Ethiopian Journal of Natural and computational Science(EJNCS)

Ethiop J Nat Comp Sci 2025, Volume 5, Issue 2

Original Research Article

Predictors of the Achievement of Primary School Students in Sciences and Mathematics in North Western Ethiopia

Aragaw Eshetie*, Asrat Atsedeweyn, Mikyas Abera, Hone Mandefro,Yemataw Wondie, Sisay Haile,

Misganaw Alene, Getnet Alene, Simegn Birhan

University of Gondar, Gondar, Ethiopia, P.O.Box 196, Gondar, Ethiopia

*Corresponding. aragaw2018@gmail.com

Article History:

Received: July 5, 2025

Accepted: September16, 2025

Published: September 19, 2025

Print ISSN: 2710-0200

Electronics ISSN: 2710-0219

ABSTRACT

This study explores the key factors that shape students' performance in science and mathematics among primary school students in Northwestern Ethiopia. Using a cross-sectional design, data were gathered from 2,928 students enrolled in 24 primary schools between January and April 2016. The schools and participants were selected through a two-stage stratified random sampling method. Information was collected using structured questionnaires and interviews with students, teachers, and school administrators. The results indicate that poor teacher performance, especially in science and mathematics, and a shortage of qualified teachers are major barriers to student achievement. Low teacher motivation and limited access to learning resources, such as textbooks and library facilities, further compound the problem. Gender differences were also considered that male students generally scored higher in science and mathematics, whereas female students showed strong interest and attitudes toward language subjects. Factor analysis revealed weak connections between teacher–student interactions and overall school engagement, suggesting gaps in the learning environment. Multivariate analysis identified school type, gender, availability of textbooks, and access to teaching materials as significant predictors of academic success. Multilevel modeling showed considerable variation in student achievement between schools, with an intra-class correlation coefficient (ICC) of 0.664, highlighting the strong role of school-level conditions in shaping learning outcomes. Overall, the findings call for comprehensive measures to strengthen school infrastructure, improve teacher training and motivation, and provide better academic support for students both at school and at home. Strengthening these areas is essential to raise achievement levels in science and mathematics and to ensure more equitable educational outcomes across schools in the region.

Keywords: Sciences, Mathematics, MANOVA, Schools, primary, Score

INTRODUCTION

Education today is widely recognized as a central driver of social progress and economic development. Enrolling children in school is no longer enough; education systems are now expected to ensure that students complete primary schooling and acquire the knowledge and skills needed for personal well-being and national growth. Globally, education is regarded as a pathway to equity, tolerance, peace, environmental protection, and active participation in democratic processes. Quality education not only raises lifetime earnings and national productivity but also empowers individuals to make informed choices about health, family, and community life (Dakar Framework for Action, 2000).

Both the World Declaration on Education for All (1990) and the Dakar Framework for Action (2000) stressed that quality is a prerequisite for universal education. Despite these commitments, monitoring reports (EFA, 2005) reveal that many children, especially in developing countries, leave school without mastering basic skills. In Ethiopia, the demand for education has expanded rapidly, but concerns remain about efficiency, learning outcomes, and overall quality (Teshome, 2001; Pankhurst, 1999; Tekeste, 2006; World Bank, 2005; UNESCO, 2004; Forum for Social Studies, 2009; Damtew & Altbach, 2004).

Central to this debate is the role of teachers. Research consistently shows that teacher effectiveness has a stronger influence on student learning than class size, school resources, or infrastructure. Students taught by highly effective teachers perform significantly better than those taught by less effective ones (Bill & Melinda Gates Foundation, 2010). Ethiopia's Education and Training Policy (1994) emphasizes student-centered, problem-solving, and active learning methods. However, these methods are not yet consistently implemented, and teacher training remains a major challenge. Programs such as the Teacher Development Program (TDP II and I) were introduced to strengthen teacher education, especially in mathematics and science, but their implementation has faced limitations, including inadequate monitoring and weak institutional incentives (World Bank, 2008).

Improving the teaching of mathematics and science is particularly urgent. These subjects are essential for producing a scientifically literate population and equipping students with problem-solving skills required in today's knowledge-based economy. Ethiopia has prioritized science, mathematics, and technology in its education policy (FDRE, 2010), yet evidence shows that many primary school students progress through the grades without mastering basic skills (Adugna, W. and Hailu, A. 2021, Tamirat, Y. and Worku, Z., 2020, World Bank, 2022, UNESCO, 2023). This gap is especially evident in underserved areas such as the North Gondar zone, where little research has conducted on student achievement in these subjects.

Given this context, the present study examines the factors that influence the academic achievement of Grade 7 and 8 students in mathematics and science in Northwestern Ethiopia. The study aims to fill a critical gap in the literature by identifying predictors of student performance and providing evidence-based recommendations for regional education authorities. Ultimately, the findings are expected to strengthening the quality of primary education, particularly in mathematics and science, and contribute to national efforts to improve learning outcomes and competitiveness in the global economy. Figure 1 presents the theoretical framework illustrating the factors influencing student performance.

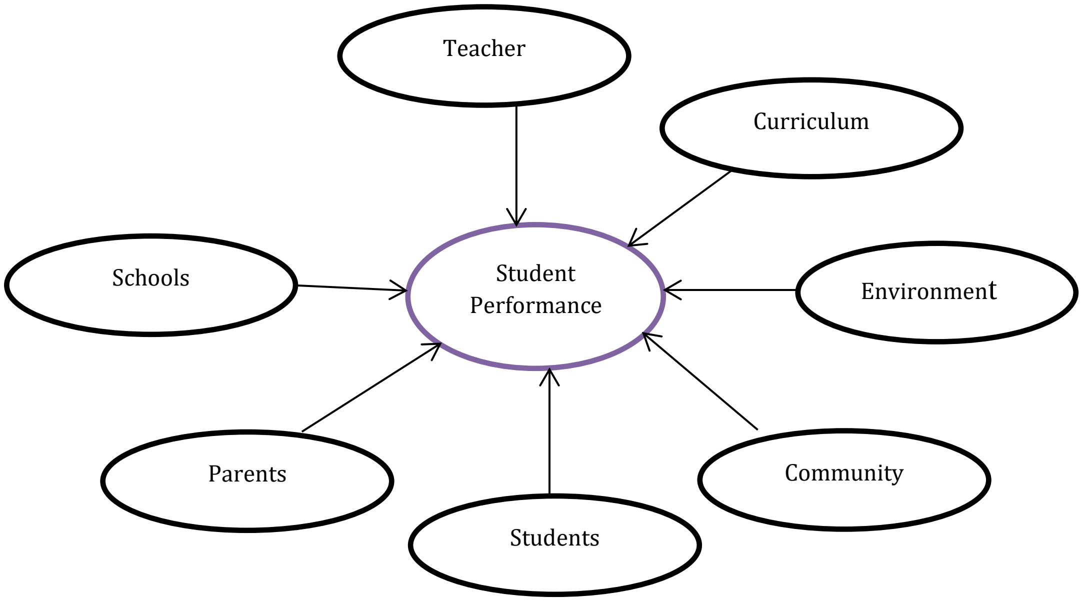

Figure 1: Theoretical Framework for Factors Influencing Student Performance

MATERIALS AND METHODS

Research Design and Study Population

This study employed a cross-sectional design with a mixed-methods approach to examine factors influencing student achievement. Data were collected between January and April 2016 in the North Gondar Zone, one of the largest administrative zones in Northwestern Ethiopia. Out of 22 woredas (districts), six of them were selected through stratified sampling: Metema, Belessa, Janamora, Gondar Zuria, Debark, and Lay Armachiho. From each woreda, four primary schools were chosen, giving 24 schools. The study population included students in Grades 7 and 8, along with teachers, school leaders, parents, and community members.

In total, 4,056 participants were involved, consisting of 2,928 students, 840 teachers, 48 school directors and supervisors, and 240 parents and community members. To ensure representativeness, proportional stratified random sampling method were applied across schools, grades, and sex, with student lists obtained from school records and participants then selected using simple random sampling within each stratum. Data collection tools included both closed- and open-ended questionnaires as well as interviews, allowing for the integration of quantitative data with qualitative insights to capture multiple perspectives on factors shaping student-learning outcomes.

Construction of dependent and independent Variables

The selection of variables were considered existing literature and the local context, focusing on factors expected to influence the academic achievement of primary school students in the region. The dependent variables were the average scores of students in science, mathematics, and overall academic performance. The key independent variables included distance from home to school, gender, student motivation, time spent on study, study environment at home, student preparation across grade levels, availability of textbooks at home, parental support, access to educational materials, reading practices outside school, influence of technology and drug use, absenteeism, and other related factors.

Sample size determination

The sample size of the study was determined using a multistage sampling method. In stage one, the 24 woredas of the North Gondar Zone were clustered into four based on Grade 8 national examination performance. From these clusters, six woredas were systematically selected. In the second stage, within each selected woreda, stratified random sampling with proportional allocation was applied at both the woreda and school levels to ensure representativeness.

Before the data collection, a pilot survey was conducted in northwestern Ethiopia on 120 students sampled from 223,327 students. An estimated proportion of pilot results ($\hat{p}$ = 0.45) was used to calculate the initial sample size at a 95% confidence level and a 5% margin of error. The SRS-based sample size was computed as:

$$n_0 = \frac{Z^2 \acute{p}(1 \acute{-} \acute{P})}{e^2} = \frac{(1.96)^2 0.45(1 \acute{-} 0.45)}{(0.05)^2} = 381$$

Because the population size (N = 223,327) was large, the finite population correction (FPC) had minimal effect:

$$nFPC = \frac{n_0}{1 + \frac{n_0}{N}} = \frac{381}{1 + \frac{381}{223{,}327}} = 381$$

To account for clustering, the sample size was adjusted using the design effect (DEFF), which inflates the required number of observations due to within-cluster similarity. The design effect was calculated as:

$$DEFF = 1 + (k - 1)\rho$$

where k is the number of sampled students per school, and ρ is the ICC from the pilot data. Plugging in these values gives::

$$DEFF = 1 + (k - 1) * \rho = 1 + 121 * 0.0553 = 7.68$$

This shows that the variance of a cluster sampling is 7.68 times larger than a simple random sample. Thus, the final adjusted sample size was:

$$nfinal = nFPC \times DEFF = 381 \times 7.68 = 2928$$

Accordingly, the overall final sample of 2,928 students was distributed across six selected woredas and 24 schools, with approximately 122 students in each school. Statistical efficiency and representativeness of the study population were guaranteed by this multistage stratified cluster design.

Methods

A multistage sampling technique was employed for this study by first selecting a sample of schools and then selecting children from these selected schools. The data have a hierarchical structure with individual children nested within schools. Correlation between same-school children would typically be larger than between children in different schools and therefore multilevel analysis would be suitable. At first, univariate ANOVA was employed to contrast average student performance in mathematics and science between nominal independent variables

However, to account for the nested structure of the data and to better understand the contribution of student-level, school-level, and other contextual factors, more advanced statistical models were applied. These included multilevel modeling to partition variance across levels, as well as linear regression, chi-square tests, t-tests, and multivariate analysis of variance to examine associations and differences in student academic performance.

The Multivariate Analysis of Variance extends the traditional ANOVA framework to cases involving two or more correlated dependent variables. It evaluates whether the mean vectors of multiple outcomes differ across levels of one or more categorical independent variables, while considering the inter-correlations among the dependent variables. In this study, student performance in science and mathematics was analyzed jointly to test whether factors such as school type, gender, and residence have significant multivariate effects on achievement.

Formally, let $Y_{ij} = (Y_{1ij} + Y_{2ij} + \cdots Y_{pij})'$ represent a p-dimensional vector of dependent variables (science and mathematics scores) for the i^{th} student in group j, and let X denote the design matrix of predictors. The MANOVA model is defined as:

$$Y = XB + \in$$

where: Y is the n×p matrix of observations, X is the n×k matrix of predictors (independent variables and intercept), B is the k×p matrix of regression coefficients (group mean vectors) and ∈ is the n×p matrix of residuals.

RESULTS AND DISCUSSION

Descriptive Analysis

The background information on student academic achievement in science and mathematics is presented in Table 1. The findings indicate that the mean score for science and mathematics is 66.11 with a standard deviation of 14.29, reflecting considerable variability in student performance. This variability is greater in science and mathematics compared to overall academic scores. Individual student scores in science and mathematics ranged from 31 to 100, while scores across all subjects ranged from 30 to 100 (See Appendix, Figure 4).

Table 1: Descriptive Analysis of academic achievement of students

Score of students	N	Minimum	Maximum	Mean	Std. Deviation
All subjects	2881	30.00	100.00	70.1361	12.52653
Science and Mathematics	2881	31.00	100.00	66.1081	14.29342
Total	2881				

Figure 2 displays a slightly left-skewed, near-normal distribution of students' average scores, indicating that academic performance is clustered in the medium to high range with moderate variability. The limited tail of low achievers suggests overall balanced performance, highlighting a specific need for targeted interventions for the minority of students at the lower end of the distribution.

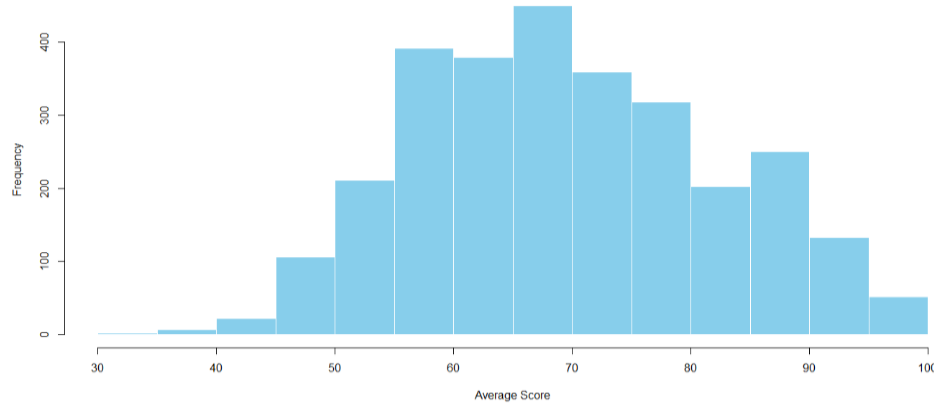

Figure 2: Distribution of Students' Average Scores in Science and Mathematics.

In Figure 3, the density plot reveals a near-normal distribution of average scores with a slight left skew, indicating that most students are concentrated in the medium to high performance range. Both male and female students show similar distribution patterns, with the majority achieving satisfactory results. The moderate spread and minimal left tail suggest generally balanced academic performance across the cohort, though targeted support may benefit the small proportion of students at the lower end of the distribution.

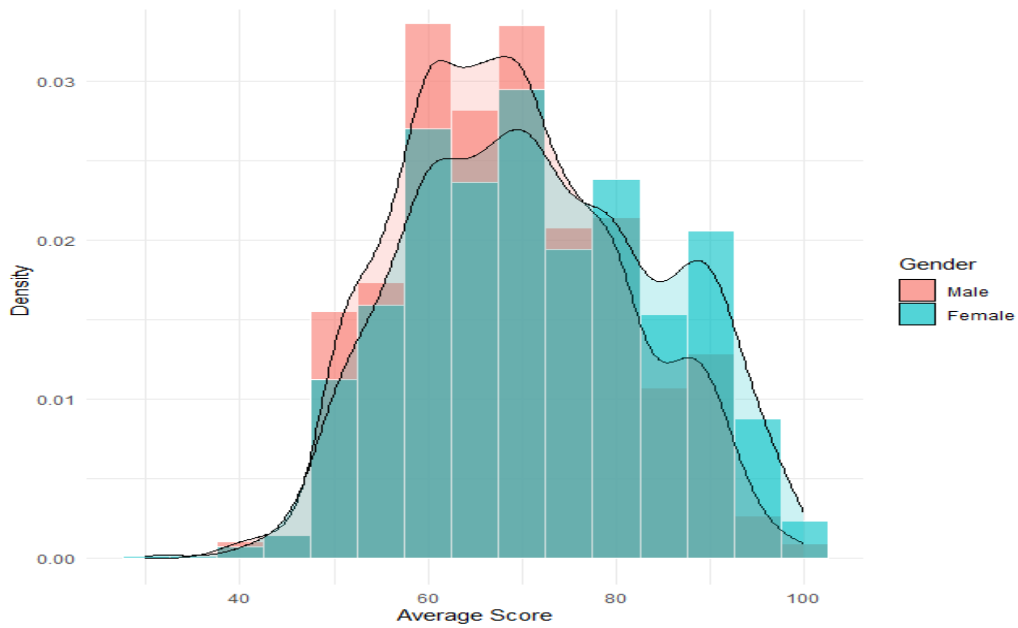

Figure 3: Distribution of Average Scores with Density Curve.

Levene's test (Table 2) showed that the variability of scores between the two groups was unequal in both cases. Even after adjusting for this inequality, the t-test results remained significant, showing that the mean scores differ between groups with one group scoring consistently lower across both "All subjects" and "Science and Mathematics."

Table 2: Levene's Test for Equality Mean score.

Score of Students	Levene's Test for Equality of Variances	F	Sig.	t	df	Mean Difference	Standard Error Difference
All subject	Equal variances assumed	27.287	.000	-6.844	2877	-3.17485	.46388
	Equal variances not assumed			-6.808	2761	-3.17485	.46633
Science and Mathematics	Equal variances assumed	30.495	.000	-8.269	2877	-4.35839	.52708
	Equal variances not assumed			-8.226	2763	-4.35839	.52981

As shown in Table 3, the Cronbach's alpha coefficient for the fifteen items was 0.879, indicating that the questionnaire is both internally reliable and consistent. This result demonstrates a relatively high level of internal consistency for the variables in the sample. In social science research, a reliability coefficient above 0.70 is generally considered acceptable, confirming that the instrument is suitable for measuring the constructs of interest.

Table 3. Test of Reliability Statistics

Alpha Cronbach's	Alpha Cronbach's Based on Standardized Items	Number of Items
.879	.879	15

In the Appendix, Table 4 highlights key relationships among the study variables. The results indicate positive and strong correlations between school environment and student support, time for discussion and teaching aids, teacher motivation and encouraging students, as well as time for discussion and the relationship between students and teachers. Conversely, weaker positive correlations were observed between homework response and both school environment and teaching aids. The correlation analysis indicated a weak relationship between student–teacher interaction and students' performance in Mathematics and Science.

Table 5 presents the correlation matrix, indicating that factor analysis is appropriate for examining the structure of the scale items. The Kaiser-Meyer-Olkin (KMO) values for all 15 items exceeded 0.45, suggesting sampling adequacy. Additionally, Bartlett's Test of Sphericity yielded a large chi-square statistic (χ^2 = 0.920) with a significance level <0.001, indicating that the correlation matrix is not an identity matrix and the data approximate multivariate normality. The correlation matrix also showed sufficient variation among items for factor extraction. Consequently, the data were analyzed using Principal Component Factor Analysis with Varimax rotation to identify the underlying factor structure.

Table 5: Bartlett's Test and KMO.

Measure of Sampling Adequacy (Kaiser-Meyer-Olkin)		.920
Test of Sphericity (Bartlett's)	Approx. Chi-Square	1.346E4
	df	105
	Sig.	.000

In Appendix Table 8 shows percentages of variance of each variable explained by the factors extracted. In the first column, all variables have a value of 1.00, which indicates that each variable initially explains its full variance in the analysis. The extraction values, which represent percentages of each variable explained by the factors retained after factor extraction, differ for most variables.

At a bigger scale, communalities are all between 0.339 and 0.771, suggesting that all the variables are very well captured by the extracted factors. School environment (0.771), student support (0.658), and teacher motivation (0.625) are comparatively high in extraction values, which suggest these variables are very much connected to the underlying latent factors dictating teaching and learning practices. Encouraging students (0.600) and discussion time (0.596) have large communalities, too, suggesting their important contribution towards the factor structure.

On the other hand, constructs like teacher fairness (0.386) and teacher-centered continuous assessment (0.339) possess relatively lower communalities. This suggests that these variables are not as well explained by the derived components, indicating that they could be indices reflecting dimensions not accounted for under the current factor model.

The pattern as a whole also indicates that the extracted factors thoroughly capture most of the observed variables, particularly those addressing classroom environment, student engagement, and instructional support. These results attest to the factor solution's reliability and provide a sound basis for interpreting the underlying constructs influencing the quality of teaching–learning practices in the study setting.

As shown in Appendix, Table 7, the total variance explained indicates that the eigenvalues for the first three factors are substantially larger than those for the remaining twelve factors. Together, the first three factors account for 53.52% of the total variance, suggesting that the scale items are multidimensional and capture multiple underlying constructs.

As shown in Table 6, the principal component method was used to extract components, followed by Varimax rotation with Kaiser normalization. The rotation converged after four iterations, indicating a stable and interpretable factor solution.

Table 8. Rotated Component Matrixa

Variables	Component		
	1	2	3
Teaching Aid	.754	.093	.130
Time for discussion	.747	.143	.135
Teacher centred	.683	.180	.093
Relationship	.667	.168	.133
Student centred	.649	.290	.163
Teacher centred	.521	.240	.100
Active participation	.511	.430	.190
Encourage students	.190	.742	.116
Teacher motivation	.235	.735	.172
Homework response	.101	.698	.030
Continuous assessment feedback	.263	.597	.211
Fairness of teacher	.390	.435	.211
School environment	.132	.119	.860
Student support	.194	.152	.773
Teaching & learning environment	.242	.422	.493

As shown in Table 9 several factors and covariates were found to have significant effects on students' academic achievement in mathematics and science ($p < 0.05$). These include woreda, grade level, school, gender, favorite subject, parents' occupation and education levels, availability and number of books, study environment at home, types of learning materials, teaching aids, readiness to learn, parental support and engagement, student activities after school, student support, school environment, fairness and follow-up by teachers, teacher support and preparation, teaching methods (student- and teacher-centered), continuous assessment and feedback, teacher-student relationships, time for discussion, classroom arrangements, active participation, and distance from home to school. In contrast, the use of the library, teacher motivation, and time spent studying did not show significant effects on students' academic achievement ($p > 0.05$).

Table 9. Regression Estimates for Factors Affecting Academic Achievement

Variable	Category	Estimate (β)	Std. Error	95% CI	Sig. (p)
Constant	-	71.780	2.512	66.857 – 76.704	<0.001
Woreda	Debark	6.735	1.700	3.403 – 10.066	<0.001
	Janamora	17.030	2.030	13.051 – 21.008	<0.001
	Gondar Zuria	33.053	1.910	29.310 – 36.797	<0.001
	Belessa	22.496	2.017	18.543 – 26.448	<0.001
	Metema	28.698	2.032	24.715 – 32.680	<0.001
Grade Level	Grade	7: 2.726	0.091	2.548 – 2.904	<0.001
Gender	Female	-3.780	0.078	-3.932 – -3.628	<0.001
Favorite Subject	Science & Math	2.399	0.172	2.062 – 2.737	<0.001

	Social Science	1.632	0.188	1.263 – 2.000	<0.001
	Language	-1.342	0.182	-1.698 – -0.985	<0.001
Father's Occupation	Farmers	2.003	0.269	1.476 – 2.531	<0.001
	Merchants	0.678	0.280	0.130 – 1.227	0.015
Father's Education	Illiterate	1.371	0.199	0.981 – 1.762	<0.001
	9–12	1.943	0.201	1.549 – 2.338	<0.001
	Diploma	3.617	0.226	3.174 – 4.060	<0.001
Mother's Education	Illiterate	-6.847	0.233	-7.303 – -6.391	<0.001
	1–8	-4.158	0.227	-4.604 – -3.712	<0.001
	9–12	-6.994	0.252	-7.488 – -6.500	<0.001
Home Resources	Availability of books	-10.147	0.557	-11.238 – -9.056	<0.001
	Number of books (4–5)	-1.546	0.139	-1.819 – -1.273	<0.001
	Availability of study place	0.579	0.095	0.393 – 0.765	<0.001
Parental Support	Yes	3.672	0.462	2.766 – 4.578	<0.001
Teacher Factors	Teacher support (medium vs high)	-2.541	0.124	-2.783 – -2.299	<0.001
	Teacher understanding (low vs high)	2.643	0.162	2.325 – 2.961	<0.001
	Teacher preparation (low vs high)	-4.616	0.159	-4.929 – -4.304	<0.001
Student Factors	Readiness to learn (low)	-3.767	0.460	-4.668 – -2.866	<0.001
	Age	0.092	0.023	0.048 – 0.137	<0.001
	Distance from home	-0.005	0.002	-0.009 – -0.002	0.001
	Time spent studying	0.002	0.002	-0.002 – 0.006	0.421

This study examined factors influencing the academic performance of grade 7 and 8 students in Mathematics and Science in northwestern Ethiopia. The findings indicate that engaging students in varied learning and teaching activities improves their capability in these subjects. From Table 9 and focused group discussion results show that male students tend to spend more time practicing mathematical symbols and participating in group problem-solving activities, whereas female students more often engage in oral language activities. This pattern aligns with previous studies (Samira Mehraein et al., 2014; Ming Eric, 2012; English,L.D, 2010; Blum,R, 2012; Borromeo Ferri, 2012).

CONCLUSIONS

The results revealed that the combined effects of school characteristics, family size, gender, favorite subject, mother's education level, availability of teaching materials, teachers' weekly workload, frequency of student evaluation, and student-teacher interactions were significant determinants of academic achievement. Multilevel analysis showed notable variation between schools, with an infraclass correlation coefficient of 66.4%, indicating considerable differences in student performance across schools. In contrast, no significant variation was observed between Woredas. Correlation analysis suggested a weak relationship between student-teacher interactions and students' scores in Mathematics and Science.

All four MANOVA test statistics for students' average scores were statistically significant, rejecting the null hypothesis. This confirms that school environment, gender, availability of books, and types of teaching materials are significantly associated with student performance in Mathematics and Science. Levene's test indicated equal variances between male and female students, and post hoc tests highlighted differences across school groups, gender, and material availability. These findings are consistent with Eshetie (2015), which reported school-level variations, and with meta-analyses showing higher male performance in Mathematics tests (Hyde, Fennema, & Lamon, 1990), though they contradict Kimball (1989), which reported better female performance in computation.

Among 2,880 students, 53% were female. The combined mean scores of male and female students were 66% in Mathematics and Science and 70% across all subjects, with a significant gender difference in science and mathematics achievement. Linear regression analysis showed that the model was significant ($P < 0.05$), with an R-value of 0.74 and an adjusted R^2 of 0.551, indicating that 55% of the variation in academic achievement could be explained by the joint effects of the variables included in the model.

Overall, the study highlights that improving school facilities (books, laboratory materials, libraries, blackboards, desks, chairs, and sufficient teaching staff), enhancing student management at home and school, and strengthening teacher capacity are critical for improving student achievement in Mathematics and Science.

Acronyms

Abbreviation	Description
EFA	Education for All
FDRE	Federal Democratic Republic of Ethiopia
TDP	Teacher Development Program
World Bank	World Bank
EFY	Education for Youth
TDP-I	Teacher Development Program I
MOE	Ministry of Education
ANOVA	Analysis of Variance
MANOVA	Multivariate Analysis of Variance
ICC	Intra class correlation coefficient

Acknowledgments

The authors gave a great pleasure to University of Gondar to give an opportunity to work this research study and author(s) thanks those school directors, principals/supervisors, students, teachers, community members, parents, data collectors, all investigators and other supporting staffs for your support, wonderful collaboration with us and successful completion of the research work.

Declaration of conflicting interests

The author(s) declared that no potential conflicts of interest with respect to the authorship, research, and publication.

Data Availability Statement

Here, the author(s) declares that on the presented research problems and conclusions, the data and detailed information will be made available by the authors as long as they needed.

Author Contributions

AE played a central role in conceptualizing the study, designing the methodology, supervising the research process, and drafting the manuscript. All other authors:- AA, MA, HM, YW, SH, MA, GA, and SB contributed equally to data collection, analysis, interpretation of results, literature review, and manuscript preparation. All authors critically reviewed the manuscript and approved the final version for publication.

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APPENDIX

Table 4. Inter-Item Correlation Matrix

Items	Student support	Schoolenvir	Fairnesof teacher	Encouragestudents	Homeworkrespone	teachermotivstu	Teachinglearenvit	continousassfeed	relatioteacher	timetodiscusion	Teaching Aid	studecenterd	teachcentered	actipart	teachcentstce
Student support	1														
School envir	.51	1													
Fairnes of teacher	.29	.27	1												
Encouragestudents	.29	.24	.40	1											
Homeworkresponе	.21	.18	.28	.40	1										
teachermotivstu	.29	.27	.38	.53	.39	1									
teachinglearenvit	.31	.42	.33	.31	.27	.42	1								
continousassfeed	.27	.25	.33	.39	.31	.45	.44	1							
relatioteacher	.27	.23	.33	.28	.23	.30	.27	.33	1.						
timetodiscusion	.27	.23	.39	.30	.21	.32	.31	.32	.51	1.					
Teaching Aid	.25	.23	.36	.27	.19	.30	.31	.27	.41	.54	1.				
studecenterd	.29	.27	.34	.34	.27	.39	.34	.35	.43	.46	.47	1.			
teachcentered	.24	.21	.32	.26	.22	.31	.31	.30	.37	.41	.44	.44	1		
actipart	.32	.27	.34	.40	.28	.44	.35	.39	.37	.39	.37	.49	.41	1	
teachcentstce	.22	.21	.28	.25	.24	.28	.27	.28	.31	.30	.33	.34	.41	.36	1

Table 6: Commonalities: Extraction Method: Principal Component Analysis

variables	Initial	Extraction
Student center	1	0.532
teacher Center	1	0.507
Active participation	1	0.482
Student support	1	0.658
School environment	1	0.771
Fairness of teacher	1	0.386
Encourage students	1	0.6
Homework response	1	0.499
Teacher motivation	1	0.625
Teaching learning	1	0.48
Continuous assessment feedback	1	0.47
Relationship between students and teacher	1	0.491
Time for discussion	1	0.596
Teaching Aid	1	0.594

Teacher Center continues assessment	1	0.339

Table 7: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.620	37.465	37.465	5.620	37.465	37.465	3.428	22.854	22.854
2	1.300	8.666	46.131	1.300	8.666	46.131	2.754	18.363	41.217
3	1.109	7.392	53.523	1.109	7.392	53.523	1.846	12.306	53.523
4	.817	5.448	58.971						
5	.762	5.082	64.053						
6	.697	4.648	68.701						
7	.682	4.546	73.246						
8	.643	4.286	77.532						
9	.548	3.651	81.183						
10	.534	3.562	84.746						
11	.518	3.455	88.201						
12	.478	3.186	91.386						
13	.447	2.979	94.365						
14	.426	2.842	97.208						
15	.419	2.792	100.000						

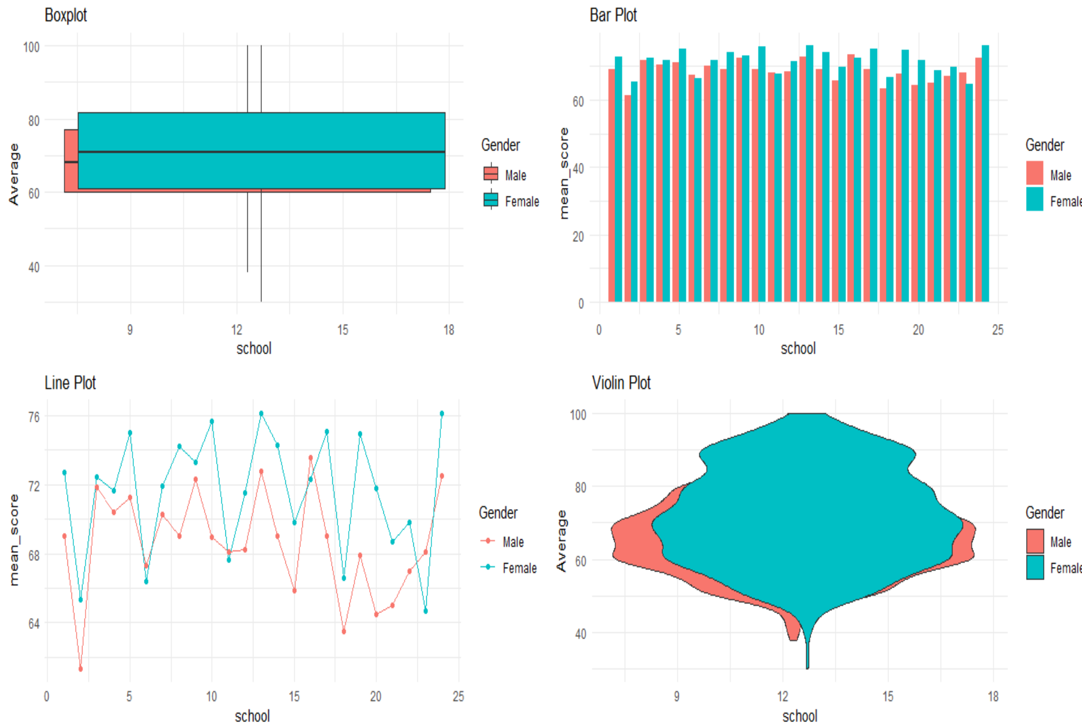

Figure 4: Multiple views: Gender and School Effects on Average Scores