

Linking school-level quality enhancement practices to students' academic achievement: a correlation study in Ethiopian secondary schools

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Abstract

Purpose – This study aims to investigate the relationship between school-level quality enhancement practices (QEPs) and students' academic achievement in Ethiopian secondary schools. It identifies key factors contributing to improved performance and proposes strategies for optimizing educational inputs and processes at both the school and classroom levels.

Design/methodology/approach – A correlational research design was used to assess the relationship between QEPs and students' academic achievement. Data were gathered from 346 educators including teachers, principals and department heads across 32 randomly selected secondary schools in Oromia Regional State. Students' achievement was measured using the 2022 and 2023 Ethiopia Secondary School Leaving Certificate Examination (ESSLCE) results. Data analysis involved descriptive statistics, Pearson's correlation and hierarchical and stepwise regression.

Findings – The results reveal a significant positive association between school-level QEPs and students' academic achievement. Notable contributors include resource utilization, community engagement and support, strategic improvement plan, leadership engagement, instructional time utilization and student learning opportunities.

Research limitations/implications – This study relied on quantitative methods, limiting contextual depth. Mixed-methods and longitudinal designs are recommended to capture deeper explanatory insights and strengthen the interpretation of achievement trends over time.

Practical implications – Improving students' achievement requires adopting a holistic quality enhancement strategy that focuses on optimizing educational inputs and strengthening processes at both the school and classroom levels.

Social implications – Raising student achievement supports equitable access to opportunities in higher education and the workforce, contributing to long-term societal advancement.

Originality/value – By centering academic achievement as the primary outcome, this study offers valuable perspectives for educators and policymakers seeking to enhance performance in Ethiopian secondary schools

Keywords Academic achievement, Educational input, School process, Quality enhancement

Paper type Research paper



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1. Introduction

1.1 Back ground of the study

Education quality is a critical issue for post-2015 education agendas worldwide. According to World Bank report (2017), developing nations like Ethiopia have improved secondary education access, but still face challenges in education quality. Access alone is not enough; young people also need quality education to adapt to the rapid economic, technological change and shifting needs of employers (Iweala, 2023). To adequately prepare students for the future, it is essential that education systems focus on not only increasing access to education but also improving the quality of teaching and learning.

Schools play a central role in fostering students' academic growth and holistic development (Reynolds *et al.*, 2018). They are expected to create learning environments grounded in evidence-based practices and committed to continuous improvement (UNESCO, 2017). However, despite numerous reform initiatives particularly in sub-Saharan countries such as Ethiopia many schools continue to face challenges in delivering meaningful learning outcomes (Stefan, 2018). While some schools consistently improve student achievement regardless of socio-economic background, others struggle to do so (Anderson and Soonarane, 2021; Scheerens and Base, 2016). By creating a supportive and enriching environment, effective schools empower students to thrive in all aspects of life, not just in improving test scores. In contrast, ineffective schools may overlook these critical factors, leaving students inadequately equipped for life beyond the classroom (Sammons, 2020).

Improving student achievement demands a systemic approach one that examines and enhances the full scope of school operations, including contextual factors, inputs and processes at both the school and classroom levels, and how these influence academic outcomes (Alzoubi, 2017). Understanding how these elements interact within specific national contexts is essential for developing effective school improvement strategies. Such evaluation enables policymakers and educators to identify institutional strengths and pinpoint areas in need of improvement. This holistic perspective supports targeted interventions and strategic planning aimed at meeting diverse student needs and fostering continuous educational excellence (Scheerens, 2016).

According to Creemers (2015), the context level influences the school and classroom level processes; therefore, some conditions need to be fulfilled, such as having national policies, standards, indicators, training, support, guidelines and inspections for education, all of which are important to guide the quality enhancement activities in the school (Ehren and Shackleton, 2016; Scheerens, 2016). Without these necessary components in place, it becomes difficult for schools to effectively implement quality enhancement activities and improve student outcomes.

School improvement research demonstrates that educational input such as adequate school infrastructure and materials (Santika *et al.*, 2021), well-trained human resources and proper financial allocation (Creemers, 2015), community involvement and support (Jeynes, 2022; Vicente *et al.*, 2023) directly improve school processes and overall effectiveness. Furthermore, studies have shown that school processes like a positive school climate, effective leadership and teacher collaboration are also crucial factors in enhancing educational outcomes (Christopher *et al.*, 2022; Day *et al.*, 2020; Jeynes, 2022). These factors contribute to creating conducive learning environment for students, leading to improved academic performance, higher graduation rates and increased student engagement (Barrett *et al.*, 2019).

Research on classroom instructional effectiveness indicates that several factors significantly impact learning outcomes. These factors include time spent on task, content

coverage, learning opportunities and structured teaching elements such as frequent evaluations of student progress, positive feedback reinforcement and cooperative learning (Christopher *et al.*, 2022). By focusing on these critical components, educators can maximize student engagement and motivation, leading to improved academic performance (Reynolds and Creemers, 2018).

Scholars (e.g. Creemers, 2015; Scheerens, 2016) emphasize school improvement factors, often studied in the context of developed countries. However, it is crucial to investigate these factors within the unique educational context of each country. In addition, scholars like Glewwe and Muralidharan (2015) and Warwick and Reimers (2020) recommend a closer examination of school and instructional factors. This examination should consider education policies, program strategies and cultural contexts at the community, school and classroom levels. Insights gained from such research can inform targeted interventions to address specific needs and challenges (UNESCO, 2017).

Studies (e.g., Glewwe and Muralidharan, 2015; Reynolds *et al.*, 2018) have shown that when evaluating education quality and standards in low-income nations, including Ethiopia, factors like enrollment, pupil-to-class ratios and pupil-to-teacher ratios are frequently used. Yet, the evaluation of the teaching process in schools has not received enough attention (Eddy *et al.*, 2017). Furthermore, it is not common practice in developing nations to holistically assess the quality of their education at the school level, mainly focusing on inputs, processes and outcomes (Reynolds, 2018). As a result, it has become difficult to know how they are working to improve the quality of their education at the school level and how they are ensuring the quality of education (Warwick and Reimers, 2020; Anderson and Soonarane, 2021).

This study offers valuable insights into school improvement by examining how school-level quality enhancement practices (QEPs) are associated with students' academic achievement in Ethiopian secondary schools. The findings contribute to a deeper understanding of how targeted improvements in educational inputs and processes can lead to measurable gains in student learning, particularly within the context of Ethiopia's ongoing educational reforms.

1.2 Context and purpose of the research

Under the General Education Quality Improvement Program (GEQIP), Ethiopian schools began emphasizing educational quality improvement in 2008 [Endale *et al.*, 2023; Ministry of Education (MoE), 2019]. The program has progressed through three phases: GEQIP-I (2008–2013), GEQIP-II (2013–2018) and GEQIP-E (2018–2023). GEQIP I and II significantly enhanced education inputs and established quality improvement mechanisms, notably school improvement and inspection, aimed at accelerating learning outcomes (World Bank, 2017a, 2017b; MoE, 2018, 2019, 2021).

GEQIP-E specifically targeted student learning outcomes. Efforts included improving educational processes at the school and classroom levels, such as enhancing school leadership, refining teaching practices, optimizing resource utilization (including textbooks) and ensuring effective implementation of school improvement plans (World Bank, 2017a; Hoddinott *et al.*, 2019). Despite these initiatives, research indicates that Ethiopia's educational system faces challenges, with many schools being ineffective (Stefan, 2018; Belay, 2019; MoE, 2021).

According to the MoE's (2023) report, school performance did not improve during the implementation of the previous (1994) education policy. Evidence highlights an issue with education quality, as students' scores remained below 50% in all subjects during national examinations (MoE, 2023). Recent data from the 2023 grade 12 national exam revealed that

only 3.3% of students achieved a score of 50% or above (MoE, 2023). This decline underscores the education system's failure to adequately prepare students for exams.

Despite increasing attention to educational quality, research specifically focused on school improvement and its influence on student achievement in Ethiopia remains limited and underdeveloped (Mitchell, 2015; MoE, 2020). Much of the existing literature has concentrated on identifying factors that undermine education quality, often emphasizing policy shortcomings and structural challenges (Michael, 2017; Alebel, 2018; Belay, 2019). However, more recent studies have begun to explore school-level determinants of academic success. For instance, Abebe (2020) highlighted the significance of leadership and teaching practices, while Desta (2021) emphasized the positive effects of school climate and parental involvement on student outcomes. These emerging findings offer valuable insights into the mechanisms through which schools can improve learning conditions and raise academic performance. In this regard, this study examines how school-level QEPs are associated with students' academic achievement in Ethiopian secondary schools. It identifies key factors contributing to improved performance and proposes strategies for optimizing educational inputs and processes at both the school and classroom levels.

The researchers framed their investigation around the following research questions:

- RQ1. What is the current state of quality enhancement practices in government secondary schools within the study area?
- RQ2. Is there a statistically significant correlation between school-level quality enhancement practices and students' academic achievement in government secondary schools?

1.3 Conceptual framework: enhancing school quality to improve student achievement

Grounded in school improvement research, this study uses school effectiveness theory and the comprehensive school effectiveness model to investigate how QEPs in Ethiopian secondary schools contribute to improved student achievement. Rather than emphasizing general effectiveness, this framework positions academic achievement as the core outcome, aligning school practices with measurable gains in student learning.

School effectiveness theory focuses on the conditions that support sustained academic achievement, including instructional quality, leadership engagement, educational resources and school climate (Creemers, 2015; Scheerens, 2016). Building on this, the comprehensive school effectiveness model developed by Levine and Lezotte (1990) and refined by Creemers (2003, 2015) and Scheerens (2013, 2016) synthesizes decades of research into a practical framework for understanding how school and classroom factors influence learning outcomes. By explicitly considering school-level influences, the model underscores the importance of promoting favorable conditions for effective instruction and highlights the interconnectedness of school policies, support structures, resources and classroom needs.

The model applies an input–process–output logic to educational settings (Christopher *et al.*, 2022; Creemers, 2015). Input includes foundational resources such as infrastructure, instructional materials, financial management and community engagement. Process incorporates strategies related to leadership, school climate, teacher development, utilization of instructional time and progress monitoring. Output the core focus of this study is student academic achievement, which reflects the cumulative impact of quality enhancement efforts. This conceptualization moves beyond abstract measures of effectiveness toward an outcome-oriented approach, offering a structured lens through which to evaluate targeted school improvement interventions (Scheerens, 2016).

In this context, the study investigates QEPs across three core dimensions of school improvement: educational inputs and processes at both the school and classroom levels. Educational input refers to the resources and conditions available for schools to operate and deliver education. These include school infrastructure, educational materials, school finance management and community engagement and support.

School-level processes involve strategies to create an optimal teaching and learning environment. This study examined strategies such as developing a school improvement plan, providing professional development opportunities, fostering a safe and supportive school climate and emphasizing leadership engagement.

Classroom-level processes encompass the methods and activities used by teachers and students to facilitate teaching and learning. This study examined these processes through the lens of instructional time utilization, student learning opportunities and progress monitoring factors in enhancing educational quality.

By systematically analyzing these components, the study maps how school-level quality enhancement efforts correlate with student academic achievement. This comprehensive approach offers insights into specific areas where targeted interventions can lead to improved educational outcomes.

2. Materials and methods

2.1 Research design

For this study, a non-experimental correlational design was chosen. This design, which has a quantitative nature, investigates whether a relationship exists between school level QEPs and school effectiveness as measured by student achievement. Correlational research provides valuable information for predicting outcomes based on associations. Correlational research enables the examination of multiple variables within a single study and provides insights into the strength of relationships among those variables (Creswell and Creswell, 2018).

2.2 Sample size and techniques

The study population comprises teachers, department heads and principals from government secondary schools in the Oromia Regional State of Ethiopia. To create a representative sample, thirty-two secondary schools were selected from four zones across 12 woredas using a simple random method. This method involved multistage sampling techniques.

In the first stage, four zones were randomly selected from the regional state to ensure geographic diversity. In the second stage, from these selected zones, 12 woredas were randomly chosen, with three woredas from each zone, adding another layer of stratification. In the third stage, secondary schools were randomly selected from the chosen woredas to reflect a variety of school contexts. Finally, in the fourth stage, teachers were randomly selected from these schools, ensuring a wide range of teaching experiences and subject specializations. In addition, all principals and department heads from the sampled schools were included to provide insights from school leadership and departmental perspectives.

The final sample consisted of 346 participants, including 54 principals (26 heads and 28 vice-principals) and 292 teachers, with 115 of them holding department head positions. This multi-stage sampling approach ensured a diverse and representative sample, providing a robust foundation for analyzing the QEPs in Ethiopian secondary schools.

2.3 Instrument

The data for this study were sourced from both primary and secondary sources. Primary data were collected through questionnaires administered to participants, while secondary data included Grade 12 Ethiopia Secondary School Leaving Certificate Examination (ESSLCE)

results from the years 2022 and 2023. Quantitative data on QEPs were obtained using 5-point Likert scale questionnaires, with one being the lowest score and five being the highest developed by the researchers. These questionnaires covered educational input (27 items), school-level processes (26 items) and classroom-level processes (18 items), totaling 71 items.

The content validity of these instruments was ensured by incorporating specific standards and strategies from Ethiopia's secondary school inspection framework and quality enhancement initiatives. Expert feedback from MoE, including school improvement and inspection directors, was sought and incorporated through an iterative refinement process. The reliability of the instruments was confirmed through a pilot test conducted in a secondary school outside the research site. The results revealed that the Cronbach's alpha values exceeded 0.7 for each scale, ranging between 0.73 and 0.92, indicating satisfactory internal consistency.

Student academic achievement was measured using the average scores from the ESSLCE for natural science stream students in 2022 and 2023. This national examination serves as a standardized, system-wide metric for evaluating academic performance at the completion of secondary education. The natural science stream includes seven assessed subjects: English, Mathematics, Chemistry, Biology, Physics, Aptitude and Civic Education. Each subject is scored on a scale of 0–100, yielding a cumulative maximum score of 700.

The selection of this stream is intentional, as it aligns with Ethiopia's national STEM priorities and reflects greater emphasis on resource-intensive instructional inputs such as laboratory activities and science materials. Furthermore, the natural science stream was consistently available across all sampled schools, ensuring comparability. Achievement scores were aggregated from a total of 10,226 students across 32 government secondary schools, and the average score across these two years was calculated to provide a robust and representative indicator of student academic outcomes.

2.4 Data analysis

In this research, the collective perceptions of educators (including teachers, department heads and principals) at the school level are considered, rather than focusing solely on individual perspectives. Emphasizing the school as the unit of analysis allows the study to effectively assess the impact of policies and practices on overall school performance (Reynolds and Creemers, 2018). This approach evaluates QEPs and its correlation with academic achievement at the school level, providing a holistic view rather than focusing on individual participants or students.

For data analysis, we used descriptive statistics and inferential analysis using the SPSS 22 program. The survey used a five-point scale to assess school-level QEPs, with composite mean and standard deviation calculations. The composite mean scores were compared to a threshold of 3 to classify practices as low, moderate or high. One-sample *t*-tests were conducted to determine if scores significantly differed from the threshold ($p < 0.05$, 2-tailed). The Intra-class Correlation Coefficient (ICC) was calculated to determine the consistency between principals' and teachers' ratings of QEPs. Composite mean scores were used to evaluate Grade 12 Secondary School Leaving Certificate Examination (ESSLCE) results for the years 2022 and 2023.

Pearson's correlation coefficient assessed the relationship between the independent variable (QEPs) and the dependent variable (students' academic achievement). A hierarchical regression was used to assess the incremental contributions of different sets of variables educational inputs, school-level processes and classroom-level processes. In

addition, stepwise multiple linear regression analyses were conducted to examine the predictive strength of quality enhancement practice variables.

To ensure data quality, outlier detection and normality tests were used. Graphical methods were used to identify any extreme values or anomalies in the data set. To test normality, the Shapiro–Wilk test and Q-Q plot were used to assess the distribution of the data and verify its normality. The results showed that both the independent and dependent variables were normally distributed, with Shapiro–Wilk p -values between 0.071 and 0.59 ($p > 0.05$).

In the regression analysis, key assumptions were tested: linearity, multicollinearity and autocorrelation in the residuals. Scatter plots verified linearity, VIF values indicated no significant multicollinearity (ranging between 1.3 and 2.8, which is less than 5) and the Durbin–Watson statistic confirmed uncorrelated residuals with a value of 1.81 (close to 2). Finally, A hierarchical regression and stepwise multiple linear regressions assessed the contributions and predictor power of QEPs variables.

2.5 Research ethics

To ensure voluntary, informed and safe participation of research participants, strict adherence to research ethics is crucial. The researcher obtained ethical approval from concerned body. In addition, cooperation letters were presented to relevant authorities for permission and cooperation. Participants were informed about the research purpose, confidentiality and their right to withdraw. An informed consent process was also followed, and anonymity participants and students' academic achievement results were maintained through coded information. Data collection was entirely voluntary for the participants.

3. Results

This study examined the QEPs of 32 secondary schools by analyzing educational inputs and processes at both the school and classroom levels, and their associations with students' academic achievement. The results are presented sequentially, beginning with descriptive statistics, followed by inter-rater agreement analysis, correlation patterns and finally, regression models that assess the contributions of each set of predictors.

Descriptive statistics (Table 1) indicated that schools generally possess some essential resources, although adequacy remains a challenge. At the school level, the mean score for the availability of infrastructure and materials (e.g. classrooms, libraries, ICT labs and sanitation facilities) was 2.75 (SD = 0.55, $p < 0.001$), while the adequacy of these resources scored lower at 2.63 (SD = 0.56, $p < 0.001$), reflecting the need for further investment. Resource utilization was rated similarly at 2.75 (SD = 0.60, $p < 0.001$), indicating moderate efficiency. Financial management practices also revealed areas for improvement, with a mean of 2.76 (SD = 0.76, $p < 0.001$). Community engagement and support, although moderately practiced, scored 2.96 (SD = 0.76, $p = 0.34$), showing moderate practices and suggesting that schools should strengthen community involvement to enhance overall quality.

Regarding school-level processes, the development of a School Improvement Plan (SIP) had a mean score of 2.90 (SD = 0.76, $p = 0.02$), indicating weak efforts in planning for improvement. Professional development activities scored 3.05 (SD = 0.65, $p = 0.17$), suggesting positive engagement in professional growth. Efforts to establish a safe and supportive school climate had a mean score of 3.11 (SD = 0.67, $p = 0.01$), reflecting commendable efforts in creating a conducive environment. Leadership engagement were rated at 3.02 (SD = 0.72, $p = 0.71$), highlighting moderate efforts in quality enhancement activities and a need for further improvement.

At classroom level process, instructional time utilization was rated with a mean score of 3.07 (SD = 0.67, $p = 0.06$), indicating moderate practices with room for improvement.

Table 1. Descriptive statistics for the variables in the study

No.	Variables	Principals		Teachers		Respondent		Total	Sig.(2-tailed)
		Mean	SD	Mean	SD	Mean	SD		
I	Educational input								
1	School infrastructure and materials								
1.1	Availability	2.65	0.55	2.74	0.56	2.75	0.55		0.00
1.2	Adequacy	2.55	0.55	2.64	0.56	2.63	0.56		0.00
1.3	Utilization	2.7	0.64	2.76	0.6	2.75	0.6		0.00
2	School finance management	2.73	1.03	2.77	0.71	2.76	0.76		0.00
3	Community engagement and support	2.79	0.91	2.99	0.73	2.96	0.76		0.34
II	School-level process								
1	The development of a school improvement plan (SIP)	2.71	0.87	2.93	0.74	2.9	0.76		0.02
2	Professional development activities	2.99	0.66	3.06	0.65	3.05	0.65		0.17
3	Efforts to establish a safe and supportive school climate,	3.01	0.75	3.13	0.65	3.11	0.67		0.01
4	Leadership engagement	2.82	0.81	3.05	0.7	3.02	0.72		0.71
III	Classroom-level process								
1	Instructional time utilization	3.06	0.71	3.08	0.66	3.07	0.67		0.05
2	Student learning opportunities	2.9	0.69	3	0.71	2.99	0.7		0.76
3	Monitoring of students' progress	2.91	0.55	3.03	0.57	3.01	0.57		0.77

Note(s): Test value $M = 3.0$, $p < 0.05$, $n = 346$ for educators (principals, 54 and 292 teachers, including department heads)
Source(s): Created by the authors

Student learning opportunities had a mean score of 2.99 (SD = 0.70, $p = 0.76$), suggesting moderate practices but indicating the need to maximize student learning experiences. Monitoring students' progress was rated at 3.01 (SD = 0.57, $p = 0.77$), emphasizing moderate efforts and the need for improvement in ongoing assessment practices.

To justify the aggregation of school-level data across raters, an inter-rater reliability test using the Intra-Class Correlation Coefficient (ICC) was conducted (Table 2). The ICC for single measures was 0.568 (95% CI[0.526, 0.611], $F(342, 3462) = 16.774$, $p < 0.001$), indicating moderate agreement among individual raters (principals and teachers). The ICC for average measures was 0.940 (95% CI[0.930, 0.950], $p < 0.001$), suggesting strong agreement in the aggregated ratings and supporting multilevel analysis of school-level variables.

Correlation analyses (Table 3) were conducted to examine the relationships between quality enhancement practice (QEP) variables and students' academic achievement, as measured by the Grade 12 Secondary School Leaving Certificate Examination (G12 SSLCE) scores for 2022 and 2023. The analysis was based on data from 10,226 students, with a combined average score of 195.4. The findings revealed statistically significant and positive correlations across all QEP indicators. Specifically, variables such as educational resource utilization ($r = 0.72$), community engagement and support ($r = 0.67$), school financial management ($r = 0.53$), school improvement planning ($r = 0.67$), professional development ($r = 0.54$), a safe and supportive school climate ($r = 0.63$), leadership engagement ($r = 0.79$), instructional time utilization ($r = 0.72$), learning opportunities ($r = 0.61$) and student progress assessment ($r = 0.58$) showed moderate to strong positive correlations with students' academic achievement. Among these, educational resource utilization, community engagement and support, SIP, leadership engagement and instructional time utilization emerged as the strongest correlates of academic achievement.

To assess the incremental contribution of each group of variables, a hierarchical multiple regression was conducted (Table 4). In Model 1, educational input variables (resource utilization, financial management and community engagement and support) explained 81.2% of the variance in student achievement ($F(4, 12) = 14.840$, $p < 0.001$). Model 2 added school-level process variables (school improvement planning, professional development, safe and supportive school climate and leadership engagement), increasing the explained variance to 83.4% ($F(4, 12) = 14.397$, $p < 0.001$). Model 3 introduced classroom-level variables (instructional time, learning opportunities and progress monitoring), further increasing the explained variance to 84.8% ($F(4, 12) = 13.648$, $p < 0.001$). Finally, the full model (Model 4), which included all variables from educational input, school-level and classroom-level processes, accounted for 85.2% of the variance in student performance ($F(4,12) = 12.051$, $p < 0.001$). This progression demonstrates that each level of QEPs focusing on optimizing inputs and improving school- and classroom-level processes adds unique and significant explanatory power to student achievement outcomes.

Table 2. Intra-class correlation coefficients for quality enhancement practices ratings

Measure	ICC	95% confidence interval	$F(342, 3462)$	p -value
Single measure	0.568	[0.526, 0.611]	16.774	0.000
Average measure	0.94	[0.930, 0.950]	16.774	0.000

Note(s): $P < 0.05$, ICC = Intra-class correlation coefficient. The analysis used a two-way random effects model where both people effects and measure effects are random

Source(s): Created by the authors

Table 3. Pearson correlation of variables

No.	variables	1	2	3	4	5	6	7	8	9	10	11
1	Students' academic achievement	–										
2	Educational resource utilization	0.72**	–									
3	Community engagement and support	0.67**	0.56**	–								
4	School financial management	0.53**	0.35*	0.49**	–							
5	School improvement plan	0.67**	0.47**	0.36*	0.34	–						
6	Professional development	0.54**	0.55**	0.53**	0.52**	0.49**	–					
7	Safe and supportive school climate	0.63**	0.61**	0.46**	0.33	0.61**	0.61**	–				
8	Leadership engagement	0.79**	0.71**	0.58**	0.39*	0.50**	0.45**	0.48**	–			
9	Instructional time utilization	0.72**	0.60**	0.53**	0.39*	0.59**	0.41*	0.52**	0.58**	–		
10	Student opportunity of learning	0.61**	0.44*	0.55**	0.40*	0.27	0.31	0.38*	0.62**	0.47**	–	
11	Student progress assessment	0.58**	0.46**	0.52**	0.47**	0.62**	0.51**	0.56**	0.47**	0.76**	0.44*	–

Note(s): ** $p < 0.01$, $n = 32$ secondary schools

Source(s): Created by the authors

Table 4. Hierarchical regression results model summary

No.	Model	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	Std error	<i>F</i>	<i>p</i>
1	Educational input	0.901	0.812	0.758	5.303	14.84	0.00
2	School-level process	0.913	0.834	0.776	5.102	14.397	0.00
3	Classroom level process	0.921	0.848	0.786	4.983	13.648	0.00
4	Combined	0.923	0.852	0.781	5.041	12.051	0.00

Note(s): *P* < 0.01, *n* = 32 schools. Predictors include quality enhancement practices variables. The dependent variable is students' academic achievement
Source(s): Created by the authors

To further identify the strongest individual predictors of academic success, a stepwise linear regression was used (Table 5). At the educational input level, resource utilization (*B* = 15.4, β = 0.47, *p* < 0.05) and community engagement and support (*B* = 12.1, β = 0.31, *p* < 0.05) were significant, with the model explaining 67% of the variance. In the school-level process model, leadership engagement (*B* = 13.6, β = 0.56, *p* < 0.05) and school improvement planning (*B* = 5.9, β = 0.27, *p* < 0.05) emerged as key predictors, explaining 76% of the variance. At the classroom level, instructional time utilization (*B* = 16.0, β = 0.55, *p* < 0.05) and student learning opportunities (*B* = 9.3, β = 0.34, *p* < 0.05) were significant, with this model accounting for 61% of the variance. In the final combined stepwise model, leadership engagement explained the largest proportion of the variance (29%), followed by school improvement planning (28%), community engagement (19%), instructional time utilization (15%), resource utilization (14%) and student learning opportunities (11%). Collectively, these variables explained a substantial 83% of the variance in student academic achievement (*R*² = 0.83), highlighting the critical importance of multi-level quality enhancement strategies in driving academic success.

4. Discussion

In the Ethiopian context, QEP in secondary schools encompassing educational inputs and processes at both the school and classroom levels are designed to significantly improve students' academic achievement and overall school effectiveness (MoE, 2018, 2021). This study highlights the current status of these practices and examines their relationship with students' academic achievement.

The findings reveal that although most schools demonstrated notable efforts in implementing QEP, there was considerable variation in the extent and quality of implementation. While many schools possess infrastructure and teaching materials, their adequacy and utilization remain insufficient. This reinforces the importance of effective resource allocation and financial management, consistent with prior studies emphasizing resource equity and efficiency in improving educational quality (Alzoubi, 2017; Cohn and Rossmiller, 2001). In addition, the significant role of community engagement suggests that strong partnerships with local stakeholders are vital for sustaining school improvement efforts. This aligns with findings that emphasize how active community participation supports accountability, resource generation and learner support in under-resourced contexts (Monk, 2017; Vicente *et al.*, 2023).

At the school-level process, the study identified significant weaknesses in improvement planning, with many secondary schools lacking a clear strategic direction. This finding aligns with prior research indicating that schools often struggle to translate policy into actionable plans without adequate training and support (Gerry and Creemers, 2014). Although elements

Table 5. Results of stepwise regressions for the predictors of academic achievement

No.	Model	Variable	B	Std. Error	B	t	Sig.	R	R ²	F	Sig.
1	Educational input	Constant	106.25	12.4		8.57	0.00	0.82	0.67	18.6	0.00
		1.1. Educational resource utilization	15.41	4.33	0.47	3.56	0.00				
		1.2. Community engagement and support	12.15	5.66	0.31	2.15	0.04				
		1.3. School financial management	5.57	3.16	0.22	1.76	0.09				
2	School level process	Constant	117.44	10.05		11.68	0.00	0.87	0.76	21.3	0.00
		2.1. School improvement planning	5.9	2.75	0.27	2.15	0.04				
		2.2. Safe and supportive school climate	4.93	4.32	0.16	1.14	0.26				
		2.3. Professional development	1.72	3.43	0.06	0.5	0.62				
		2.4. Leadership engagement	13.62	2.82	0.56	4.84	0.00				
3	Classroom level process	Constant	117.11	12.13		9.66	0.00	0.78	0.61	14.6	0.00
		3.1. Instructional time utilization	16.01	5.45	0.55	2.94	0.01				
		3.2. Student opportunity of learning	9.34	3.71	0.34	2.52	0.02				
		3.3. Student progress assessment	0.41	5.25	0.01	0.08	0.94				
4	Combined model	Constant	102.11	9.93		10.28	0.00	0.91	0.83	19.65	0.00
		4.1. Educational resource utilization	4.5	4.19	0.14	1.07	0.29				
		4.2. Community engagement and support	7.45	4.54	0.19	1.64	0.11				
		4.3. School improvement planning	6.09	2.34	0.28	2.6	0.02				
		4.4. Leadership engagement	7.14	3.47	0.29	2.06	0.05				
		4.5. Instructional time utilization	4.36	3.6	0.15	1.21	0.24				
		4.6. Student opportunity of learning	3.11	3.13	0.11	0.99	0.33				

Note(s): $p < 0.05$, $n = 32$ secondary schools**Source(s):** Created by the authors

such as leadership engagement, professional development and a supportive school climate were present to varying degrees, they were not consistently strong across schools. These components are widely recognized as essential for fostering a productive learning environment and sustaining instructional quality (Edward, 2014; Reynolds and Creemers, 2018; Scheerens, 2016). The findings underscore the need to strengthen leadership capacity and planning competencies to more effectively implement and sustain quality enhancement initiatives. In particular, the development of a strategic SIP, coupled with committed leadership, is critical for identifying priority areas, mobilizing resources and driving meaningful school-level change (Day *et al.*, 2020).

The study also sheds light on classroom-level processes in secondary schools. While some schools made efforts to manage instructional time, diversify learning opportunities and assess student progress, these practices were inconsistently applied. Effective time management and structured instructional delivery are essential for maximizing teaching and learning (Gerry and Creemers, 2014; UNESCO, 2023). Similarly, differentiated instruction and regular formative assessments are critical for identifying learning gaps and providing timely support (Demeuse, 2014; Christopher *et al.*, 2022). These classroom-level processes are not only central to student engagement and achievement but also serve as the operational link between school-level strategies and tangible academic outcomes.

The statistical analysis confirms a strong positive association between QEP and student academic achievement. Educational inputs such as resource utilization, financial management and community engagement significantly contributed to explaining variations in performance, consistent with findings by Alzoubi (2017) and Cohn and Rossmiller (2001). The inclusion of school-level processes particularly improvement planning, leadership, professional development and a supportive school climate further enhanced the model's explanatory power. Classroom-level practices, including effective utilization of instructional time, provision of diverse learning opportunities and regular assessment, added unique value to the model. Collectively, these multilevel strategies accounted for 85.2% of the variance in academic outcomes, underscoring the importance of an integrated approach to educational quality enhancement (Scheerens, 2016; Reynolds and Creemers, 2018).

The analysis also identified the most influential predictors of student academic achievement across input, school and classroom levels. Among educational inputs, effective resource utilization and strong community engagement and support had the most substantial effects, reinforcing earlier findings that emphasize how focusing on these practices enables schools to allocate resources more effectively, engage stakeholders and support students (Jeynes, 2022; Mpolokeng, 2011; Monk, 2017). At the school level, leadership engagement and strategic improvement planning emerged as key predictors, underscoring the importance of visionary leadership and evidence-based planning in driving sustainable school improvement (Day *et al.*, 2020; Hanushek and Woessmann, 2012; Scheerens, 2016). At the classroom level, effective utilization of instructional time and diversifying learning opportunities significantly contributed to student performance, highlighting the centrality of instructional quality and responsiveness in daily teaching practices (Creemers, 2014; Christopher *et al.*, 2022).

To situate these findings within a broader international context, comparative studies from developed countries offer valuable insights. Research from the UK, Netherlands and Australia underscores the critical role of school leadership, instructional quality and strategic planning in promoting academic achievement (Day *et al.*, 2020; Hattie, 2021). Similarly, studies from Canada and Finland highlight the value of structured instructional time, formative assessment and professional learning communities (Jeynes, 2022; Sahlberg and Cobbald, 2021). These thematic priorities closely align with international benchmarks such

as the Programme for International Student Assessment (PISA) and the Teaching and Learning International Survey (TALIS), which highlight leadership efficacy, teacher collaboration and resource equity as key drivers of student outcomes (OECD, 2019, 2021).

Ethiopian secondary schools demonstrate considerable alignment with these global priorities, particularly in areas such as leadership engagement, strategic planning and instructional time management. However, implementation across schools remains uneven, reflecting systemic inconsistencies that hinder the full realization of QEPs. These findings point to a critical need for coherent, system-wide approaches that more effectively translate policy into practice, in line with internationally validated standards.

5. Conclusion

This study demonstrates that QEPs in Ethiopian secondary schools are strongly associated with improved student academic achievement. The most influential predictors include resource utilization, community engagement and support, strategic improvement planning, leadership engagement, effective use of instructional time and expanded student learning opportunities. These factors collectively explain a substantial proportion of the variance in students' academic achievement, highlighting the importance of a holistic quality enhancement strategy that optimizes resources and reinforces improvement mechanisms at both the school and classroom levels.

Although the study does not establish causality, the strength of the identified associations provides compelling evidence to inform policy and practice. The alignment of these findings with international research reinforces their relevance and highlights the importance of an integrated, context-sensitive quality enhancement approach one that supports student academic achievement in Ethiopian secondary schools and similarly structured educational contexts.

6. Recommendation

Based on the findings of this study, it is recommended that educational policymakers adopt a comprehensive quality enhancement strategy that integrates improvements in both educational inputs and school- and classroom-level processes. Strengthening the alignment between national education priorities and school-level implementation remains essential. This includes ensuring the equitable distribution and efficient utilization of key resources such as school infrastructure and instructional materials. Schools also need sustained support in conducting needs-based planning to ensure that available resources are strategically directed toward improving student learning outcomes.

Equally important is the development of strong school leadership and strategic improvement planning. Investing in leadership development programs can empower principals and department heads with the skills necessary to lead data-driven school improvement initiatives. These efforts can be further strengthened through targeted professional development for teachers, with a focus on enhancing instructional practices particularly in managing instructional time, assessing student progress and expanding access to meaningful learning opportunities. At the same time, schools are encouraged to foster safe, inclusive and supportive learning environments that promote student engagement and academic success.

Moreover, maximizing instructional time and broadening learning opportunities merit focused attention. Schools benefit from support in managing time effectively, minimizing disruptions and integrating formative assessments to track student progress. Strengthening community engagement is also vital, as collaborative partnerships with parents and local

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stakeholders can enhance accountability and mobilize additional resources. By implementing these interconnected, evidence-based strategies, educational leaders can create the conditions necessary for sustained improvements in student learning outcomes.

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7. Limitation
This study primarily used quantitative methods, which limited contextual depth and explanatory insight that qualitative approaches such as interviews or focus groups might have provided. To enhance interpretation of achievement trends and capture richer contextual nuances, future research may benefit from adopting mixed-methods and longitudinal designs. In addition, the data collection instruments were developed within the Ethiopian educational context, which may affect the generalizability of the findings to other educational settings.

The investigation focused on selected QEPs within the domains of educational inputs, and processes at both the school and classroom levels. However, other relevant dimensions within these categories may not have been captured, underscoring the need for a more comprehensive and inclusive framework in future research.

To ensure institutional comparability, the study concentrated exclusively on government secondary schools in zonal woredas. While this design helped minimize socioeconomic variation, the absence of student- and school-level socioeconomic status (SES) data as control variables remains a limitation. Residual SES differences may still influence patterns of student achievement. Future studies should incorporate SES indicators to better disentangle the relationship between QEPs and educational outcomes.

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Data availability
The primary quantitative datasets, along with any secondary data used and analyzed in this study, are available from the corresponding author upon reasonable request.

Authors' Contributions
Debeli Belina: conceptualization, validation, visualization, investigation and writing (original draft). Abeya Geleta Geda, Desalegn Beyene Debelo and Mebratu Tafesse Teferi: validation, visualization, supervision and manuscript review.

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