoo herreegaa yommuu kennaman kanneen ulfaatoon filadha					
4	Herreega barachuun carraa bal'aa naaf kenna					
5	Herreega hojjechuniin yeroo koo dabarsa					
6	Gaaffilee addaa fi ulfaatoo ykn hojii barnoota herreegaatti bashannanun jaalla dha					
7	Kennaaleen amilee namaa cimsaan alaan mullatan hojilee ciccimoo akkaan hojjedhu nataasisu.					
8	Ofii koon of danda'ee herreega barachuu offitti amanamummaa guddaan qaba					
9	Gaaffileen herreegaa natti ciman baayyeetuu jiru.					
10	Gaaffileen herreegaa hanga hojjetamanii xumuramaniitti barsiisaa koo nan hordofa					
11	Yaadoolee herreegaa tokko tokko ofii kootiin of danda'ee nan hubadha					
12	Herreegni anaaf kan natti toluu fi nama bashannansiisu dha					
13	Gaaffileen wayitii herreegaatti hin hojjeetamiin yoo hafan boodaitti yaadeen hojjedha					
14	Jajjabinni keessoo hojjilee ulfaatoo akkaan hojjedhuuf na kakaachisu					
15	Akkan yaadutti wantootni wayitii kana keessaatti ani barachaa jiru kan namatti toludha					
16	Yommuu barsiisaan herreegaa gaaffilee ciccimoo kennuu namatti tola					
17	Herreegaan jaalladha					
18	Rakkoo addaa fi ulfaataa yaada herreegaa keessaa furuun jaalla dha					

Appendix III

Checking of assumption:

However, multiple regression analysis relies statistically on several assumptions, In case of this study the assumption of independence, normality and homoscedasticity, multicollinearity linearity, constancy and influential assumption were used to test.

Those are written under the following;

Assumption #1: The relationship between the IVs and the DV is linear.

Scatter plots show that the assumption had been met (although you would need to formally test each IV variables). The linearity assumption means that there is a linear relationship between the set of the independent variables and the dependent variable. This assumption was assessed through plot the regression standardized residuals and the dependent variable (math scores) as shown in figure 1 to figure 3. The assumption was also met but, no curvilinear relationship.

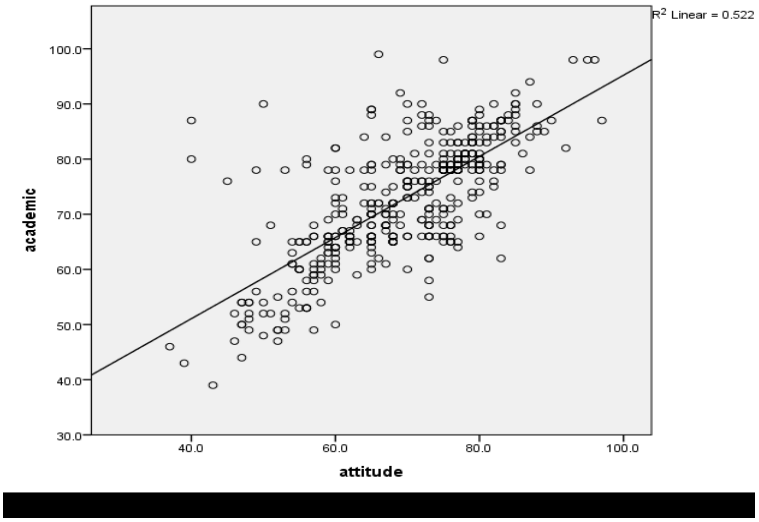

Figure 2; The Relationship between Attitude and Mathematics achievement

Y= DV, X= IV figure showed the is a linear relationship between IV and DV.

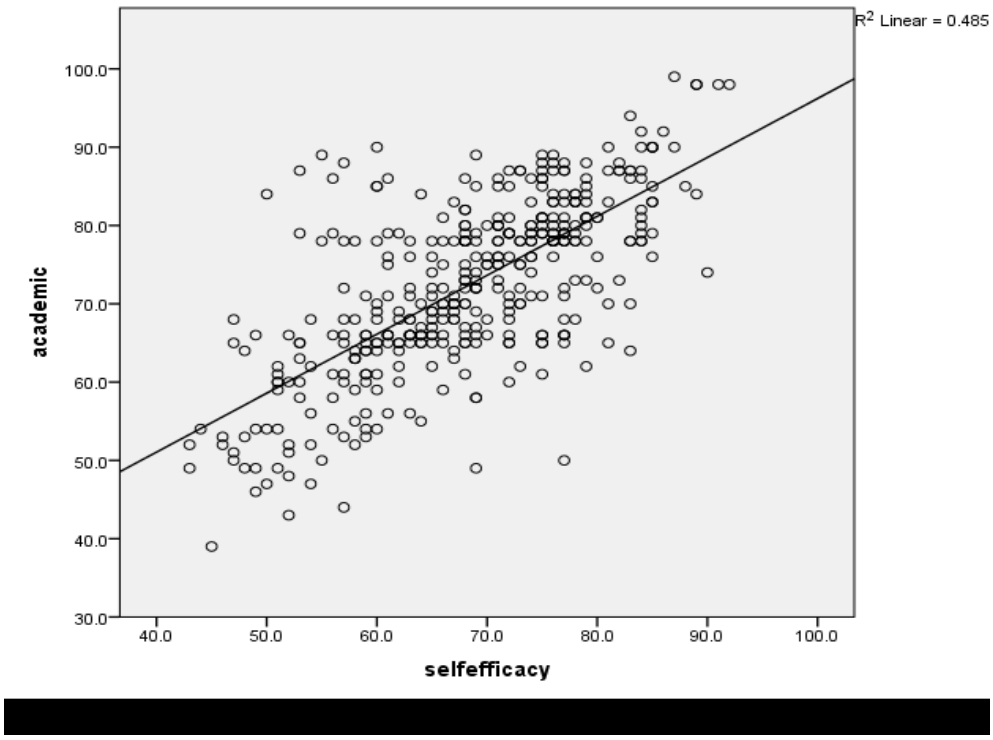

Figure 3; The Relationship between Self-efficacy and Mathematics achievement

figure showed there is a linear relationship between IV and DV.

IV= Independent variable

DV= Dependent variable

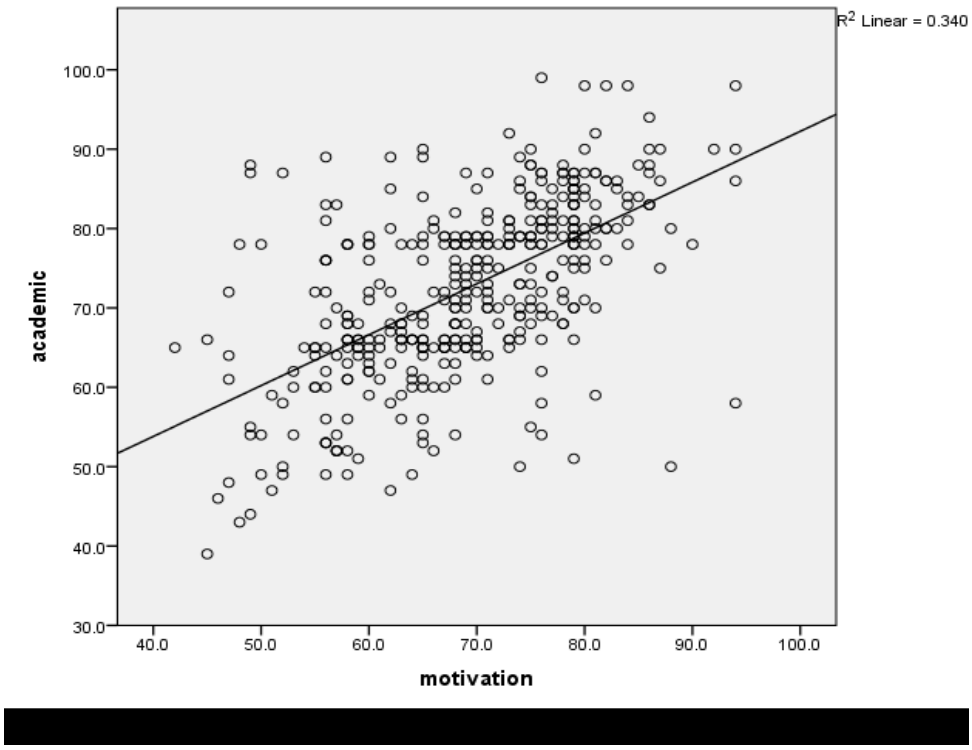

Figure 4;The Relationship between Motivation and Mathematics achievement

Y= DV, X= IV figure showed the is a linear relationship between IV and DV.

Assumption 2: There is no multicollinearity

The assumption we can tested was that the predictors (IVs) are not too highly correlated. We can do this in two ways. First, we need to look at the Correlations. Correlations of more than 0.8 may be problematic. But in this part the highest correlation is r=.70.

We can also test this assumption by looking at the **Coefficients** table. This allows us to more formally check that our predictors (IVs) are not too highly correlated. We can use VIF and Tolerance statistics to assess this assumption. So the analysis of colinearity statistics show this assumption has been met, as VIF scores were well below 10, and tolerance scores above 0.2 (statistics = 1.785 and 0.560 respectively).

- **Assumption 3: The values of the residuals are independent.**

To check this assumption we need to look at the Model Summarybox. Here, we can use the Dubbin-Watson statistic to test the assumption that our residuals are independent (uncorrelated). This statistic can vary from 0 to 4. For this assumption to be met, we want the value to be close to 2. Values below 1 and above 3 are cause for concern and may render our analysis invalid. So, the Durbin-Watson statistic showed that this assumption had been met, as they obtained value was close to 2 (Durbin-Watson = 2.05). In this case, the value is 2.05, so we can say this assumption has been met.

Assumption 4: The variance of the residuals is constant.

To test the fourth assumption, we need to look at the figure or graph of the output. This tested the assumption of *homoscedasticity*, which was the assumption that the variation in the residuals (amount of error in the model) is similar at each point of the model.

This graph plots the standardized values in our model would predicted, against the standardized residuals obtained. As the predicted values increase (along the X-axis) the variation in the residuals should be roughly similar. If everything is going, this should look like a random array of dots. If the graph looks like a funnel shape, then it is likely that this assumption has been violated.

Our plot of standardized residuals vs standardized predicted values showed no clear signs of funneling; that suggesting the assumption of homoscedasticity has been met.

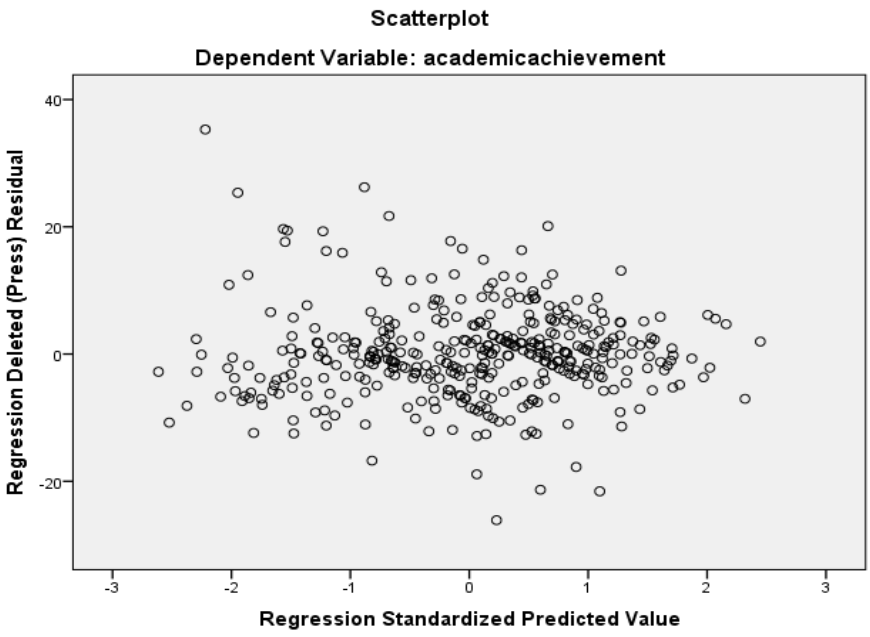

Figure 5; Homoscedasticity of independent variables

Y= DV, X= IV .*The variance of the residuals is constant*

Assumption 5: The values of the residuals are normally distributed.

The P-P plot for the model suggested that the assumption of normality of the residuals may have been violated. This assumption can be tested by looking at the P-**P plot** for the model. The closer the dots lie to the diagonal line, the closer to normal the residuals are distributed. In this case, the data points hardly touch the line at all, and indicating that assumption 5 may be violated.

However, as only extreme deviations from normality are likely to have significant impact on our findings the results are probably still valid.

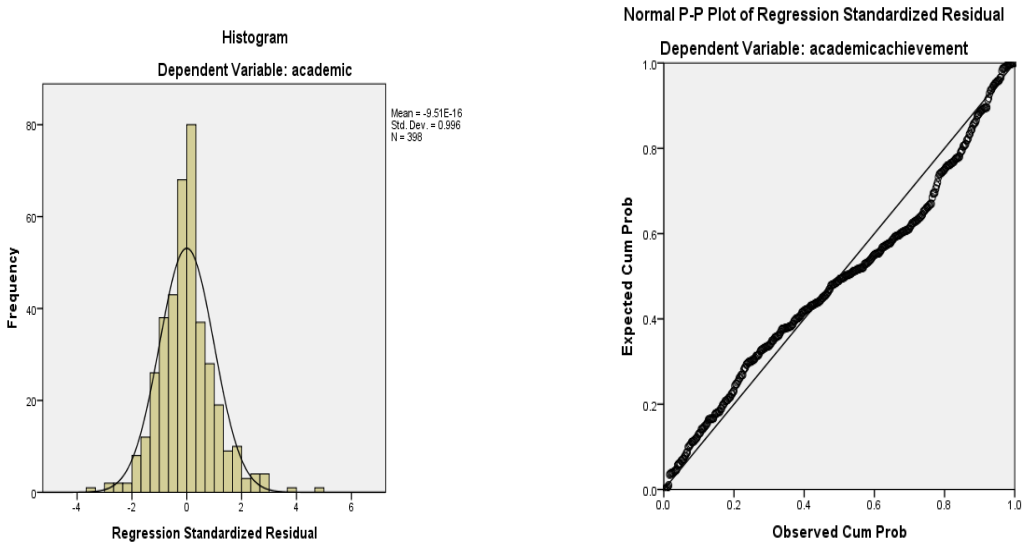

Figure 6; Normal P.P plot of Regression standardized Residual

The values of the residuals are normally distributed

X= Independent variable

Y= Dependent variable

Assumption 6: There are no influential cases biasing model.

This contains the Cook's Distance statistics for each observation. Any values over 1 are likely to be significant outliers, which may place undue influence on the model, and should therefore be removed and analysis rerun. In this case, no such instances have occurred. Because Cook's Distance values were all under 1, suggesting individual cases were unduly influencing the model.