

# Factors Affecting the Academic Achievement of Grade Eight Students in Government and Private Schools in Debre Markos, Ethiopia

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## ABSTRACT

The primary purpose of this study was to compare science academic achievement of students in government and private schools and examine the relationship of factors that affect science academic achievement. Besides it tried to examine the prediction of science academic achievement with the four independent factors parental involvement, school facilities, teacher competency, and principal leadership. Three government and three private primary school students were used in this study. A questionnaire and science academic achievement test were prepared to 215 student participants; more over an observation was conducted in each sampled schools. The 215 participants were randomly by stratified sampling chosen to respond to items in the provided questionnaires and achievement test. Data from the completed questionnaires were reported using descriptive statistics and frequency data. Major findings of the study were that the mean value for each of the independent variables of private schools was greater than the government schools, and the t-test computed revealed that there was statistically significant difference on science academic achievement between government and private schools in favor of private schools. Besides, the correlation of the independent variables to the dependent variable was low for both government and private schools science academic achievement result. Parental involvement ( $t = 5.39$ ,  $p < 0.01$ ) was positive predictors to students' academic achievement for government schools; and none of the predictor variables influence the achievement of science subjects in private primary schools. The predictor variables account for 13% of the variability in the criterion variable.

**Key words:** Science, Science Academic Achievement, Government and Private schools

## 1. INTRODUCTION

### 1.1. Background of the Study

Science and Technology play an important role in the modern world. Science education is believed to serve as the foundation of technological development and a key factor in economic growth. Given the United States' goal of being the most scientifically advanced country in the world, the lag behind other countries in student science achievement scores is alarming [2]. International comparative studies such as International Assessment of Educational Progress (IAEP), and the Third International Mathematics and Science Study (TIMSS), have found that while students from Hong Kong, the People's Republic of China and Taiwan perform consistently higher than students from the U.S., no significant

differences were found in curriculum, aptitude or expenditure per-student [48]. Other factors, such as family value system, family background, or school characteristics may play an important role in determining the science academic success of the students. Science academic performance is undoubtedly a research after the heart of educators, teachers, psychologists, policy makers, parents and guardians, social workers, etc. In their attempts to investigate what determines academic outcomes of learners, they have come with more questions than answer.

In recent, prior literature has shown that factor impacting on students' science performance [1] thought the primary factor that's accountable for poor performance in science subjects are family influence, poor teaching method, poor textbooks, students' interest, class size, poor laboratory facilities, teacher attitude to work and poor condition of service.

Family aspects such as parenting style, socioeconomic status (SES), parental involvement, and parental belief and attitude are particularly related to student's science achievement and academic attitude [35]. This can be either direct participation in science activities or indirect improvement on home resources. Parents with positive attitudes toward science have more interactions with schools regarding school work and are more likely to take their students to libraries and science museums [18, 27]. In their study, the availability of home resources like computers and science books were also found to be highly correlated to parents' science attitudes.

School factors explain student academic achievements from another perspective. About one-third of all variation in student performance (33%) was between schools [31]. Within the words of [3] inadequate assets for that learning and teaching of science constitute a significant reason for student underachievement. The inadequate assets include laboratories, science equipment, and individuals for use as teaching helps. Lack of qualified and devoted science teachers because the factor affecting student performance in science which poor practical orientation will result in poor knowledge of the idea. In the opinion science teachers aren't any more devoted for their projects 4, 37].

According to the new structure of Ethiopian education system [15, 45], primary education lasts for eight years (age group 6-14) and is divided into two cycles: basic education (Grades I-IV) and general education (Grades V-VIII). Secondary education is divided into two cycles: the first grades IX and X are assumed to be general secondary education, and the second cycle grades XI and XII for preparatory secondary education.

As it has been prevalent, the educational system in all over Ethiopia, is virtually segregated into government educational system and private educational system. In Debre Markos town there are two types of primary schools. For this study, these schools have been categorized as government and private schools. These primary schools plan and execute their teaching and learning program, which usually includes Amharic, Mathematics, English, physics, Chemistry, Biology, Civics and Ethical Education, History, and geography, on the basis of the centrally designed curriculum prepared by the Ministry of Education. Controlling and supervision of the implementation of the curriculum is the responsibility of region zone and woreda educational offices. The minimum level of qualification to teach in both government and private primary schools would be a diploma holder.

There are some differences between these two types of primary schools in areas such as source of finance, class size, time spent by students in school compound, and the day-to-day timetable etc. Government schools do not charge tuition. They are funded through the region educational bureau revenue while, private schools generate their income through tuition. The tuition fee they charge varies from one type of school to another depending on the quality of services they provide and the reputations they have in their community. As opposed to private schools, government schools admit children with diverse abilities. To enroll in government schools parents register their children only by filling out the necessary paperwork while, Private schools are selective. They are not obliged to accept every child, and in many private schools admission is somewhat competitive.

The goal of primary education is to offer basic and general education to students in order to prepare them for further general education and training. The emphasis of the curriculum reform was to design and develop learning materials that shall improve the problem-solving capacity of the students and to make them more productive members of the community who respect human rights and democratic values.

This study was conceived when I was in practicum assessments in different primary schools and also the interest of students to study science subjects and their participation even in the college level decrease in a significant way during my work in the Debre Markos College of teacher education. I have got many opportunities to participate in different educational conferences and committee in both governmental and private primary schools. The issues of discussion at the conference mainly include access to the equity and quality of science education, efficiency whose main component include students' achievement gap between government and private schools. The causes for students achievement gap had been raised to be, among many, parental involvement, school facilities, teacher competency, and principal leadership etc. These factors developed in the writer a strong desire to undertake a systematic study as factors affecting the academic achievement of students in science subjects particularly in grade seven and eight government and private schools of Debre Markos town and also the writer have a strong desire of doing research on school affects play a critical role in many on-going science educational reforms.

## 1.2. Statement of the Problem

Science(from Latin *scientia*, meaning "knowledge") is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe or it is the intensive human effort to understand or to understand better, the history of the natural world and how the natural world works, with observable physical evidence as the basis of that understanding.

Science is different from other disciplines by its processes which are; observation, classification, measurement, prediction, problem identification, collection, analysis and interpretation of data, drawing conclusion, experimentation etc.

The performance of students in science academic task has always been of special interest to educators, parents and society at large. The primary concern of any educator who is entrusted with the responsibility of selecting students for any advance science and technology training program in a given field is the ability to estimate as accurately and as early as possible the probability that such candidates will succeed or fail.

A key aim of science education program should be to recognize the natural curiosity that young children bring to the process of exploring and understanding the natural world they live in. Basic science subjects(Biology, chemistry and physics) are core stone for the development of science and technology, which are provided as a separate starting from grade seven. All government and private primary schools follow the same curriculum provided from ministry of education (MOE) and modified by Regional education bureaus.

Comparison of student's achievement can be done in terms of many variables of which some of them are parental involvement, tutorial, school facilities, teacher competency and principal's leadership etc. For instance, parents with higher income and education are more likely to have higher expectations for their children's educational attainment, have knowledge about their children's educational options and involve their children in intellectual activities [1, 7]. These factors have a positive impact on student learning. On the other side, lower socioeconomic status parents have fewer economic resources from which to purchase books and other items to improve academic outcomes of their children [3].

In Debre Markos town, no study has been conducted on the impact of these factors on student science achievement in government and private primary schools. In spite of the similarities between these two types of schools such as implementing the centrally designed curriculum, follow the directives and policies of the MOE, duration of study, and students' preparation for the same type of regional examination, the influence of other factors on which the two types of schools differ on students' science achievement was not yet studied. Hence, in this study an attempt was made to examine the impacts of factors that affect students' science academic achievement in government and non-government primary schools.

### 1.3. Research Questions

The main purpose of the study was investigating factors affecting the science academic achievement of grade eight students in government and private primary schools in Debre Markos town.

The specific objectives of the study are:-

- i. Compare the science academic achievement of grade eight students in government and private primary schools of Debre Markos town.
- ii. Examine the relationship of factors that affect students' academic achievement in science subjects between government and private primary schools of Debre Markos town.
- iii. Examine the prediction of science academic achievement result with the factors that affect students' academic achievement.

Hence the study is expected to answer the following basic questions:-

- a. Is there statistically significant difference between government and private primary schools of Debre Markos town in science academic achievement?
- b. Is there any significant correlation between student science academic achievement result and parental involvement, school facilities, teachers' competency, and principal leadership?
- c. To what extent do parental involvement, school facilities, teachers' competency, and principal leadership predict students' achievement in science subjects?

### 1.4. Significance of the study

This study is important because it examines the extent to which different types of schools exert influence on the science academic achievement of primary school students. Thus the findings of the study may help to:-

- reveal the extent of differences in science academic achievement between government and private primary school students for parents, all stakeholders, and the schools themselves;
- uncover the factors for such differences;
- provoke both types of schools to share experiences from each other by visiting the better performing schools and arranging a roundtable discussion;
- invite further research on the problem.

Comparison of science academic achievement between different types of schools has a great advantage. It helps to provide some important information for science educational decision making. Decisions can be made concerning:-

- teaching materials, teaching and supporting staff, and other resources necessary in the teaching-learning activities in science subjects.
- it has a merit in the sense that it encourages a follow-up on how well and how much students learn easily science subjects in schools.
- it may enable the concerned authorities to suggest how the well-functioning schools will be further strengthened and how the low performing schools will be supported. Finally, it may indicate ways to suggest on how the less advantageous students will be academically supported in science .

### 1.5. Delimitation of the Study

This study is designed to examine differences in science academic achievement between government and private primary school students, and the factors for their differences

(if any). Both groups are those who are grade eight primary education in Debre Markos town.

### 1.6. Limitation of the Study

- The factors for such differences could be many and all the factors cannot be treated by this study. Hence, as mentioned earlier, this study focused on parental involvement, school facilities, teachers' competency, and principal leadership as major factors affecting students' science academic achievement in science subjects.
- The respondent sincerity of purpose were not sure since what was conceived in the mind were hidden.
- Due to time constraints, the ability to reach out to many primary schools for the collection of data was hindered, and the area which the study was conducted at that time was congested.

### 1.7. Definition of Terms

#### **Government schools**

these are schools generally refer to primary or secondary schools mandated for or offered to all children without charge paid for, in whole or in part. The term may also refer to institutions of post-secondary(preparatory) education funded, in whole or in part, and overseen by government.

#### **Private Schools**

These are also called non-government schools owned and controlled by individual or a school that is established, conducted, and primarily supported by a nongovernmental

#### **Science Academic Achievement**

success in science subjects in a class based on test scores

#### **Science subjects**

only embraces the three basic natural sciences(chemistry, physics and biology)

#### **Teacher competency**

tell us the extent in which a teacher who teaches the classroom as a whole; present information or skills clearly and animatedly; keep teaching sessions task oriented; have high expectations for achievement, and relate easily to students.

## 2. REVIEW OF RELATED LITERATURE

### 2.1. Factors that Contribute to Students' Science Academic Achievement

Factors related to student science achievement are numerous. There are many factors that contribute to student achievement include parental involvement, homework, class size, school facilities, teacher competency, and instructional leadership, etc. Among them I tried to review briefly are briefly reviewed parental involvement, school facilities, teacher competency, and instructional leadership as follows.

#### 2.2.1. Involvement of Parents

Successful parent involvement can be defined as the active, ongoing participation of a parent or primary caregiver in the science education of his or her child. The most basic involvement of parents in their child's schooling is provision of basic needs. Teaching materials and related material inputs that are linked directly to teaching are related consistently to higher student achievement [16, 17]. The availability of textbooks and other instructional materials has a consistently positive effect on student achievement in developing countries [31, 46]. Textbooks are the instructional device par excellence, and central to science teaching [12]. Parents

provide school supplies, supervision of activities, and home environments that are learner friendly [2, 7]. The next type of involvement involves the school's ability to establish a two way channel of communication about the child they share. A bond of ownership is formed between the parent and the school, and parents can become comfortable communicating with the school. When parents are comfortable with the school's expectations, they are willing to communicate with their child's teacher [21, 28]. Communication between school and home is the goal of parent involvement. Parents should be aware of their role in the communication partnership, communicating needs of their child in a clear manner [14]. Parents can also participate in committees, parent-teacher organizations, and other groups involved in decision making for the school. Parents feel a sense of ownership at school when they know they were involved in creating a policy, providing an activity for students, or changing a policy.

Academically, students have higher test scores, higher graduation rates, more homework completion rates when parents are involved [21, 28]. When parents are involved in their child's education, students' academic and social lives show the effects. In short, parents make a difference. The mutual interest the schools and parents have in each child [33]. Teachers want parents to be involved, parents want to be involved, and students want their parents and teachers to work together [42]. Parents and students can both benefit academically when there is collaboration between home and school.

Parents from a variety of cultural backgrounds and with different levels of education, income, or occupational status can and do provide stimulating home environments that support and encourage their children's learning [14, 17, 21, 35]. Students having one or two parents in the household are also thought to be important in determining educational achievement and outcomes. Coming from a two-parent family has generally been shown to have a positive effect on educational outcomes and achievement, and occupation. Besides, parents' education levels have the largest and most consistent effect on student academic attainment. Students with one or two college-educated parents have higher levels of academic achievement than other students [23].

#### **2.2.2. School Facilities**

It is quite known that clean, quiet, safe, comfortable, and healthy environments are an important component of successful teaching and learning. On this account, the literature indicates that some of structural features of schools that impact student achievement include indoor air quality, lighting, and facilities that support the delivery of curricular programs like libraries, laboratories, etc.

Teaching materials and related material inputs that are linked directly to teaching are related consistently to higher pupil achievement, after controlling for the influence of family background [30,31]. The availability of textbooks and other instructional materials has a consistently positive effect on student achievement in developing countries [47, 49]. They recommend the provision of good textbooks and teacher guides as a "promising avenue" for policy-makers. More generally, textbooks are the instructional device par excellence, and central to teaching [3, 25].

#### **2.2.3. Teacher Competency**

It is agreeable that the central tasks of teaching include planning for instruction, managing instruction (including the learning environment), and assessing student learning and each of these tasks depend on the quality of teachers [23, 30].

Teacher educational level would seem to have a positive effect on student achievement. The impact of teacher degrees on student achievement and found that having advanced degree in math and science for math and science teachers appears to be associated with increased student science learning from the 8<sup>th</sup> to the 10<sup>th</sup> grade [32]. Similarly, in 1986 Hanushek reviewed 109 previous studies and found a statistically significant of teacher experience on student achievement.

Curricular factors are also important in shaping student science performance. The number and type of tests students are given, or the frequency of student assessment was also found to have an impact on student performance [13]. Thus, the study found that teacher training aspects were important as well as curricular aspects that determine the emphasis, teaching methods, and assessment tools employed in schools [3, 38]. They also found that providing one-on-one tutoring gave students the necessary support to help them catch up and learn the necessary study skills required to learn on their own.

#### **2.2.4. Principals Leadership**

The leadership of the principal is an important aspect of moving towards a learning community that in turn will restructure schools for improved student outcomes. Schools with principals who controlled teachers through a system of feedback and socialization had more teacher conformity and higher student achievement when compared to schools where programming and sanctions are used to control teachers [2, 18].

Schools that offer opportunities for teachers to reflect on teaching and learning can create more positive changes than schools where such opportunities are limited. The study showed that new teachers that were observed five times in a semester had higher self-efficacy beliefs than those teachers that were not observed by the principal. In addition to observing the teachers, frequency of feedback, and the focus of the feedback are as important as the brief observations. Without the feedback, teachers feel a sense of uncertainty because the supervisor is not validating or improving the teachers' instructional practices [44, 47, 51].

Besides, administrative and instructional supervision and support play an important role in improving what goes on in schools and in classrooms. Supervision and support that schools and teachers typically receive from inspectors and pedagogical advisors are insufficient and ineffective. This is particularly the case in most Sub-Saharan African countries [10]. Interactions between principals and teachers in terms of the principal as a resources provider, instructional resource, a communicator, and a visible presence [17, 31]. They further stated that a principal has a visible presence in classrooms, department meetings, and talks with staff and students throughout each day.

### **3. METHOD OF THE STUDY**

#### **3.1. Design of the Study**

The design of the study was descriptive. The survey method was used to collect information related to factors affecting the science academic achievement of grade eight government and private primary school students in Debre Markos town. Correlation and regression analysis were used to identify the most contributing factors to students academic achievement in science subjects.

### 3.2. Variables in the Study

The dependent variable of the study was students science academic achievement scores as average result from grade eight Biology, Chemistry and Physics. The average achievement result of the sample school students was obtained from their examination results.

The independent variables of the study were parental involvement, teacher competency, school facilities, and principal instructional leadership.

### 3.3. Population and Sampling

This study was conducted in Debre Markos town. It was restricted to primary school second cycle students who are

currently attending grade eight in 2012/13 . By then, there were 8 government and 4 private primary schools in this town. Accordingly, out of the 8 government schools 3 (37.5%) and from the 4 private schools 3 (75%) were chosen to balance the number of the comparison groups. Hence, the sample for this study were from the selected government and private primary schools in Debere Markos town. The target sample schools were Dibza, Abma, Edetbeb, Hohyat, Sintayehu and Linger primary schools. These sample schools, which were selected using lottery system, operate under the same curriculum and language of instruction.

The composition of the number of respondents by sex and age is disaggregated and illustrated on table 1 below

**Table 1: Respondents by Sex and Age**

item		Respondents			
		Governmental school students		Private school students	
		No	%	No	%
Sex	Male	86	55.13	36	61.02
	Female	70	44.87	23	38.98
	Total	156	100.00	59	100.00
Age	12-14	131	83.97	47	79.66
	15-17	23	14.74	11	18.65
	>17	2	1.29	1	1.69
Total		156	100.00	59	100.00

As shown in table 1, among students of government schools 86 (55.13%) were male and 70 (44.87%) were female. Similarly, among students of private schools 36 (61.02%) were male and 23 (38.98%) were female. Sex wise, in both groups, the number of female respondents was less than the male respondents.

Concerning the age composition of student respondents in government schools, 131 (83.97%) were between 12-14 years,

23 (14.74%) were between 15-17 years, and the remaining 2 (1.29%) were above 17 years old. Correspondingly, the age composition of student respondents in private schools, 47(79.66%) were between 12-14 years, 11 (18.65%) were between 15-17 years, and the remaining 1(1.69%) was above 17 years old. This shows that the majority of student respondents were between 12-14 years old for both government and private schools. The participants of this study were students of grade eight in 2012/13 of the sample school.

**Table 2: Sample Schools with Total and Sample Respondents**

School type	Sample primary schools	Total number of students			Sample size		
		M	F	T	M	F	T
Government	Dibza	94	107	201	24	22	46
	Edetebeb	96	83	179	29	25	54
	Abma	108	132	240	33	23	56
Total		298	225	523	64	30	94
private	Sintayehu	20	23	43	13	15	28
	Hohyat	9	10	19	4	5	9

	Linger	19	16	35	12	10	22
Total		48	49	97	29	30	59
Sum Total		366	371	737	122	93	215

The total population of the study was 737. The sample size was determined in line with [28, 33]. Therefore the method of sample selection that suggested by Krejcie and Morgan was applied to draw the sample of this study. From the total of 737 students 215 were taken as a sample of his study.

Due to the difference in school size, proportional stratified sampling followed by simple random sampling was applied to select students as a sample of study from each sample school. Based on the student list, 156 participants from 620 government school students and 59 participants from 97 non-government school students were selected proportionally.

### 3.4. Tools of Data Collections

#### a) Questionnaire

A questionnaire which was divided into three sections was developed. Part I include: - school, sex, age, and grade 7 science examination achievements average point. Part II consisting of general information questions, dealt with information on educational background of parents; the monthly tuition fee parents pay and whether tutorial is provided. Part III dealt with items that could be summarized into the four independent factors: parent support to their children, school facilities, teacher quality, and principal instructional leadership. All the items that dealt with the independent factors were prepared on Likert-type five point scales to which respondents were required to indicate how often each of the statement items had occurred and three psychology DMCTE instructors are critically assessed and finally modified to my situation. The five point rating scales used were: always (5), often (4), sometimes (3), rarely (2), and never (1).

#### b) Science achievement test

Students' science achievement test made up of ninety objective questions (thirty questions from each were prepared from grade seven chemistry, biology and physics text books) with multiple choice items only was extracted. To make the instrument valid, the achievement test is first prepared by Debre Markos College of Teacher Education (DMCTE) Biology, Chemistry and Physics instructors and finally approved by another DMCTE instructors.

The reliability of the test were checked by internal consistency method. Cronbach's alpha is the most commonly used measure of reliability (i.e., internal consistency); there for the ninety questions the Cronbach's alpha obtained was 0.857.

#### c) Observation

I prepared some checklist related to the independent variables which is important for strengthening the power of the questionnaire. I have observed the Library, laboratory, pedagogical centre and their text books of each sample school.

### 3.5. Pilot Testing

Pilot testing was conducted on a total of 50 students at Dibza primary school. The instruments which assessed in the pilot

try out generally constructed to measure the relationships and the impacts of parental involvement, school facilities, teacher competency, and principal leadership. Students were told how to give response to the questionnaire that was provided to them. Vague questions, which were raised by the students, were made clearer during the pilot distribution. The numbers of male and female participants were nearly proportional. During the pilot try out the total of 50 students completed the questionnaire appropriately.

Finally, the responses of the participants were entered to SPSS to compute item inter-correlation and Cronbach-Alpha in order to evaluate the scales and their reliability. The measure was found to be reliable with Alpha 0.73 (18 items).

### 3.6. Procedure of Data Collection

At the very initial level, the total number of grade eight students in 2012/13 was collected from the principals of each targeted primary schools. Based on the collected data, the size of the target population was known. Then the sample size for each school was set proportionally using the target student population of each school. Subsequently, discussion was conducted with principals of each school as to how and when the achievement tests and questionnaires should be distributed to students.

Then the selected list was registered and handed to the principal (in some of the schools it was the deputy principal or the unit leader) and the principal or the unit leader posted their names and announced their presence in the room being ready to fill in the questionnaire and take the science academic achievement examination. Before the students start filling in the questionnaire and taking the achievement examination, the purpose of the study was orally given and explained by the researcher and by his colleageous. The questionnaire and the achievement test were administered in their respective schools out of their regular class periods. They were told not to discuss on the items as the response of one student may be influenced by the other. The questionnaire and the test were administered to 230 students. The analysis was made using 215 students. Five questionnaires were discarded because the respondents gave incomplete or inappropriate information. Besides, the respondent's science achievement test, the questionnaires and also the data collection process were accomplished by the researcher in collaboration with his assistants.

### 3.7. Data Analysis Techniques

After collecting the data the following steps were followed in analyzing the data. First, each sample school student's academic achievement test score was collected from their answer sheet. Responses of the questionnaire were entered into SPSS , then descriptive values such as percentage, mean, standard deviation, Pearson correlation coefficient and regression analysis were computed to see the relationship of the independent variables with the dependent variable. Percentage was used to compare parent's educational status, tutor type, and weekly study hours. Mean score was used to compare student academic achievement of government and

private schools. Standard deviation was employed to observe the variation on student result of government and private schools. Multiple regression analysis was conducted to see if it was possible to predict students academic result on the basis of parental involvement, school facilities, teacher competency, and principal leadership.

#### 4. Presentation, Analysis and Interpretation of Data

In the first part of this chapter, the analysis of the background information of students such as the educational background of parents, tutorial support by family members, and weekly study hours have been analyzed based on frequencies and

percentage. In the second part, the analysis looks for whether there is a significant difference between government and private schools on their science academic achievement as measured by their science average results. Furthermore, correlations of factors that affect student science academic achievement have been treated. Besides, an attempt was made to analyze the science academic achievement of government and private school students and the effect of each contributing factor as a predictor of average of the two groups of students.

##### 4.1. Characteristics of the Study Group

**Table 3: Parents educational status by school type**

Educational Level	Mother's educational status by school type				Father's educational status by school type			
	Government		Private		Government		Private	
	No.	%	No.	%	No.	%	No.	%
No basic education	61	39.1	10	16.9	26	16.7	7	11.9
Grade 1 - 8	42	26.9	5	8.5	81	51.9	4	6.8
Grade 9 - 12	15	9.6	14	23.7	8	5.1	9	15.3
Certificate	7	4.5	3	5.1	11	70.1	5	8.5
Diploma	19	12.6	18	30.5	27	17.3	13	22
Degree or above	12	7.7	9	15.3	3	1.9	21	35.6
Total	156	100	59	100	156	100	59	100

As shown in Table 3, 66% of mothers of students from government schools and 25.4% of mothers of students from private schools were below grade 9. On the other hand, 20.3% of the mothers of students from government schools and 45.8% of mothers from private schools were with diploma and above educational level. On the basis of the data mothers of private school students had a better educational level than students from government schools.

Looking at fathers' educational level, 68.6% of fathers of students from government schools and 18.7% of fathers of students from private schools are below grade 9 educational levels. On the other hand, 19.2% of fathers of students from government schools and 57.6% of parents of students from private schools are diploma and above educational level. Here, again, the proportion of students' fathers with better educational levels was found to be higher for those in private schools than those in government schools.

**Table 4: Tutors by School type**

Who tutors you?	School Type			
	Government		Private	
	No.	%	No.	%
Mother	9	5.8	4	6.8
Father	14	9.0	8	13.6
Brother/sister	21	13.5	7	11.9
Hired tutor	10	6.4	9	15.3
No tutor	102	65.4	31	52.5
Total	156	100	59	100

A question was raised concerning the educational support given after school hours. Based on this, as shown in Table 4, the role of mothers and fathers in tutoring their children was very low in both groups of schools. The tutorial support that was given to private schools was a bit better than the government schools.

Student respondents were asked to respond how many hours they utilize for studying. With regard to this question, as

shown in Table 5 below, 62.2% of government school students and 64.4% of private school students spend more than five hours per week. Moreover, 5.1% of government school students and 15.3% of private school students spend five hours per week. From Table 5, it is also referred that 10.3% of government school students and 8.5% of private school spend four hours per week in studying science subjects.

**Table 5: Weekly study hours and School type**

Weekly study hours	School Type			
	Government		Private	
	No.	%	No.	%
greater than 5 hours per week	97	62.2	38	64.4
5 hours	8	5.1	9	15.3
4 hrs	16	10.3	5	8.5
3 hrs	10	6.4	3	5.1
2 hrs	6	3.8	2	3.4
I do not have time to study	9	5.8	4	4.4
Total	156	100	59	100

As these figures support, 16.0% of government school students and 12.9% of private school students used to spend a minimum of four hours per week for studying science subjects.

**4.2. Science achievement of Government and private primary school students**

In this part, the analysis looks for whether there is difference between government and private schools on their science

academic achievement as measured by summing up each item of the independent variables: parental involvement, school facilities, teacher competency, and principal leadership. Besides, t-test between the independent variables with the dependent variable (average of students in science test) have been treated.

**Table 6: t-test for each of the independent variables**

Group Statistics	School Type	N	Mean	Sd	t- value
Parental Involvement	Government	156	18.29	5.40	-2.38*
	Private	59	19.97	4.12	
School Facilities	Government	156	19.96	4.78	-4.83**
	Private	59	23.36	6.72	
Teacher Competency	Government	156	19.98	4.44	-4.66**
	Private	59	22.75	4.08	
Principal Leadership	Government	156	28.37	7.52	-4.87**
	Private	59	33.24	6.76	

\* $P < 0.05$

\*\* $P < 0.01$

As indicated in table 6, the mean value for each of the independent variables has been greater for private schools as compared to the government schools. Besides, t-test was computed to look for any statistically significant difference for each of the independent variables between the two groups

of schools. The computed t value for each of the independent variables was found to be statistically significant at the alpha level of 0.05 for parental involvement and at the alpha level of 0.01 for the rest of the independent variables.

**Table 7: t-test between government and private schools by students science average result.**

School type	Mean	Standard Deviation	t-value
Government	48.8	0.67	-3.71*
Private	57.4	0.64	

\* $P < 0.05$



As shown in Table 7, t-test has been used to see whether there was a statistically significant difference or not. The mean result for government school students was 48.8 with a standard deviation of 0.67. Similarly, the mean score of science academic achievement for private school students was 57.4 with a standard deviation of 0.64. This indicates that private school achievement mean (57.4) is greater than government school students mean (48.8), and there is a difference between government and private schools in science academic achievement.

The t-test was computed in order to check whether or not the mean differences for the two groups was statistically significant. The computed value of  $t = -3.71$  was found to be statistically significant at the alpha level of 0.05. This implies

that there is statistically significant difference on their science achievement between government and private schools; meaning science achievement of students from private schools was better than that of the government schools.

Table 8 shows that the correlation between the independent variables treated under the study and science academic achievement as described by average in each of the two groups of schools. There were positive correlations between the dependent and the rest of the independent variables. A positive coefficient indicates that two variables systematically vary in the same direction, i.e., as one variable increases, the other variable tends to rise.

**Table 8: A Correlation between science achievement and factors that affect science achievement result in government and private schools.**

	Schools Science Average Result in	
	Government	Private
Parental Involvement (PI)	0.33**	0.19
School Facilities(SF)	0.13*	0.20
Teacher Competency(TC)	0.10	0.21
Principal Leadership(PL)	0.09	0.25*

\* $P < 0.05$

\*\* $P < 0.01$

Looking at the specific variables, average of government schools in science test had a low positive correlation with all the independent variables. Among these, parental involvement ( $r = 0.33$ ,  $p < 0.01$ ), and school facilities ( $r = 0.13$ ,  $p < 0.05$ ) had a statistically significant relationship with government students' science achievement, while teacher competency ( $r = 0.10$ ), principal leadership ( $r = 0.09$ ) had no statistically significant relationship with average result.

Similarly, average result of students from private schools had a low positive correlation with all the independent variables. Among the rest of the independent variables, except with principal leadership ( $r = 0.25$ ,  $p < 0.05$ ), teacher competency, school facility, parental involvement have a correlation coefficient of  $r = 0.21$ ,  $r = 0.20$ , and  $r = 0.19$  respectively, were all not statistically significant.

Comparing the correlation between the two types of schools, the correlation of parental involvement, and school facilities

were statistically significant for government schools but not for the private schools. The correlation of each of these variables with government school students' average result systematically varies greater than that of the private schools. On the other hand, except for the correlation coefficient of principal leadership, the other independent variables were not statistically significant for private schools.

In general, the association of the independent variables to the dependent variable is low for both government and private schools average result; and the direction of the relationship the variables were positive.

#### 4.3. Predicting science achievement from factors affecting academic achievement

Table 9 presents how much of the variability in the criterion (average result) variable is accounted for by the predictor (the independent) variables.

**Table 9: Multiple Regression to predict the criterion from the predictor variables.**

School type	N	R	R Square	Adjusted R Square	Std. Error of the Estimate
Government	156	0.38	0.14	0.13	0.63
Private	59	0.35	0.12	0.03	0.63

Multiple Correlation (R) between the criterion and the predictor variables is 0.38 and 0.35 for government and private schools, respectively. The proportion of variance (R<sup>2</sup>) in the criterion variable which is accounted for by predictors (parental involvement, school facilities, teacher competency, and principal leadership) was 0.14 for government and 0.12 for private schools. However, R square tends to somewhat

overestimate when applied to the real world, so an Adjusted R<sup>2</sup> is calculated which takes into account the number of variables and the number of observations. The Adjusted R<sup>2</sup> value were 0.13 (13%) and 0.03 (3.1%) in government and private schools respectively. The standard error of estimate (the standard deviation of the residuals) is 0.627 for government and 0.634 for private schools. Hence, the four

predictor variables account for 13% of the variability in the criterion variable for students of government schools.

**Table 10: Predicting the criterion from the predictor variables.**

School Type	Source	Sum of Squares	DF	Mean Square	F (MSreg /MSres)	Sig.
Government	Regression	18.95	4	3.16	8.03**	0.00
	Residual	113.26	151	0.39		
	Total	132.21	155			
Private	Regression	3.25	4	0.54	1.35	0.25
	Residual	24.11	54	0.40		
	Total	27.36	58			

\*\*p<0.01

Table 10 indicated the analysis of the significance of the model. The model was found to be significant in predicting science academic achievement from parental involvement in government schools (F = 8.03, p < 0.01) but not in private schools.

Table 11 provides the constant and the regression coefficients as well as the associated significance

tests. Using these values the regression equation for the two groups of schools would be:-

$$GRE = 1.19 + 0.04PI + 0.01SF - 0.01TC \quad \text{for government schools, and}$$

$$NGRE = 2.08 + 0.02PI + 0.01SF + 0.03TC + 0.01PL \quad \text{for private schools.}$$

**Table 11: beta coefficients for predicting the criterion from the predictor variables**

School type		Unstandardized coefficients(b)		Standardized coefficients(β)	t
		b	Std.error (Sb)	Beta	T= b/Sb
Government	Constant	1.97	0.25		
	Parent involvement (PI)	0.04	0.01	0.32	5.39**
	School facility(SF)	0.01	0.01	0.06	0.96
	Teacher competency(TC)	-0.01	0.01	-0.08	-1.15
	Principal leadership(PL)	-0.00	0.01	-0.02	-0.33
private	Constant	2.08	0.68		3.07
	Parent involvement (PI)	0.02	0.02	0.15	1.13
	School facility(SF)	0.01	0.01	0.07	0.44
	Teacher competency(TC)	0.03	0.02	0.16	1.16
	Principal leadership(PL)	0.01	0.01	0.06	0.42

\*\*p < 0.01

The standardized beta coefficients give a measure of the contribution of each variable. A large value indicates that a unit change in this predictor variable has a large effect on the criterion variable. In this respect, except parental involvement (0.32), for government school students, the rest variables were found to be no good predictors of science achievement. Particularly for private schools students, no variable was found to have strong predictive power.

Thus, there is no need to rank order the variables in terms of their predictive power because the respective

Bs were not statistically significant. This, in essence means, B = 0 for most variables. Checking for significance, only parental involvement for government schools were statistically significant with t = 5.39, p < 0.01 for parental involvement and t = 3.12, p < 0.01 for government schools. The other predictor variables for government and all the variables for private schools were not found to be statistically significant predictors.

#### 4.4. School Observation

as I observed almost all the schools have laboratory rooms, library, pedagogical center where they are my focus of observation. but the status of each variables are different from one school to another. Let's consider the laboratory arrangement and its facility. Comparably the laboratory arrangement and availability of chemicals and apparatus are somewhat better in government schools than private schools.

**The big difference as I observed between these two school types are lack of text books for almost all private school.**

## 5. DISCUSSION

The main concern of this study was to compare the grade eight science academic achievement for government and private school students'. Secondly, the study attempted to look for any relationship between the dependent variable (science academic achievement) and the independent variables (parental involvement, school facilities, teacher competency, and principal leadership). Finally, it also looked for the predictability of the independent variables to the criterion variable. Hence, the research questions of are:

*5.1. Is there significant differences between government and private primary*

*schools of Debre Markos town in science academic achievement ?*

*5.2. Is there any correlation between student academic achievement in science subjects with*

*parental involvement, school facilities, teachers' competency, and principal leadership?*

*5.3. To what extent do parental involvement, school facilities, teachers' competency,*

*and principal leadership predict students' achievement in science subjects?*

### **5.1. Is there significant differences between government and private primary schools of Debre Markos in science academic achievement ?**

With regard to the first research question the mean data on science achievement test revealed that the mean and standard deviation for government schools was 48.8 and 0.67, respectively. Likewise, the mean and standard deviation for private schools was 57.4 and 0.64, respectively. Besides, since the schools are randomly selected and assigned individually to the two groups of schools, t-test for independent samples was carried out. The result was that a statistically significant difference existed between government and private school students in terms of their science academic achievement  $t(215) = -3.71, p < 0.05$ . That is, government school students performed significantly lower than private school students.

### **5.2. Is there any correlation between student academic achievement in science subjects with parental involvement, school facilities, teachers' competency, and principal leadership?**

With regard to the second research question Pearson correlation between the independent variables and the dependent variable as described by mean showed that there was low positive correlation between the dependent and the independent variables. When looked individually, parental involvement, and school facilities for government school students, and only principal leadership for private schools had

a statistically significant relation with student science academic achievement.

Parental involvement in education is one of the most recognized non school factors impacting student academic achievement. This study used four items that made the respondents respond on fulfillment of educational materials, , communicating teachers about academic progress, involvement in school parent teacher conferences and in-school activities when requested, and knowledge of the subjects their children learn.

Based on these items, comparing the correlation between the two types of schools, parental involvement in government school was statistically significant ( $r = 0.33; p < 0.01$ ) while the relationship of parental involvement in private schools was not statistically significant ( $r = 0.19; p > 0.05$ ). This shows that government schools should work hard and follow better experiences of private schools to make parental involvement their priority so as to make their students perform better. The finding of this research was supported by others as well.

However, [4, 22] confirmed that the most accurate predictor of student achievement is the extent to which the family is involved in the child's education. The study of [4, 22] have found that students with involved parents, no matter what their income or background, are more likely to earn high grades and test scores, and enroll in higher-level programs; pass their classes, earn credits, and be promoted; attend school regularly; and graduate and go on to postsecondary education.

Besides, not all parents are involved in school activities even if they are requested. [23] also noted that parental pressure has a positive and significant effect on public school performance. [33] also reported that children of passive parents were found to perform poorly academically. [44] reported that science academic performance is positively related to having parents who enforce rules at home.

### **5.2.1. School facilities and mean of science achievement test of government and private school students**

This study used seven items that made the respondents respond on the availability of textbooks and reading materials, the conduciveness of school buildings for teaching-learning activity, the appropriateness of the school climate to attend schooling, the availability of the necessary reference materials in the library and being open whenever students want to read, using the school laboratories effectively.

Based on these items, comparing the correlation between the two types of schools, school facilities in government school was statistically significant ( $r = 0.13; p < 0.05$ ) while the relationship of school facilities with private schools was not statistically significant ( $r = 0.20; p > 0.05$ ).

To meet the needs of teachers and students the school must have the personnel, information sources, funds, quarters and equipment, etc that are necessary for its successful performance science [35].

Actually, this result showed opposite to what I really observed in the sample schools. Relatively government schools had better infrastructure especially their science laboratory and library.

### **5.2.2. Teacher quality and achievement test of government and private school students**

This study used six items that made the respondents respond on the number of exercises and tests teachers give, teachers encouragement to make students active participants in the teaching-learning process, teachers methodology of teaching, how teachers manage the instruction time properly, the qualification and competency of teachers, and the continuous follow up and evaluation of teachers. Based on these items, comparing the correlation between the two types of schools, teachers competency in government school was not statistically significant ( $r = 0.10$ ;  $p > 0.05$ ) while the relationship of teacher competency with non-government schools was statistically significant ( $r = 0.25$ ;  $p < 0.05$ ).

Effective teachers, according to [17, 38, 46] teach the classroom as a whole; present information or skills clearly and animatedly; keep teaching sessions task oriented; have high expectations for achievement, and relate easily to students. Curricular factors are also important in shaping student performance. The number of homework and type of tests students are given, or the frequency of student assessment was also found to have an impact on student science performance [50].

### **5.2.3. Principal Leadership and science academic achievement of government and private school students**

This study used seven items that focused on principals involving teachers in decision making, involving parents in different school activities, regularly informing parents on their children's academic achievement, initiating the school community to aspire high expectation in student science achievement, making regular classroom visits, coordinating instructional program appropriately, and monitoring student science academic progress.

Based on these items, comparing the correlation between the two types of schools, the correlation principal leadership in government schools ( $r = 0.09$ ;  $p > 0.05$ ) was not statistically significant while, in private schools ( $r = 0.25$ ;  $p > 0.05$ ) was statistically significant. [5, 17] defined instructional leadership in a series of principal behaviors: making suggestions, giving feedback, modeling effective instruction, soliciting opinions, supporting collaboration, and providing professional development opportunities. Consistently communicating expectations for high performance has been linked by researchers to positive results in school and student achievement [6].

“The basic cause of inefficiency of any institution is lack in administration and incompetency of its head, if the principal is man of principles, hardworking and honest then one will demand the same from one's teachers, and if the head himself is idle and shirk- worker then its team-mates will also be like him” [19].

### **5.3. to what extent do parental involvement, school facilities, teachers' competency, and principal leadership predict students' achievement in science subjects?**

The independent variables, when taken together, accounted for 13% of the total variance in science achievement of students (Adjusted  $R^2 = 0.13$ ,  $p < 0.01$ ) of government school students. This percentage, though low, is statistically significant. The low percentage only shows that there are other factors (besides the independent variables considered for

this study) that can also explain science achievement. Thus, these four independent variables are important predictors of science achievement in government schools.

The independent variables, for private schools, when taken together accounted for only 3% of the total variance in student science achievement (Adjusted  $R^2 = 0.03$ ,  $p > 0.05$ ). This percentage is very low and is not statistically significant. Thus, the selected four independent variables are not important predictors of science achievement for nongovernment schools and this implies that there are other factors besides the ones that are considered here.

This study indicates that some variables differentiate between government and private schools but others do not. For example, one of the findings from the [42] study is that there is limited variance among schools in terms of school organizational characteristics, school conditions, and curriculum delivery. This study also reveals that government and private schools differentiate with regard to parental involvement and principal leadership, while they do not differentiate between the other variables that had been discussed.

## **6. CONCLUSIONS AND RECOMMENDATIONS**

### **6.1. Conclusion**

This study revealed that when the variables under this study taken together, they determined significantly government primary school students science academic performance, but not for private primary school students academic performance. Based on the findings, it has been found that comparing factors that affect students' science academic achievement is a complex issue that can vary from one school to another. This had been indicated from the findings in terms of mean difference, the correlation of the independent variables among each other and with the dependent variable. Besides, it was only few of the predictor variables that were statistically significant. This does not, however, in any way imply these factors are not important as predictors. The failure to predict does not necessarily indicate that the empirical studies conducted are unreliable and invalid. They may have failed to predict because of the possible effect of some other unidentified factors. On the contrary, it points to the need to control or study the effect of some other relevant factors since student science achievement is a multiple function of several variables.

In a situation where such educational research is scarce, research of this kind can contribute to an understanding of why differences occur in science academic achievement. It is hoped that results of this study will provide the necessary basis for policy makers, planners, teachers and school administrators to realize the magnitude of the problem and design viable and effective community-based intervention measures for mitigating the problem under consideration. Finally, the findings of this study may generate interest or assist as a stepping-stone for those who have an intention for further study in the fields.

### **6.2. Recommendations**

The following recommendations were made based on the findings of the study:

- Government schools and all stake-holders must break down any barriers that impede parental involvement and work diligently to increase parental interaction at school and with their children's schoolwork. These schools can do this by creating a welcoming and inviting environment at the school for parents, providing opportunities for parents to collaborate with the school and/or teachers to identify support needs of the students, and keeping the lines of communication open.
- Even if the science academic achievement of private school students are somewhat better than the government school students but, the principal leadership is statistically significant, so this difference is in-line with what I have seen in my observation i.e. lack of text books, well arranged laboratories, etc might be the cause for this result. There for the private school principal leadership work together with those in government schools to promote science education.
- On the other hand, the remaining observed independent variables showed no statistical significant difference between government and private school students in terms of their academic achievement and this calls for repeating the same research on a wider population by including many other relevant variables that possibly differentiate the learning gain of government and private school students. Hence, an investigation should be completed that replicates this study by designing variables that consistently and significantly relate to student achievement.
- From the results of the study the science academic achievements in all school types is not satisfactory, so all stake- holders must work collaborate to enhance and promote science academic achievement.

## 7. ACKNOWLEDGEMENTS

Above all, my greatest thanks goes to the Almighty God, who gave me the ability, wisdom and good health to start and finish this research work.

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