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## THE STATUS OF GRADE EIGHT STUDENTS' ACADEMIC ACHIEVEMENT IN MATHEMATICS AND FACTORS AFFECTING: THE CASE OF SOME SELECTED PRIMARY SCHOOLS IN NEKEMTE TOWN

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### ABSTRACT

The study's main objective was to investigate the status of grade eight students' academic achievements in mathematics in governmental primary schools of Nekemte Town and the factors affecting them. For this research, 144 students were selected using simple random sampling, and 20 teachers were selected via purposive sampling techniques. On the other hand, 15 respondents were selected via purposive sampling for an interview out of 5 sample schools; the study design was employed a sequential explanatory research approach thereby, questionnaires, post-semi-structural interviews, and observation tools that analyzed and interpreted using descriptive statistics, independent sample t-test, multiple regression, and one-way ANOVA computed by SPSS- version 24:00. The results of students' achievement test corresponding with predicted factors was indicating a low average mean score of algebra and Geometry tests rated by accepted value (75%) of Cronbach alpha, ANOVA test scores between teachers and students respondents indicated that school facilities, teacher's quality, parental support and, parental level of education revealed ( $F > 5.161 < 848.18$ ,  $P < .05$ ) supposed to four independent variables, whereas, attitude towards mathematics test depicted ( $F = .063$ ,  $P > .05$ ) values. The results of multiple regression confirmed that the set of independent variables explained ( $P \leq .05$ ) dependent variable was regressed on predicted variables such as school facility, teachers' quality, and parental educational level; however, attitude and parental support ( $P > .05$ ). The  $R^2 = .357$  depicted that the model explains 35.70% of the variance in achievement tests in mathematics. Similarly, qualitative data probe that independent study variables mainly affect students' academic achievement in mathematics. From the finding, the researcher forwards recommendations for the unexplained variables that require diagnosis in further investigation to fit the model summary.

**KEYWORDS:** Status, Test, Academic Achievement, Achievement test, Factors,

### INTRODUCTION

Education at the early stage of life is crucial since this period affects the next process because children remain under their families' care until they begin attending school. Even if children study in school,

many factors, such as friends in and out of school, affect their educational process (Hasan Arslan, 2018).

To understand an abstract concept like Education, one must explicate its meaning or nature from the point of view of the functions such concepts perform or the contexts in which such concepts are appropriately used. Hence, Mathematics is the backbone of all-natural science and the main crucial in daily life. It is an art, language, and science of reasoning and computations and can help to represent scientific phenomena and understand scientific concepts (Meredith & Rogers et al., 2018). Mathematics and natural science have greatly contributed to technological development, economic growth, and the discovery of new ideas. It enriches our understanding and lets us communicate and make sense of our experiences.

Kitta (2004) mathematics is a way of organizing our world experience and solving many practical tasks and real-life problems. We use it in many areas of our lives. In mathematics, we use ordinary language and the special language of mathematics. Mathematics can describe and explain but also predict what might happen (Clements & Battista, 2002).

Mathematics is one of the compulsory subjects in our country (Ethiopia) that determines to join some disciplines like engineering and professional Education. As a subject opens and shuts more doors for individuals than any other content area (Bolaji, 2005), an important subject for skilled workers, and the national economy, it is a prerequisite for studying many scientifically oriented professions (Justina, 2003) and studying other subjects such as physical sciences and technology Education. Betiku (2009) is the bedrock of science, while physical science is necessary for technological and industrial development Betiku (2009).

After the Dergi regime had failed in Ethiopia designing, different educational policies and strategies were to improve Education. Workneh (2013) states that the new Ethiopia Education sector strategies in Ethiopia designed and implemented a series of concerns on Education (ESDP, 1994), and the issue of education quality is emphasized more in ESDP IV. The government also inducted the general education quality improvement program, anticipating to improve the delivery of quality education (World Bank, 2008), and also implemented the goal of ensuring universal access to and completion of basic Education and reducing the adult illiteracy rate by 2015 (Lasonen et al., 2005).

Ethiopia's new education and training policy in recent years addressed several issues, including introducing standardized students (MOE, 1994). Regarding the new education and training policy, there was a gap between what was to be done and what exists, in reality, to achieve the proposed outcomes of all class students' academic achievement; that could be carryout because related issues strongly identified in terms of many factors, some of which were student activity, class size, school facilities, teacher competence, and parent involvement.

The level of academic achievement has been rated as insufficient as it was commonly presented that students are promoted from lower grades to higher grades without sufficient knowledge. The Federal Ministry of Education, in its third National Learning Assessment of Grade eight students, stated that few parents feel satisfied with the student's achievement. At the same time, most expressed dissatisfaction with the achievement and behavioral qualities of the students. The research indicates that students' main causes of failure are: School environment, parents' socio-economic status, and gender-related factors (MOE, 2008).

Therefore, based on the observation, academic background, and experiences of teaching mathematics, the researcher of this study endeavored to investigate the status of students' academic achievement in mathematics and its influential factors in Nekemte Town primary school, focusing on grade eight.

### **Statement of the problem**

Science and technology play an important role in the modern world. They are believed to be the foundation of technological development, a key factor in economic growth, 'critical' to the future supply of a qualified scientific workforce, and strategically important to the nation because of the increased competition from rapidly advancing economies worldwide (HMSO, 2004).

The intention of science education to improve children's academic performance is the most crucial investment. Even though some constrain hinder students from performing well at school, several studies have been conducted to unravel factors affecting students' academic achievement. Derebssa (2006) founds that the tradition of teaching and learning process leads learners to achieve less preference for actively participating in learning due to poor relationships between teachers and students, lack of prior experience in teaching methods, teachers' lack of expertise, inadequate teaching material, or inappropriate curricular materials in Ethiopia.

Increasing access to quality education is another pressure on poor academic achievement (Ayalew, 2005). Nevertheless, statistics still show that most students scored very poor results in eighth-grade school leaving examinations; because of this, students lose their motivation to continue learning; the reason could be due to some problems rather than the quality of education and teaching and learning processes.

Several studies and research have been done in many countries to determine the factors influencing students' mathematics achievement; students' interest in mathematics is one important factor that has been consistently found (Genene Bekele, 2014); despite the aforementioned related things mathematics education has, the quality of teaching and learning has been one of the major challenges and concerns of educators in different countries. Identifying the problems and striving for the solution would help to utilize limited resources, including finances and time, more effectively (Lubienski, S. T. and Gutiérrez; R., 2008).

The aspiration to recognize and identify factors that may have expressive and consistent relationships with mathematics achievement has been communal among national policymakers and educators worldwide (Kupari & Kari Nissinen, 2013). Teachers, trainers, and researchers have long been interested in discovering variables related to students, parents, leadership, teachers, school, and peers that contribute effectively to the quality of achievement of learners inside and outside the school, affecting students' academic achievement (Crosnoe, R., Johnson, M. K., and Elder, G. H., 2004).

Specifically, the problem related to learning mathematics is a common phenomenon among students in Ethiopia. As Effa (2020) conducted his research in the Oromia region, the mean score of mathematics achievement of grade eight students is 32.99, influenced by parental socio-economic factors and educational level, and school-based factors such as school facilities, teachers' competence, and student's attitude towards school and mathematics.

Achievement in mathematics is inextricably associated with upcoming career opportunities for learners, plays a substantial role in the student's general learning acquisition level, and is a reliable criterion to divide students into scientific or literary streams. Thus, improving the quality of Education has been a challenging issue in Ethiopia, Oromia in general Nekemte Town in particular. However, no study has been conducted to investigate the status of grade eight students' academic achievement in mathematics and the factors affecting their status in the sample schools of the study area. For this reason, the studies conducted to investigate the status of grade eight students' academic achievement in mathematics and factors affecting: the case of some selected primary schools in Nekemte town have been conducted to find factors affecting student achievement in mathematics.

Therefore, to fill the research gap, the researcher of this study is interested in identifying the status of student's academic achievements in mathematics and factors affecting their achievement in grade eight of government primary school in Nekemte town, focusing on study variables, i.e., school facilities, teacher quality, student's attitude towards the use of mathematics and parent background (parental educational level).

### **Research questions**

The current study attempted to identify students' mathematics achievement status and its influential factors at government schools in Nekemte Town. To realize this objective of the study, three research questions were framed to anticipate the study.

1. What is the status/level of grade eight students' academic achievements on tests in mathematics in primary schools of Nekemte Town?
2. Are there significant differences in mean average between teachers and students in responding to factors (school facilities, teachers' quality, parent support, student's attitude, and parent educational level) affecting the academic achievements of grade eight students in mathematics tests?

3. To what extent do factors (school facilities, teachers' quality, parent support, parental education, and students' attitude) hinder grade eight students' academic achievements in mathematics tests?

### **Specific Objective of the study**

1. To examine the status of academic achievement of students in mathematics in primary school at Nekemte Town.

2. To identify the factors that contribute to the existing situation of academic achievements of students in mathematics in terms of school facilities (such as availability of textbooks, reference books, teaching aid, type and number of chairs in the room, availability of library, etc.).

3. To analyze the factors that contribute to the existing situation of academic achievements of students in mathematics in terms of teachers' quality (such as teachers' classroom management, method of teaching and assessment, teachers-parent communications, Giving contingent feedback, etc.), students' attitude towards usefulness of mathematics and parental educational background.

4. To identify the most challenging areas of emphasis to bring success in students' academic achievement in mathematics.

### **Review of Related Literature**

#### **Academic Achievements test in Mathematics**

Academic achievement is the knowledge that learners accomplished or skills developed in school subjects, usually determined by test scores or marks assigned by teachers or both (Carter (1959), and Chaplin (1965) specified academic achievement as a level of attainment or proficiencies in academic work as evaluated by the teachers, standardized tests, or by a combination of both.

Mathematics achievement is the competence students show through acquired knowledge, understanding, skills, and techniques developed in mathematics at a particular stage. The mathematics achievement measure is the score of the mathematics achievement test (Pandey, 2017). Student's academic and special mathematics achievements greatly play a role in developing economic, political, and social nations; however, achievement in mathematics is particularly recognized as a major problem in schools serving disadvantaged communities (Justina, 2003).

The study discovered that the relationship between students' attitudes and academic achievement shows a positive relationship (Mohamed and Ismael (2011). In addition, demographic instructional, and individual factors have an association with students' academic achievement (Demir et al., 2009; and (Wang',2004).

Mathematics Knowledge is built structurally; that means previous knowledge is important for developing new knowledge. Mathematics is a cumulative subject; previously learned math skills are

the foundation on which new skills had built (Firew, 2014). Failure to understand some math skills today will keep learners from understanding a new math skill tomorrow (Andualem, 2006).

### **Parental socio-economic Background**

Some researchers suggest that parents' educational level is positively correlated with mathematics achievement (Griff et al., 2007); (Ma, 1999); (Sileshi, 1995); (Tadese, 2006); (Coleman, 1966), Cooper et al. (1998); parental education influence directly contributes to mathematics achievement through parents' ability to help with homework, Campbell et al. (2000) parents had less than high school education obtain lower grades in mathematics than those with higher education levels, Hoover Dempsey (1997) parental involvement enhances children's academic self-efficiency and intrinsic motivation to learn, and Fiore (1999) parents with mathematics anxiety could pass it on to their children.

Parental level of income and educational background plays an important role in students' mathematics achievement throughout their life (Crosnoe and Coopert (2010), Clements and Sarama (2007), Jordan et al. (2007, Smith- Gunn, and Klebanov (1997); educational environment mediated the correlation between students' mathematics achievement and parental background at home, the mediation effects were higher on parents' educational level than on parents' socio-economical status. Children's mathematics achievement could increase even when parents read books to their children early Padavick (2009).

Another research revealed that parents with more education appear better able to provide their children with the academic and social support important for educational success than parents with less education (Schiller et al., 2002). This idea does not mean that low-income parents are not concerned about their children's mathematics achievement. However, the reason is that they do not feel ready to assist their children because of their own limited educational and financial resources (Clements & sarama, 2007).

Parent-children communication and parents' attitude toward mathematics subject has the power to improve students' academic achievement in school. Belete (2014) stated that socio-economical states and parents' educational backgrounds influence students' achievement, and parent-child communication, parental expectation, and beliefs could play a role in students' mathematics achievement.

### **School Environment**

#### **School facilities**

The main cause of students' poor academic mathematics achievement is maybe school facilities and instructional materials such as textbooks, reference books, magazines, new audiovisuals, and other equipment are crucial in facilitating effective learning (Tariku,2018), the nature and quality of classroom teaching carried out during one's years in school may influence achievement over time,

and one's current performance (Michael & Matthews, 2008), and Vaughan (2002) determined a significant relationship between the learning environment and learners' attitudes towards mathematics.

The students with a higher perception of the learning environment have a more positive attitude toward mathematics learning (Firew, 2014). A classroom that loses improper seating arrangements of the students and disorder of chairs and tables encourages "teaching as telling" (Alexander & Halverson, 1956). On the other hand, the insufficiency of teaching-learning materials in school is a great obstacle for teachers and students to address and achieve the stated competence on the syllabus. Tekeste (1990) has revealed in his research that Ethiopian school teachers have no teaching materials designed to assist their textbooks. One load to students against payment is always in short supply; in most cases, several students share the textbook.

The importance of human and material resources in achieving better schooling outcomes, including school infrastructure, class size, teacher experience, qualifications, and instructional materials, has largely been emphasized in low-income countries (Fuller & Clarke, 1994). Wobmann and West (2006) stated that conventional estimates of class size affect academic achievement.

### **Teachers' quality**

Teacher quality refers to teachers' support, student assessment techniques, the applications of teaching methods and ways of communicating with their students and their families focusing on teachers' successful involvement recognized s by their administrators or peers (Westerman, 1991). Koedel (2007) found that variation in teacher quality is an important contributor to student achievement. Accordingly, the principles of effective teaching are that teachers should be able to understand their subject matter and relate it to students, adopt teaching strategies that are responsive to different learners, employ diverse instructional strategies, establish proper assessment tools to measure student development, and engage in frequent curriculum evaluation and teachers' professional development.

Richardson (2008) states that all teachers must possess instructional/ intervention skills to maximize the learner's outcomes policies approved by the government regarding teacher in-service training, education, accrediting, engagement, and professional development may make an important difference in learning and teaching, and capacities that teachers bring to their work. Derebssa Dufera (2006) cited in Workneh Gebreseleassie (2013), and teachers' quality is teacher development, stresses that quality relies on an increased supply of academically qualified, motivated, and ethically trained teachers and in-service and pre-service teacher development efforts in primary and secondary education (MOE, 2008).

The identical factor of a teacher's qualifications and teacher's experience is consistently associated with student's academic achievement (Clotfelter et al., 2014); Ogbonnaya's (2009) finding suggested

a significant positive relationship between students' achievement in mathematics and teachers' qualifications, years of experience, especially from six years of teaching nevertheless, during their first year or two in the classroom (Buddin & Zamarro, 2009); Koedel's (2007) teachers' qualifications cannot predict value-added in learners' performance, and Kimani et al. (2013) identify that teachers' professional qualifications and teaching experience were not significantly related to students' academic achievement.

Another factor that can influence students' academic achievements is teachers' workload. Teachers' high workload hindered students' academic performance, but when their workload was reduced, students' performance improved (Nwinkaurd & Nwanekeri, 2010). Concerning this, teachers' knowledge of the subject matter determines effective teaching and mastering of pedagogical skills, which positively affect students' academic achievement (Tariku, 2018); as Ayalew (2009) stated, whatever curriculum changes are introduced and whatever reform is made will be of little to no avail without qualified and commitment of teachers. Frase (1992) noted that the most important measurable impact of the school on the measure competency of their students was not the curriculum or school's resources but the teacher's knowledge of subject matters and teaching methods, and also interactive class discussions positively correlated with mathematics achievement, while a lecture is negatively associated with poor academic achievement (House, 2005).

Alexander and Haluerson (1956) revealed that classroom management and teachers' responsibility influences students' academic achievements. Borich (1996) revealed that teachers' unpreparedness to teach and poor classroom management can lead to poor classroom discipline.

### **Students attitude**

Student's attitude refers to student's well-being, perception of the school environment, motivation, involvement in scholastic and co-curricular activities and effects of students, perception of students on parental support and involvement, and focus of control in all areas have significant effects on students' academic achievement (Engin-Memir, 2009).

Students' attitude in the mathematics classroom can improve their achievement in the subject. As shin et al. (2009) showed that there is a relationship between students' related factors and mathematics achievement. A conducive school environment and Mathematics teacher-parent communication can improve students' academic achievement; focusing on students' level of understanding and motivational development must be considered during new curriculum development.

Students spend more time doing assignments; project work, homework, and class work are very important activities to improve their grades (Tariku, 2018). Cooper et al. (1998) found that the amount of homework appropriately completed is positively related to academic achievement.



Therefore, it is reasonable to assign, whether inside or outside the classroom, the better their achievement will be (Michael & Matthews, 2008).

Research has shown that the student's achievement in Mathematics may be influenced by their attitude towards the subject. Different factors influence students' attitudes. As key (2006) suggested, several aspects of school context (for example, teachers' ways of giving support, the relationship between students themselves, and the academic and behavioural expectations of the teachers) are highly related to students' attitudes towards mathematics. Ma and Kishor (1997) stated that 'attitude' is one of the main factors related to mathematics achievement.

### **Research Design and Methodology**

In this study, the researcher applied an explanatory sequential research design related to the status of grade eight students' academic achievement in mathematics and factors affecting the case of Nekemte Town primary schools and their contribution to improving learner achievement. In this study, a purposive random sample was used to select 20 sample teachers, and 144 students were selected using simple random sampling for quantitative data, whereas 15 school directors, teachers, and supervisors were selected using purposive random sampling techniques for responding to the qualitative parts. The data collection instruments were questionnaires, observations, and semi-structural interviews directed at literature reviews as evidence to support arguments from existing facts or information. The questionnaires were used for students and teachers; even though all the instruments and the study items were developed in the English language, the researcher of this study translated them into Afan Oromo. To avoid language barriers, having an option of five Likert scales representing 1=strongly disagreed, 2= Disagree, 3=Neutral, 4=Agree, and 5=strongly agreed.

The data collected from the primary investigation in the study area were tallied, tabulated, analyzed, and interpreted, corresponding with the number of participants. The information gathered from the questionnaires and achievement test were analyzed using SPSS, version 24:00. Therefore, descriptive statistics were used to analyze and interpret demographic variables, whereas; Independent sample t-test, multiple regression, and one-way ANOVA were employed to see a significant difference and the prediction power of affective factors on student "s mathematics achievement in mathematics, and interview item was administered to school directors, supervisor, mathematics teachers and students on the second phases.

### **Achievement test**

All questions were prepared from students' textbooks depending on the competence set on the syllabus. To identify students' achievement level in mathematics in grade eight, the researcher was interested in knowing their background knowledge or information in grades 5, 6, and 7 in addition to their level of achievement in the present class (grade 8). So the achievement test incorporated questions based on competence in grades 5-8. For simplicities during analysis, all questions are objective type (True/ False and multiple choices). Ten (10) true/ false questions and thirty (30)

multiple choice questions total of 40, were prepared to achieve the desired objectives. Thirty questions were algebra part, and the rest 10 questions were geometry part. Then, the accuracy of the question was validated by three subject teachers from primary schools in the focused town. The test was statically analyzed (mean average).

### Validity and reliability of the study instrument

The achievement test depended on competence-based constructed by the researcher and validated by three primary school mathematics teachers. Furthermore, the reliability of the questionnaire was checked by using 27 students and 3 mathematics teachers in the study area. Then, the internal consistency of the questionnaire was computed by Statistical Package for Social Sciences (SPSS-Version 24:00) via Cronbach alpha (0.7%), indicating an acceptable level of internal consistency. In addition to testing the internal reliability of the questionnaire, the pilot study was used to verify whether the students and teachers comprehended the statements in the research questionnaire. As a result, each item of the instruments was thoroughly examined, and finally, vague and unclear statements were corrected before the actual usage.

### Quantitative Result

**Table 1. Result of Students Mathematics achievement test**

Item Statistics				
	Mean	Minimum	Maximum	N of Items
Students Achievement Means in maths	36.024	18.012	54.036	2
Cronbach's Alpha =0.750				

The Cronbach's Alpha value (0.75) indicates that the reliability of the questions was estimated at acceptable values. However, the average mean score in the mathematics achievement test for 8th-grade students at Nekemte town government schools was 36.024, indicating low mathematics achievement as indicated in table 1 above.

**Table 2. Results of respondents (MT&GS) related to affective factors**

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Attitude	Between Groups	.122	1	.122	.063	.803
	Within Groups	315.000	162	1.944		
	Total	315.122	163			
PEL	Between Groups	3.372	1	3.372	5.161	.024
	Within Groups	105.840	162	.653		
	Total	109.212	163			
School facility	Between Groups	.719	1	.719	9.484	.002
	Within Groups	12.286	162	.076		
	Total	13.005	163			
Teachers Quality	Between Groups	21.006	1	21.006	848.178	.000
	Within Groups	4.012	162	.025		
	Total	25.018	163			
Parental support	Between Groups	3.970	1	3.970	341.288	.000
	Within Groups	1.884	162	.012		
	Total	5.854	163			

Table 2 above shows that the F-statistics of teacher and student responses towards school facilities, teacher's quality, parental support, attitude towards mathematics, and parental education level F-value were estimated at 9.484, 848.178, 341.288, 0.063, and 5.161 respectively. Significance differences observed between the two groups of participants in responding school facilities, teacher quality, parent support, attitude towards mathematics, and parental educational level were 0.002, .000, .000, .803, and 0.024, consequently computed one way of ANOVA thereby post hoc. From the data above, it was possible to conclude that there was a significant difference in dependent variables of school facilities, teacher quality, student parental support, and parental educational level response

concerning all factors except the status of mathematics achievement test contrary to student's attitude towards achievement test in mathematics at the study area.

Respondents were asked whether different questions responded to the major factors that influence students' academic achievement in mathematics. They suggested that students' lack of interest was one of the major factors hindering their attitude toward mathematics. In addition to this, the method of teaching, teacher qualification, students' parent education background, large class size, the availability of chairs, blackboards, and insignificant parental support in strengthening students' academic achievements was some of the factors that affected students' academic achievement in mathematics.

**Table 3. Multiple linear regressions mathematics achievements test and affective factors**

Coefficients a								
Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.	R	R2
		B	Std. Error	Beta				
1	(Constant)	-78.989	31.335		-2.521	.013	0.597	0.357
	Attitude	-.802	.678	-.090	-1.183	.239		
	PEL	6.697	1.008	.459	6.641	.000		
	School facility	21.379	5.816	.407	3.676	.000		
	Teachers Quality	37.778	6.753	.487	5.594	.000		
	Parental support	-27.672	14.660	-.178	-1.888	.061		
a. Dependent Variable: Achievement test of students from 100%								

The significant impact value of each independent variable school facility, teachers' quality, parent support, attitude towards mathematics, and parent education level was: 0.000, 0.000, 0.061, 0.239, and 0.000, respectively. This data indicated that school facility, teachers' quality, and parent education level in Nekemte town Governmental grade 8 students significantly impact students' mathematics achievement. As the parent's education level, teacher's quality, and school facility increase by one unit, students' academic achievement also increases by 6.697, 37.778 and 21.379, respectively, as shown in table 3 above. However, attitude towards mathematics and parental support do not significantly impact students' mathematics achievement. So, students' and teachers' attitudes

toward mathematics and parental support have an effect of -0.802 and -27.672; consequently, students develop a negative attitude towards math by 1 unit, and their achievement decreased by 0.802 and 27.672, respectively.

According to this data, teacher quality (using teaching aid, giving contingent feedback, giving sufficient activities, understanding the subject matter, adopting teaching strategies, proper employee assignment, etc.) and parental support are the main factors affecting students' achievement in mathematics.

From table 3, the dependent variable (achievement test in mathematics) was regressed on predicted variables such as school facility ( $P=0.000$ ), teachers' quality ( $P=0.000$ ), parental support ( $P=0.061$ ), attitude ( $P=0.239$ ), and parental educational level ( $P=0.000$ ). The four independent variables significantly predicted achievement tests in mathematics; however, the attitude was not significant.  $F(5.138) = 15.313$ ,  $P = 0.001$ , which indicates that school facility, teacher's quality, and parental educational level treated under the study significantly impact achievement tests in mathematics. Moreover, the  $R^2 = 0.357$  depicted that the model explains 35.70% of the variance in achievement tests in mathematics.

## **Qualitative Result**

### **Interviews Result**

The interviewees were asked about the major factors that affect students' academic achievement in mathematics. Thus, the lack of students' interest in learning mathematics is a major factor affecting their achievement. In addition to this method of teaching, teacher qualification, students' parent educational support, teaching strategies, classroom chairs, qualities of blackboard, class size, insufficiency of students' textbooks, teacher-student interaction in the classroom, the perception of their parents to the subject, parents' education background were suggested as the factors that affect student's academic achievement in mathematics.

Similarly, the respondents were interviewed about the coping mechanism used at the school level to improve students' academic achievement in mathematics. They responded that at first better to develop an interest in the subject among students, and the teacher must assist their students in bringing changing feelings of students toward the subject and eliminate examination theft; parents of students must follow what their children learn day to day in the class, the schools as much as possible fulfill teaching and learning facilities, teachers have to design teaching strategies and appropriate assessment techniques.

### **Observation Result**

During the class observation, the researcher had a chance to observe the physical condition of the classrooms; most of the classrooms were not suitable for active learning, students were lack of motivation, classroom chairs were not comfortable for mathematics learning, and most of the students had not mathematics textbook, students did not engage in active learning. The researcher noted that

during observations, the overall pattern was correcting homework on the blackboard, followed by teachers introducing a new topic. Students then copied the work the teacher had done on the blackboard into their notebooks. Finally, homework is given to students. Students appeared to be very dependent on note-taking. In all schools at the observation time, the researcher believed that training might improve teaching strategies and assessment methods that bring students to be high achievers in mathematics. In addition, teaching aids and a library with good supplementary books are necessary to improve students' achievement in mathematics. Still, the school's pedagogical center and library are poorly equipped, and there are no sufficient teaching materials.

## DISCUSSION

This part of the study discussed the study's result, the interview with school directors, mathematics teachers, supervisors, and students, and classroom observation. The investigation was performed to identify the status of students' achievement tests in mathematics and key factors that affect/influence students' academic achievement in mathematics. Under this section, the result of this study was carried out corresponding with the related literature of the previous studies, focusing on specific objectives and research questions in the expectations to conclude the findings and to point out possible recommendations.

As mentioned in table 2 above, the related achievement test score in mathematics, the mean value (36.024) was estimated to be low, and Cronbach's alpha (0.750 or 75%) indicated that the reliability of the achievement test was acceptable. This result shows the status of students' academic achievement in mathematics below the cumulative average. The results of this study calculated using Cronbach's Alpha related to the status of grade eight students in mathematics achievement test was consistent with the study of Griethuijsen et al. (2014), which provide the following rules of thumb: ".9-Excellent, .8-Good, .7-Acceptable, .6-Questionable, .5 Poor, and .5-Unacceptable"(Nunnally J, Bernstein L., 1994). The results of the study computed using One Way of ANOVA showed the significant differences between teachers and students' respondents in a school facility, teachers' quality, parental support, and educational level of parents; however, they did not reveal significant differences between them in the attitude of students toward mathematics which consistent with the study of following studies. Parents support as role models and guide in encouraging their children to pursue high educational goals and desires by establishing the educational resources on hand in the home and holding particular attitudes and values towards their children (Pardimin HM., 2018). influence on child performance in mathematics is paramount (Kushoka I., 2006). positively influence their children's mathematical performance (Mji A, Makgato M., 2006); Woessmann and Fuchs (2004) observed that students performed significantly worse in reading, mathematics, and science in schools by the lack of parental support. Parental encouragement by paying for extra tuition, purchasing textbooks, promoting hard-working, participating in activities such as attending meetings of the parent-teacher association in schools, assisting in doing homework, and guiding learners were positively associated with students' success in mathematics (Kiwanuka et al., 2015).

The student's attitude affects their performance in mathematics in different studies have found a direct link between students' attitudes toward mathematics and student outcomes (Paksu AD., 2008), and there was a positive correlation between student attitude and student performance (Schenkel BD., 2009). Ronnie R. Landicho (2021) found that study habits and academic achievement are possibly correlated, Mohamed and Ismael (2011) revealed positive relationships between students' attitudes and academic achievement, and highly positive attitudes indicated strong performances in mathematics. This interdependent relationship of interest in mathematics affecting achievement and high achievers showing positive interest has been seen in studies by Koller O. and Baumert J. (2001) cited in (Yohannis, 2007). Their strong link indicated that attitudes are important outcomes in students' achievement.

From the review of related literature, different findings stated a significant positive relationship between students' achievement and teaching methods and teaching practices (Ademe & Gebre, 1990). Accordingly, they suggested that teaching methods, practices, and all factors were high and positive, though a low and positive relationship with students' attitude towards mathematics was observed. As Savaş, Taş, and Duru (2010) stated that studying time, students' attitudes toward mathematics, and attendance had statistically significant effects on students' mathematics achievement.

Another study showed that the demographic factors such as parents' educational level and socioeconomic status, instructional factors such as curriculum instructional strategies and methods, teachers' competency, school context and facilities, and individual factors such as self-directed learning arithmetic ability and motivation or concentration (Demir et al., 2009); (Hammouri & Wang, 2004). Daniel and Bamlaku (2017) indicated that mothers' literacy, fathers' literacy, and parents' income had a positive and statistically significant relationship to regional primary schools leaving examination scores in mathematics. According to studies in four countries (Ethiopia, Peru, India, and Vietnam), if parents have more schooling and household wealth increases, students' mathematics achievement scores improve over time (Lynn, Cheng, & Meisenberg, 2019).

The present study was focused on discussing teacher quality and student achievement tests in mathematics relationships, using matched class-teacher data to provide more accurate estimates of how individual teachers can affect their students' achievement. Many researchers have argued that teacher quality is a powerful predictor of student performance (Cheng, 1996; Gibson, 2004; Rugraff, 2004). Some researchers focus on teacher personalities, traits, behaviors, attitudes, values, abilities, and competencies, among other characteristics. Other authors are more concerned with teaching styles, teacher-student interactions, classroom management, or teaching outcomes such as students' academic achievement, personal development, and learning experiences, Ornstein (1991) affirms that every teacher has his/her teaching style, which reflects personality and philosophy associated with their behavior and attitudes. Rubin (1986), cited in Roberto Alvarez (2008), argues that through their style, teachers integrate a specific pedagogy background that defines the practices they adopt in the classroom. On the contrary, teachers who are not very competent in using constructivist methods and

principles in the teaching and learning of mathematics are likely to negatively influence learners' performance in the subject (Makgato, 2012). Since the concern is the poor performance of learners in mathematics and the fact that contributing factors to this situation are less known, examining and understanding these factors from the constructivist perspective hoped to bring solutions to improve the effective teaching and learning of mathematics in line with the principles of constructivism, Kirkpatrick (2003) cited in Roberto Alvarez (2008) supports that despite the interest in teacher quality and the relationship between specific teacher characteristics and student achievement, it is not clear how these variables are related to one another or how they collectively impact student achievement. School-related variables, such as school resources, school environment in terms of parental involvement and support in school-related activities, school principal experience and education, and library and instructional resources, might affect students' achievement in mathematics. Studies find that school resources positively impact students' learning and academic performance (Greenwald, R.; Hedges, L.V.; Laine, R.D., 1996). Studies suggested that parental involvement in school significantly influences students' academic performance (Lara, L.; Saracostti, M., 2001). School principals play a major role in teacher development, parental engagement in school, maintaining a safe climate, and providing instructional supervision and leadership to improve student achievement (UCHICAGO, 2018).

School or classroom variables played an important role in affecting mathematics achievement. Particularly, a school's location, resources, and social atmosphere often relate to its students' academic success. In Ethiopia, school factors are the main reason for differences in primary school students' achievement (Azubuike, 2015). As Kiwanuka, Damme, Van den Noortgate, Anumendem, and Namusisi (2015) reported, out of the total variance in mathematics achievement, about 14% and 17 % variation accounted for the classroom and school-level factors, respectively. School resources, school and classroom sizes, and good attendance in school were significant factors that affected mathematics achievement (Mohammadpour, 2012).

Some school-related factors are discussed in detail: school and classroom learning environment is the other variable that determines students' performance (Creemers & Kyriakides, 2008), and school resources such as office space, playgrounds, classroom furniture, and libraries are associated with higher levels of student academic achievement (Holmlund, McNally, & Viarengo, 2008). In many countries, school resources, including access to pure water and electricity, are associated with better student academic achievement (Lee, Zuze, & Ross, 2005). Moreover, mutual trust and positive interactions between staff and students predict better student scores (Stewart, 2008). According to Rumberger and Palardy (2004), school inputs and classroom processes contribute to students' achievement in mathematics. School contexts and facilities significantly influence students' mathematics learning achievement (Abaineh, 2012). According to Rajoo (2013), the quality of the learning environment is an important determinant factor that influences students' mathematics achievement. Accessibility to enough materials and facilities in the schools/ classrooms are the core factors that affect mathematics learning achievement (Habtamu, 2017).



According to Fardin, Alamolhodaei, and Radmehr (2011), international research has highlighted 50 factors influencing learners' mathematics performance, including school and home resources. Family background variables and school-related factors are significantly related to academic achievement (Engin-Demir, 2009).

## CONCLUSIONS

The primary objective of this study was to assess the status of students' academic achievement in mathematics, and its affective factors in Nekemte town Government schools of grade eight students. The study's findings computed using Coranbache's alpha, independent sample t-test, one-way ANOVA, and multiple regressions probe the following conclusion.

The finding of this study regarding the status/ level of students' achievement in mathematics tests was embracing very low mean scores, accounting for a mean of 36.024, and the results of coranbach's alpha rated acceptable level by 0.750(75%).

The finding concerning the significant differences between mathematics teachers and students responding to the five predicted factors such that school facility, teachers' quality, parental support, and parental education level p-value implies greater than 0.05. That means, there was no significant difference in attitude towards mathematics between teachers, and students' respondents but, the p-value of attitude was greater than .05.

The finding of this study regarding the extent to which independent variables  $p= 0.000$  (teachers' quality),  $0.000$ (school facility), and  $p= 0.000$  (parental educational level) indicated a significant association, whereas  $p=.061$  (parental support) and  $p=0.802$ (attitude)not significantly explained on dependent variable; the fit model summary of the result confirmed the effect size of independent variables was moderately explained (0.357 or 35.70%) of the variance on the dependent variable.

The finding of the semi-structural interview and observation checklist confirmed that school facility, teachers' quality, student's attitude, level of parental education, and parental support largely affect students' academic achievement in mathematics.

## RECOMMENDATIONS

Based on the findings of this study, suggestions about the practical implication and further investigation were forwarded by the researcher to the concerned bodies:

School directors, supervisors, and teachers should have the potential to strengthen the students' achievement in mathematics by preparing awareness of the subject's importance. They should facilitate appropriate learning materials in and outside class to maintain the continuous achievement of students in collaborating with parents.

The biased beliefs and attitudes of parents, school communities, and students themselves also contributed to students' low achievement in mathematics. Therefore, panel discussions, workshops, and seminars should be held both in schools and at the town level to awaken students' general competency and mathematics.

Teachers are a crucial person on the achievement of students in mathematics. Subsequently, they should be encouraged to provide different methodologies and continuous assessments in regular classes and adjust special classes according to their needs.

The school needs to keep filling the classroom with the number and type of classroom seats, textbooks, teacher's guides, learning aids, etc., suitable for all general subjects and mathematics in particular.

Future research should be conducted on whether family income and occupation affect students' mathematics achievement in mathematics, including unexplained variables for further investigation.

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