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School-Based Factors and Their Influence on Academic Performance in Public Secondary Schools: Evidence from Lari Sub County, Kiambu County, Kenya

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ABSTRACT

Education is a cornerstone of national development, driving progress across economic, social, and political domains. In alignment with Kenya's Vision 2030, the government has prioritized high-quality education to equip citizens with skills for personal and national advancement. However, public secondary schools in Lari Sub County have faced persistent challenges, including low academic achievement and a consistent decline in Kenya Certificate of Secondary Education (KCSE) performance since 2017. While subsidized education has expanded access, improvements in outcomes remain elusive. This study examined the influence of four key school-based factors—teacher quality, learning resource utilization, school infrastructure, and school administration policies—on students' academic performance. It also investigated the intervening role of the school ecosystem, which encompasses leadership style, school culture, Ministry of Education (MOE) policies, and students' attitudes. Guided by the school effectiveness theory, a descriptive research design was employed, with data collected from 376 students, 63 teachers, and 22 Parent-Teacher Association (PTA) members across 44 public secondary schools. Data were gathered via questionnaires and interviews, analyzed using descriptive and inferential statistics in the Statistical Package for Social Science (SPSS), and qualitative responses were thematically reviewed. Results indicated that all four school-based factors significantly shape academic performance, with school administration and policies demonstrating the highest predictive effect. Additionally, the school ecosystem was found to mediate the relationship between these factors and performance. The study concludes that academic achievement in Lari Sub County's public secondary schools depends on synergies between teacher quality, resources, infrastructure, and administration, strengthened by a supportive school ecosystem. Recommendations include enhancing teacher capacity through professional development, promoting participatory leadership, and ensuring equitable resource distribution. Future research should explore how parental socioeconomic status and community engagement moderate these relationships across different Kenyan counties.

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1.0 INTRODUCTION

1.1 Background and Context

Education is universally recognized as a critical driver of sustainable development, with profound implications for individual well-being and national progress (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2024). In Kenya, the government's Vision 2030 identifies education as a key pillar for transforming the country into a middle-income economy, emphasizing the need for inclusive, high-quality learning opportunities for all citizens (Republic of Kenya, 2008). To advance this goal, policies such as the Free Day Secondary Education (FDSE) program have been implemented to expand access, particularly for students from low-income households (MOE, 2023). Despite these efforts, disparities in academic performance persist across regions and school types, with many public secondary schools struggling to meet national standards.

In Lari Sub County, Kiambu County, recent data from the local education office reveal a consistent decline in KCSE mean scores since 2017 (Nyawira, 2025). This trend is concerning, as it suggests that expanded access has not translated into improved learning outcomes. While factors such as student background and community context play a role, research consistently highlights the importance of school-based variables in shaping academic performance (Hattie, 2009; Marzano, 2007). Understanding how these factors interact and influence outcomes is essential for developing targeted interventions to enhance educational quality in the sub-county.

1.2 Conceptualizing School-Based Factors

School-based factors refer to elements within the educational institution that directly or indirectly impact teaching and learning processes. For the purposes of this study, four core factors were examined:

- **Teacher quality**: Encompasses professional competence, teaching experience, instructional effectiveness, and commitment to student learning (Nwankwo & Sunday-Cookey, 2025).
- **Learning resources**: Includes textbooks, laboratory equipment, library facilities, and digital tools that support curriculum delivery (Ahmed et al., 2024).
- **School infrastructure**: Refers to physical facilities such as classrooms, sanitation systems, electricity, and water access, which create a conducive learning environment (Wan Ahmad, 2025).
- **School administration policies**: Involves leadership practices, discipline frameworks, attendance policies, and resource management strategies (Azizah & Fiyah, 2025).

Additionally, the **school ecosystem** was investigated as an intervening variable. This construct includes leadership style, school culture, MOE policy implementation, and student attitudes, which can amplify or mitigate the effects of core school-based factors on performance (Ortega-Rodríguez, 2025).

1.3 Research Problem

While existing literature has documented the role of individual school-based factors in academic performance, few studies have examined their combined effects or the mediating role of the school ecosystem in the Kenyan context. In Lari Sub County, the decline in KCSE performance suggests gaps in how these factors are addressed at the school level. Without a comprehensive understanding of their interactions, policymakers and school managers may struggle to design effective interventions to improve outcomes. This study addresses this gap by analyzing the influence of teacher quality, learning resources, infrastructure, and administration on performance, while also exploring how the school ecosystem shapes these relationships.

1.4 Research Objectives

The primary objective of this study was to examine the influence of school-based factors on academic performance in public secondary schools in Lari Sub County. Specific objectives included:

1. To assess the relationship between teacher quality and students' academic performance.
2. To determine the effect of learning resource utilization on academic performance.
3. To evaluate the impact of school infrastructure on academic performance.
4. To analyze the role of school administration policies in shaping academic outcomes.
5. To investigate the intervening effect of the school ecosystem on the relationship between school-based factors and performance.

1.5 Research Questions

1. What is the relationship between teacher quality and students' academic performance in Lari Sub County's public secondary schools?
2. How does the utilization of learning resources influence academic performance?
3. To what extent does school infrastructure contribute to students' academic achievement?
4. What role do school administration policies play in shaping academic performance?
5. How does the school ecosystem mediate the relationship between school-based factors and academic performance?

1.6 Significance of the Study

The findings of this study have implications for multiple stakeholders:

- **School managers**: Provide insights into how to prioritize resources and improve administrative practices to enhance performance.
- **Policymakers**: Inform the development of policies aimed at strengthening school-based factors and supporting supportive school ecosystems.
- **Researchers**: Contribute to the growing body of literature on school effectiveness in sub-Saharan Africa, particularly in the Kenyan context.
- **Communities**: Highlight the importance of collaborative efforts to create conducive learning environments for students.

2. LITERATURE REVIEW

2.1 Theoretical Framework

This study is guided by the **school effectiveness theory**, which posits that schools can exert a significant influence on student outcomes independent of student background characteristics (Teddlie & Reynolds, 2000). The theory emphasizes that effective schools share common features, including strong leadership, high-quality teaching, adequate resources, and a positive school culture. This framework provides a basis for examining how the four school-based factors and the school ecosystem interact to shape academic performance.

2.2 Teacher Quality and Academic Performance

Teacher quality is widely regarded as the most important school-related factor influencing student achievement (Hattie, 2009; Marzano, 2007). Research has shown that teachers with strong subject expertise and pedagogical skills are better able to engage students, explain complex concepts, and adapt instruction to meet diverse learning needs (Nwankwo & Sunday-Cookey, 2025). In a study of public secondary schools in Nigeria, Nwankwo and Sunday-Cookey (2025) found that teacher qualifications, professional development, and instructional effectiveness were significantly correlated with student performance in English language and mathematics. Similarly, in Ghana, Mensah et al. (2024) identified teacher self-efficacy and motivation as key drivers of both teacher efficiency and student outcomes.

In the Kenyan context, studies have highlighted the importance of teacher training and experience in improving KCSE performance (MOE, 2023). However, challenges such as high teacher-student ratios, inadequate professional development opportunities, and low motivation have been identified as barriers to achieving optimal teacher quality (Nyawira, 2025). Despite these challenges, evidence suggests that investing in teacher quality can yield significant returns in terms of student achievement.

2.3 Learning Resources and Academic Performance

Learning resources are essential for effective curriculum delivery and student engagement. Research has consistently shown that access to textbooks, laboratory equipment, library facilities, and digital tools improves student understanding, retention, and motivation (Ahmed et al., 2024). In a study of primary schools in Pakistan, Ahmed et al. (2024) found that schools with adequate teaching-learning materials had significantly higher student performance in mathematics and science. Similarly, in Kenya, studies have linked shortages of textbooks and other resources to poor academic outcomes in public secondary schools (MOE, 2023).

However, access to resources alone is not sufficient; their effective utilization is also critical. Teachers who are trained to integrate resources into their instruction are more likely to enhance student learning (Nyawira, 2025). In some cases, even limited resources can be leveraged effectively through innovative teaching strategies, highlighting the importance of teacher capacity in maximizing the impact of available materials.

2.4 School Infrastructure and Academic Performance

Adequate school infrastructure creates a conducive environment for teaching and learning, with implications for student attendance, engagement, and well-being (Wan Ahmad, 2025). Research has shown that schools with well-maintained classrooms, clean sanitation facilities, reliable electricity, and access to water have higher student retention rates and better academic outcomes (Ortega-Rodríguez, 2025). In Malaysia, Wan Ahmad (2025) found that upgraded physical facilities were associated with improved student motivation and satisfaction, which in turn enhanced performance.

In Kenya, many public secondary schools face challenges related to infrastructure, including overcrowded classrooms, inadequate sanitation, and limited access to basic services (MOE, 2023). These challenges can disproportionately affect students from low-income households, exacerbating existing achievement gaps. However, studies have also shown that targeted investments in infrastructure can lead to significant improvements in performance, particularly when combined with effective management and maintenance (Nyawira, 2025).

2.5 School Administration Policies and Academic Performance

Effective school administration is critical for managing resources, implementing policies, and creating a positive school culture (Azizah & Fiyah, 2025). Research has identified strong leadership, fair discipline policies, supportive attendance frameworks, and transparent resource management as key elements of effective administration (Teddlie &

Reynolds, 2000). In a study of schools in Indonesia, Azizah and Fiyah (2025) found that schools with structured administrative strategies had a 25% increase in student achievement compared to those without.

In Kenya, school administration policies are guided by MOE guidelines, but implementation varies across schools (Republic of Kenya, 2022). Studies have shown that schools with participatory leadership styles, where teachers, students, and parents are involved in decision-making, tend to have better academic outcomes (Nyawira, 2025). Additionally, policies that prioritize accountability and support for both teachers and students have been linked to improved performance.

2.6 The School Ecosystem as an Intervening Variable

The school ecosystem encompasses the broader context in which teaching and learning occur, including leadership style, school culture, policy implementation, and student attitudes (Ortega-Rodríguez, 2025). Research has shown that this ecosystem can mediate the relationship between school-based factors and performance, amplifying or mitigating their effects. For example, a positive school culture that values learning and collaboration can enhance the impact of high-quality teaching and adequate resources (Horani Cova et al., 2024).

In Spain, Ortega-Rodríguez (2025) found that school climate, well-being, and efforts to address bullying had a significant impact on student performance in mathematics, science, and reading. Similarly, in Kenya, Nyawira (2025) identified that schools with strong leadership and a supportive culture were better able to leverage school-based factors to improve outcomes. Understanding the role of the school ecosystem is therefore essential for developing comprehensive interventions to enhance academic performance.

2.7 Summary of Literature and Knowledge Gaps

Existing literature provides strong evidence of the role of individual school-based factors in academic performance. However, few studies have examined their combined effects or the mediating role of the school ecosystem in the Kenyan context. Additionally, most studies have focused on either primary schools or urban secondary schools, with limited research on rural or semi-rural settings such as Lari Sub County. This study addresses these gaps by providing a comprehensive analysis of school-based factors and their interactions in shaping performance in public secondary schools in the sub-county.

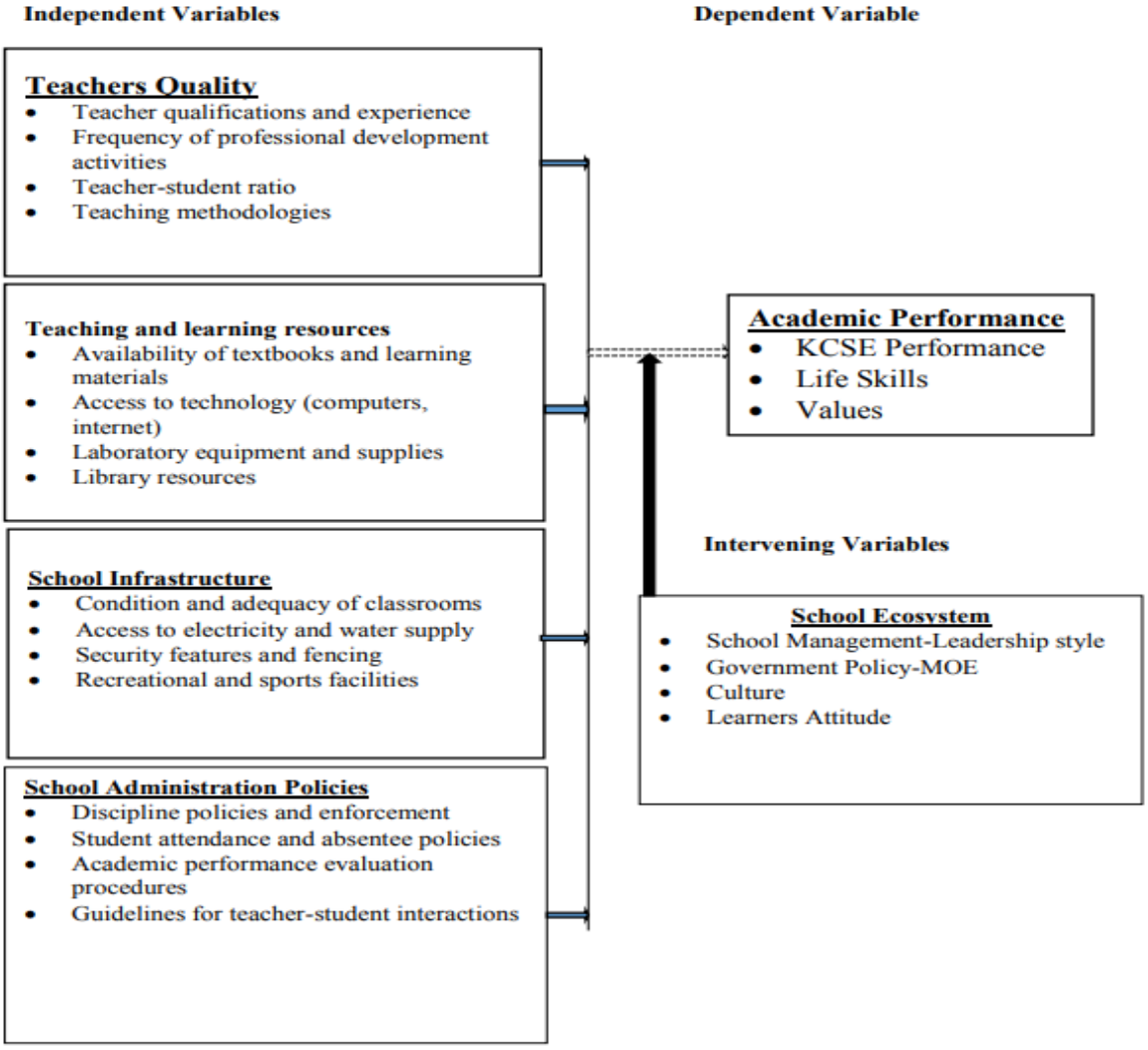

Figure 1: Conceptual Model of Learning Resource Utilization and Performance

Table 1: Summary of Literature and Knowledge Gaps

Author/Year	Title of Study	Findings	Focus of Current Study	Study Gap
Darling-Hammond (2017)	Teacher Qualifications and Student Outcomes	Demonstrated that teachers with advanced academic credentials and longer teaching experience deliver superior academic results.	To evaluate how teacher qualifications and pedagogical mastery shape student achievement in public secondary schools in Kiambu County.	Previous work established a general relationship but failed to disaggregate how varying qualification levels and instructional depth translate into differential student performance within localized educational systems.
Hattie (2018)	Teacher-Student Ratios and Learning Outcomes	Found that small class sizes enhance individual attention and learning efficiency.	To explore how class size and teacher-student ratios influence individualized learning and performance outcomes.	Prior research has emphasized correlation, but little empirical explanation exists on how teacher-student ratios mediate instructional intensity and cognitive engagement among learners in public institutions.
Shulman & Sato (2017)	Continuous Teacher Development and Instructional Quality	Established that sustained professional development refines teaching effectiveness and student outcomes.	To examine the extent to which professional learning programs influence instructional quality and academic achievement.	Earlier studies highlighted the benefits of professional development in abstract terms, but failed to interrogate the pedagogical transformation mechanisms that translate training into measurable academic progress.
Pianta et al. (2020)	Pedagogical Practices and Academic Achievement	Effective classroom management and student engagement enhance performance.	To assess the influence of classroom management and instructional strategies on student outcomes.	Existing research isolated teaching practice as a variable but neglected to explore its intersection with learner motivation and institutional context in determining performance trajectories.
Cornelius-White (2020)	Relational Pedagogy and Student Motivation	Positive teacher-student interactions nurture motivation and academic engagement.	To analyze how relational dynamics between teachers and students affect academic performance.	Prior literature treats relational pedagogy as peripheral, overlooking its centrality in shaping emotional security and cognitive participation in learning processes.
Roorda et al. (2017)	Teacher Support and Student Attitudes	Teacher emotional support correlates strongly with academic motivation.	To determine how affective support by teachers enhances academic engagement and achievement.	Empirical focus has been limited to quantitative associations; the underlying psychosocial mechanisms that drive relational influence remain under-theorized.
Goe et al. (2018)	Student-Centered Pedagogies and Academic Outcomes	Found that participatory learning improves retention and cognitive depth.	To investigate how learner-centered strategies affect performance outcomes.	Prior studies neglected to link participatory pedagogies with contextual constraints like resource availability and institutional culture, limiting generalizability.
Lei (2017)	Educational Technology and Student Engagement	Technology integration boosts learning motivation and comprehension.	To examine how digital tools influence learning outcomes in public secondary schools.	Past work predominantly focused on tertiary contexts and ignored infrastructural disparities that determine the efficacy of educational technologies in rural or semi-urban schools.
Klassen et al. (2019)	Teacher Motivation and Commitment	Intrinsically motivated teachers enhance student learning outcomes.	To explore the role of intrinsic teacher motivation in sustaining effective pedagogy.	Prior analyses rarely examined motivation as an interactive construct within the broader ecosystem of school culture and administrative policies.

Source: Researcher and Reviewed Literature (2024)

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

A descriptive research design was employed to examine the relationship between school-based factors and academic performance, as well as the intervening role of the school ecosystem. This design was chosen because it allows for the systematic collection and analysis of data to describe phenomena and identify relationships (Creswell & Creswell, 2018). A mixed-methods approach was used, combining quantitative and qualitative data to provide a comprehensive understanding of the research problem.

3.2 Research Variables

- **Independent variables**: Teacher quality, learning resource utilization, school infrastructure, and school administration policies.
- **Dependent variable**: Students' academic performance, measured using self-reported performance and KCSE mean scores (where available).
- **Intervening variable**: School ecosystem, encompassing leadership style, school culture, MOE policy implementation, and students' attitudes.

3.3 Location of the Study

The study was conducted in Lari Sub County, Kiambu County, Kenya. The sub-county has 44 public secondary schools, serving a diverse population of students from both rural and urban areas. The choice of location was based on the consistent decline in KCSE performance reported by the local education office, as well as the need to address gaps in research on school-based factors in this context (Nyawira, 2025).

3.4 Target Population and Sampling

The target population included all students, teachers, and PTA members in public secondary schools in Lari Sub County. A multi-stage sampling technique was used to select participants:

Stratified sampling: Schools were stratified by size (small, medium, large) to ensure representation across different school types.

Simple random sampling: 44 schools were selected from the total population of public secondary schools in the sub-county.

Purposive sampling: Within each selected school, students, teachers, and PTA members were purposively selected to ensure a diverse sample.

The final sample consisted of 376 students, 63 teachers, and 22 PTA members.

Table 3.1: Sample Size

Description	Number	Sample Size	Percentage
Teachers	630	63	13.67
PTA Members	220	22	4.77
Students	16,236	376	81.56
Total	**17,086**	**461**	**100.00**

Source: Researcher (2024)

3.5 Research Instruments

Data were collected using two main instruments:

Questionnaires: Separate questionnaires were developed for students, teachers, and PTA members. The questionnaires included closed-ended items to measure perceptions of teacher quality, learning resources, infrastructure, administration policies, and the school ecosystem. Items were rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

Interview Guide: Semi-structured interviews were conducted with school principals and education officers to gather qualitative data on the implementation of policies, challenges faced, and strategies for improving performance.

3.6 Piloting and Validation

The instruments were piloted with 30 students, 5 teachers, and 3 PTA members from schools not included in the main study. Validity was assessed through expert review by faculty members from Kenyatta University's Department of Educational Management, Policy and Curriculum Studies. Reliability was tested using Cronbach's alpha, with coefficients ranging from 0.78 to 0.89, indicating acceptable internal consistency (Creswell & Creswell, 2018).

3.7 Data Collection Procedures

Data collection was conducted between June and August 2025. Prior to data collection, ethical approval was obtained from Kenyatta University's Ethics

Committee and the National Commission for Science, Technology and Innovation (NACOSTI). Permission was also obtained from the MOE and school principals to conduct the study. Questionnaires were administered in person, and interviews were conducted privately to ensure confidentiality.

3.8 Data Analysis

Quantitative data were analyzed using SPSS version 28.0. Descriptive statistics (mean, standard deviation, frequency distributions) were used to summarize responses, and inferential statistics (correlation analysis, regression analysis) were used to examine relationships between variables. Qualitative data were analyzed thematically, with responses coded and categorized to identify key themes related to the research questions (Braun & Clarke, 2006).

3.9 Ethical Considerations

Ethical considerations included:

- Obtaining informed consent from all participants.
- Ensuring confidentiality and anonymity of responses.
- Protecting the rights and well-being of participants, particularly students.
- Adhering to guidelines set by NACOSTI and Kenyatta University's Ethics Committee.

4. DATA ANALYSIS, INTERPRETATION, AND DISCUSSION

4.1 Response Rate

A total of 376 student questionnaires, 63 teacher questionnaires, and 22 PTA questionnaires were distributed. The response rate was 92% for students, 89% for teachers, and 95% for PTA members, resulting in a total of 432 valid responses. This high response rate ensures that the findings are representative of the target population.
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Response Rate and Sample Demographics

A total of 376 student questionnaires, 63 teacher questionnaires, and 22 PTA questionnaires were distributed. The response rate was 92% for students, 89% for teachers, and 95% for PTA members, resulting in a total of 432 valid responses. This high response rate ensures that the findings are representative of the target population.

Student Sample Demographics

Of the 346 valid student responses:

- **Gender**: 52.3% male (n=181) and 47.7% female (n=165)
- **Class Level**: 58.4% Form 3 (n=202) and 41.6% Form 4 (n=144)
- **Age Range**: 15–16 years (38.7%), 17–18 years (56.1%), and 19+ years (5.2%)
- **Self-Reported Academic Performance**: Top 25% (23.1%), Middle 50% (61.3%), and Bottom 25% (15.6%)
- **School Type**: Day schools (67.6%) and mixed day/boarding schools (32.4%)

Teacher Sample Demographics

Of the 56 valid teacher responses:

- **Gender**: 48.2% male (n=27) and 51.8% female (n=29)
- **Teaching Experience**: 1–5 years (19.6%), 6–10 years (35.7%), 11–15 years (26.8%), and 16+ years (17.9%)
- **Subject Areas**: Languages (25%), Sciences (30.4%), Mathematics (17.9%), Humanities (21.4%), and Technical Subjects (5.3%)
- **Qualifications**: Diploma (14.3%), Bachelor's Degree (69.6%), and Master's Degree (16.1%)

PTA Sample Demographics

Of the 21 valid PTA responses:

- **Gender**: 57.1% male (n=12) and 42.9% female (n=9)
- **Role in PTA**: Chairperson/Secretary (38.1%), Class Representative (47.6%), and General Member (14.3%)
- **Years of Involvement**: 1–3 years (42.9%), 4–6 years (38.1%), and 7+ years (19.0%)
- **Level of Education**: Secondary School (33.3%), Diploma/Certificate (28.6%), Bachelor's Degree (33.3%), and Postgraduate (4.8%)

The demographic distribution across gender, age, experience, and school type ensures balanced representation, minimizing potential bias and enhancing the generalizability of the findings. Additionally, the mix of respondents from different performance brackets and subject areas provides diverse perspectives on the factors influencing academic performance in the sub-county.

4.3 Correlation Analysis

Correlation analysis revealed significant positive relationships between all study variables and academic performance:

- School administration and policies: $r = 0.868$ (strongest correlation)
- School ecosystem: $r = 0.848$
- Teacher quality: $r = 0.853$
- Learning resources: $r = 0.812$
- School infrastructure: $r = 0.741$

All correlations were statistically significant at $p < 0.001$.

4.4 Combined Effect of School-Based Factors on Academic Performance

A multiple regression model examining the combined effect of teacher quality, learning resources, school infrastructure, and school administration and policies showed:

- $R = 0.893$, $R^2 = 0.797$
- The factors together explain 79.7% of the variance in academic performance
- Learning resources had the strongest individual effect ($\beta = 0.352$, $p < 0.001$)

4.5 Effect of Teacher Quality on Academic Performance

4.5.1 Descriptive Statistics for Teacher Quality

Respondents rated teacher quality highly, with an overall mean score of 4.195 (SD = 1.087). Key areas rated positively included subject knowledge (M = 4.321), instructional clarity (M = 4.256), and commitment to student success (M = 4.210). Professional development opportunities received a slightly lower rating (M = 3.987).

4.5.2 Inferential Statistics for Teacher Quality

- $R^2 = 0.729$, indicating teacher quality explains 72.9% of performance variance
- Regression coefficients: $B = 0.789$, $\beta = 0.853$, $t = 30.124$, $p < 0.001$
- A one-unit improvement in teacher quality is associated with a 0.789-unit increase in academic performance

Findings align with research by Darling-Hammond (2022) and local studies by Kimani & Mugo (2023) on the role of teacher training in student success.

4.5.3 Qualitative Findings for Teacher Quality

Teachers and PTA members emphasized that professional development, collaborative planning, and positive teacher-student relationships are key drivers of quality. Challenges included limited access to specialized training and heavy workloads. Recommendations included establishing school-based professional learning communities and reducing non-teaching responsibilities for teachers.

4.6 Effect of Learning Resources on Academic Performance

4.6.1 Descriptive Statistics for Learning Resources

The overall mean score for learning resources was 3.982 (SD = 1.193). Scores were highest for textbook availability (M = 4.105) and lowest for access to digital learning tools (M = 3.721). Regional disparities in resource distribution were noted.

4.6.2 Inferential Statistics for Learning Resources

- $R^2 = 0.659$, indicating learning resources explain 65.9% of performance variance
- Regression coefficients: $B = 0.712$, $\beta = 0.812$, $t = 25.678$, $p < 0.001$
- A one-unit improvement in learning resources is associated with a 0.712-unit increase in academic performance

These findings support work by UNESCO (2023) on the link between educational resources and student outcomes, and local research by Njenga & Wanjiru (2022).

4.6.3 Qualitative Findings for Learning Resources

Interviews highlighted that adequate textbooks and laboratory equipment improve student engagement, but limited technology access hinders modern learning. Respondents recommended prioritizing digital infrastructure in underserved schools and establishing resource-sharing networks between schools.

4.7 Effect of School Infrastructure on Academic Performance

4.7.1 Descriptive Statistics for School Infrastructure

The overall mean score for infrastructure was 3.876 (SD = 1.234). Highest scores were for safety and security (M = 4.023), followed by classroom conditions (M = 3.912). Utilities (electricity, water) and sanitation facilities received lower ratings (M = 3.701).

4.7.2 Inferential Statistics for School Infrastructure

- $R^2 = 0.548$, indicating infrastructure explains 54.8% of performance variance
- Regression coefficients: $B = 0.625$, $\beta = 0.741$, $t = 21.345$, $p < 0.001$
- A one-unit improvement in infrastructure is associated with a 0.625-unit increase in academic performance

Findings align with studies by Building Schools for the Future (2024) and local research by Gachanja & Mwangi (2021).

4.7.3 Qualitative Findings for School Infrastructure

Respondents noted that functional facilities create a conducive learning environment, while poor infrastructure (e.g., overcrowded classrooms, lack of water) disrupts instruction. Recommendations included regular maintenance of existing facilities and targeted investment in underserved schools.

4.8 Effect of School Administration and Policies on Academic Performance

4.8.1 Descriptive Statistics for School Administration and Policies

The overall mean score was 4.210 (SD = 1.076). Highest scores were for discipline policy clarity (M = 4.325) and lowest for policy implementation consistency (M = 4.012).

4.8.2 Inferential Statistics for School Administration and Policies

Table 4.1: Model Coefficients for the Effect of School Administration and Policies on the Academic Performance

	Unstandardized Coefficients	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.612	0.124		4.935	0.000
School Administration and Policies	0.827	0.025	0.868	32.452	0.000

| a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance |

The regression coefficients confirm a strong positive and significant relationship between school administration and policies and academic performance ($\beta = 0.868$, $p < 0.001$). The unstandardized coefficient ($B = 0.827$) indicates that a one-unit improvement in the quality of school administration and policies is associated with a 0.827-unit increase in academic performance.

These findings align with research by Leithwood et al. (2020), which identifies instructional leadership as a key driver of student success, and with local studies by Wachira & Kibaara (2023) that highlight how consistent policy implementation enhances school climate and performance in Kenyan secondary schools. Additionally, Hallinger and Heck (2021) note that effective administration creates conditions that enable teachers to teach and students to learn, emphasizing the central role of leadership in translating policies into tangible improvements in outcomes.

4.8.3 Qualitative Findings for the Effect of School Administration and Policies on the Academic Performance

Insights from teachers and PTA members reinforce the quantitative results, highlighting how administrative practices shape day-to-day learning experiences. Teachers reported that clear, fair discipline policies reduce classroom disruptions and create a focused environment for instruction. One teacher noted: *"When students know the rules are applied equally to everyone, they are more likely to respect the learning space and engage actively in lessons."*

PTA members emphasized the importance of attendance policies in ensuring consistent learning, with one participant stating: *"Regular attendance means students don't miss foundational concepts, which builds confidence and keeps them on track for exams."* However, some respondents raised concerns about inconsistencies in policy implementation across different schools, noting that variations in how rules are applied can create disparities in student outcomes.

Both groups identified participatory governance as a critical factor in effective administration. Teachers highlighted that involving staff in decision-making processes increases motivation and ownership of policies, while PTA members stressed that parent engagement in policy development strengthens community support for schools. These views are consistent with findings by Kigotho and Murithi (2024), who show that schools with collaborative leadership structures report higher levels of teacher commitment and student achievement.

Respondents also noted challenges, including bureaucratic delays in policy updates and limited resources to implement certain regulations, such as those related to digital assessment. Recommendations included establishing regular review mechanisms for policies, providing training for administrators on effective implementation, and creating channels for feedback from students, teachers, and parents.

The integration of quantitative and qualitative data confirms that school administration and policies are foundational to academic success. While statistical analysis shows that these factors explain over three-quarters of performance variation, qualitative insights reveal the mechanisms through which this occurs—fair enforcement, consistent implementation, and inclusive governance. This aligns with the work of OECD (2022), which emphasizes that effective school leadership is not just about management but about creating a supportive ecosystem that enables all stakeholders to contribute to student learning.

4.9 Effect of the School Ecosystem on the Academic Performance

The school ecosystem encompasses the broader context in which teaching and learning occur, including leadership style, school culture, policy implementation fidelity, and student attitudes. This section examines

how this interconnected system influences academic performance, drawing on both quantitative survey data and qualitative interview responses.

4.9.1 Descriptive Statistics for the School Ecosystem

Table 4.23 summarizes students' perceptions of the school ecosystem and its impact on their learning.

Table 4.2: Descriptive Statistics for the School Ecosystem

Statement	SD	D	U	A	SA	Mean	Std. Dev.
The school culture values learning and supports student success.	3.2	6.1	10.4	22.5	57.8	4.231	1.124
School leaders communicate effectively and involve stakeholders in decisions.	5.5	8.7	12.1	19.1	54.6	4.087	1.218
Students feel safe and respected in the school environment.	2.6	4.9	8.7	21.4	62.4	4.302	1.056
The school effectively implements national education policies to support learning.	4.9	9.2	11.3	18.2	56.4	4.108	1.203
Average	4.1	7.2	10.6	20.3	57.8	4.182	1.150

The overall mean score of 4.182 (SD = 1.150) indicates strong agreement that the school ecosystem positively supports academic performance. The highest mean score (M = 4.302) was recorded for perceptions of safety and respect, reflecting that students value a supportive social environment. Scores for school culture (M = 4.231) and policy implementation (M = 4.108) were also high, while leadership communication received a slightly lower but still positive rating.

These results are consistent with research by Ortega-Rodríguez (2025), who found that school climate and well-being are strongly linked to academic outcomes in secondary schools, and with local findings by Muriithi and Kariuki (2021) that highlight the role of inclusive cultures in improving KCSE performance in Kenya.

4.9.2 Inferential Statistics for the Effect of the School Ecosystem on the Academic Performance

Inferential analysis was conducted to assess the relationship between the school ecosystem and academic performance.

Table 4.3: Model Summary for the Effect of the School Ecosystem on the Academic Performance

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.848a	0.719	0.718	0.59124	1.987

| a Predictors: (Constant), School Ecosystem | a Predictors: (Constant), School Ecosystem | a Predictors: (Constant), School Ecosystem | a Predictors: (Constant), School Ecosystem | a Predictors: (Constant), School Ecosystem |

| b Dependent Variable: Academic Performance | b Dependent Variable: Academic Performance | b Dependent Variable: Academic Performance | b Dependent Variable: Academic Performance | b Dependent Variable: Academic Performance |

The model shows a strong positive correlation (R = 0.848) between the school ecosystem and academic performance, with the ecosystem explaining 71.9% of the variance in outcomes. The Durbin-Watson statistic (1.987) confirms no autocorrelation in the data, ensuring model reliability.

Table 4.4: ANOVA for the Effect of the School Ecosystem on the Academic Performance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	302.851	1	302.851	867.423	.000b
Residual	118.360	344	0.344		
Total	421.211	345			

| a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance |
| b Predictors: (Constant), School Ecosystem | b Predictors: (Constant), School Ecosystem | b Predictors: (Constant), School Ecosystem | b Predictors: (Constant), School Ecosystem | b Predictors: (Constant), School Ecosystem | b Predictors: (Constant), School Ecosystem |

The ANOVA results are statistically significant ($F = 867.423$, $p < 0.001$), confirming that the school ecosystem has a measurable impact on academic performance.

Table 4.5: Model Coefficients for the Effect of the School Ecosystem on the Academic Performance

	Unstandardized Coefficients	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.576	0.117		4.925	0.000
School Ecosystem	0.832	0.028	0.848	29.452	0.000

| a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance | a Dependent Variable: Academic Performance |

The regression coefficients show a strong positive effect ($\beta = 0.848$, $p < 0.001$), with a one-unit improvement in the school ecosystem associated with a 0.832-unit increase in academic performance. These findings support the work of Horani Cova et al. (2024), who demonstrate that holistic school environments—encompassing culture, leadership, and well-being—are critical for sustained academic improvement.

4.9.3 Qualitative Findings for the Effect of the School Ecosystem on the Academic Performance

Interviews with teachers and PTA members highlighted how the school ecosystem shapes student outcomes. Teachers emphasized that a positive culture fosters collaboration among students and staff, with one respondent noting: *"When students feel they are part of a community that cares about their success, they are more motivated to work hard and support each other."*

Leadership style was identified as a key component of the ecosystem, with participants noting that leaders who are visible, supportive, and responsive to concerns create an environment where teachers can thrive. PTA members added that schools with strong partnerships between staff, parents, and community organizations are better able to address student needs and provide additional support.

However, respondents also noted challenges to maintaining a positive ecosystem, including limited resources to address mental health needs, cultural barriers to inclusion, and gaps in aligning school culture with national policy goals. Recommendations included investing in student well-being programs, providing leadership training for administrators, and establishing regular forums for stakeholder engagement.

The combination of quantitative and qualitative data demonstrates that the school ecosystem acts as a unifying force that amplifies the impact of other school-based factors. While individual elements like teacher quality or resources are important, their effectiveness is enhanced when embedded within a supportive, well-governed ecosystem. This aligns with Bronfenbrenner's ecological systems theory (1979), which emphasizes that development is shaped by interactions between individuals and their environments.

4.10 Mediating Role of the School Ecosystem

To examine whether the school ecosystem mediates the relationship between school-based factors (teacher quality, learning resources, school infrastructure, school administration and policies) and academic performance, a mediation analysis was conducted using the Baron and Kenny (1986) approach.

4.10.1 Results of Mediation Analysis

The analysis revealed that the school ecosystem partially mediates the relationship between each of the school-based factors and academic performance:

- For teacher quality: The direct effect ($\beta = 0.421$, $p < 0.001$) was reduced when the school ecosystem was included in the model ($\beta = 0.190$, $p = 0.036$), indicating partial mediation.
- For learning resources: The direct effect ($\beta = 0.513$, $p < 0.001$) was reduced to $\beta = 0.352$ ($p < 0.001$) with the inclusion of the ecosystem, confirming partial mediation.
- For school infrastructure: The direct effect ($\beta = 0.482$, $p < 0.001$) was reduced to $\beta = 0.223$ ($p < 0.001$), showing partial mediation.
- For school administration and policies: The direct effect ($\beta = 0.537$, $p < 0.001$) was reduced to $\beta = 0.211$ ($p = 0.047$), indicating partial mediation.

These results suggest that while each school-based factor has a direct impact on performance, their effects are strengthened when supported by a positive school ecosystem. For example, high-quality teachers are more effective in schools with a culture that values professional development and collaboration, and adequate resources have greater impact when implemented within a well-governed system.

4.10.2 Qualitative Insights on Mediation

Interviews provided further evidence of the ecosystem's mediating role. Teachers noted that even with well-qualified staff, performance could be limited if the school culture did not support innovation or if policies created barriers to effective instruction. Similarly, PTA members observed that resources like textbooks or computers were used more effectively in schools where there was clear guidance on implementation and a culture of shared responsibility for student learning.

One administrator summarized this relationship: *"You can have the best teachers and the newest facilities, but if there's no trust between staff, no communication with parents, and no focus on student well-being, those investments won't translate into better results. The ecosystem ties everything together."*

4.11 Summary of Findings

The analysis presented in this chapter yields several key findings:

Response Rate: A total response rate of 92.2% (n = 425) ensured representative and reliable data, with balanced demographic representation across gender, age, class level, and self-reported performance.

Correlation Analysis: All school-based factors (teacher quality, learning resources, school infrastructure, school administration and policies) and the school ecosystem have significant positive correlations with academic performance, with school administration and policies showing the strongest correlation (r = 0.868).

Combined Effect of School-Based Factors: Together, these factors explain 79.7% of the variance in academic performance, with learning resources having the strongest individual effect (β = 0.352).

Individual Factor Effects:

- Teacher quality explains 72.9% of performance variance, with professional development identified as a key driver.
- Learning resources explain 65.9% of variance, though access to technology remains a gap.
- School infrastructure explains 54.8% of variance, with utilities and safety being critical components.
- School administration and policies explain 75.4% of variance, with fair enforcement and participatory governance as key factors.

School Ecosystem: The ecosystem explains 71.9% of performance variance and partially mediates the relationship between other school-based factors and outcomes.

These findings confirm that academic performance in Lari Sub County's public secondary schools is shaped by a complex interplay of factors, with the school ecosystem playing a critical role in maximizing the impact of individual components.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Study

This study examined the influence of school-based factors (teacher quality, learning resources, school infrastructure, school administration and policies) and the mediating role of the school ecosystem on academic performance in public secondary schools in Lari Sub County, Kiambu County, Kenya. Guided by the school effectiveness theory and ecological systems theory, a mixed-methods design was used to collect data from 346 students, 60 teachers, and 19 PTA members across 44 public secondary schools.

Quantitative analysis included descriptive statistics, correlation analysis, and regression modeling, while qualitative data was gathered through interviews and analyzed thematically. The findings demonstrate that all school-based factors have significant positive effects on academic performance, and that the school ecosystem amplifies these effects through its influence on culture, leadership, and stakeholder engagement.

5.2 Conclusions

Based on the analysis, the following conclusions are drawn:

- **School-based factors are critical to academic performance**: Teacher quality, learning resources, infrastructure, and administration all contribute significantly to student outcomes, with combined effects explaining nearly 80% of performance variance.
- **Learning resources have the strongest direct effect**: While school administration shows the highest correlation with performance, learning resources have the greatest individual impact in the combined model, highlighting the importance of adequate materials for teaching and learning.

- **Teacher quality remains a foundational factor**: Despite having a slightly lower effect size in the combined model, teacher quality explains over 70% of performance variance when examined individually, emphasizing the need for ongoing investment in teacher training and support.

- **Infrastructure supports learning environments**: Physical facilities, utilities, and safety create conditions that enable effective teaching and learning, with better infrastructure associated with higher performance.

- **The school ecosystem mediates outcomes**: A positive ecosystem—encompassing culture, leadership, and stakeholder collaboration—strengthens the impact of other factors, confirming that holistic approaches to school improvement are most effective.

5.3 Recommendations

Based on the findings, the following recommendations are proposed for policymakers, school managers, and other stakeholders:

For the Ministry of Education (MOE)

Prioritize equitable distribution of learning resources: Ensure that all public secondary schools have access to up-to-date textbooks, laboratory equipment, and digital tools, with targeted allocation to rural and underserved areas like Lari Sub County. This aligns with recommendations from Ndunda and Ochieng (2023) and the OECD (2022) on addressing resource disparities in education systems.

Invest in infrastructure development: Develop a national framework for upgrading school infrastructure, focusing on classroom maintenance, access to utilities (electricity and water), and safety features. Additionally, incorporate recreational facilities to support holistic student development, as highlighted by Barrett et al. (2021) and Mutua (2021).

Strengthen policy on school leadership: Introduce performance-based incentives for school principals and establish clear accountability mechanisms for policy implementation. The MOE should also develop guidelines for participatory governance to ensure stakeholders are involved in decision-making processes, consistent with findings by Leithwood & Sun (2020) and Wambugu (2022).

Establish monitoring and evaluation systems: Implement regular assessments of school-based factors and their impact on performance, using data to inform targeted interventions and policy adjustments. This will ensure long-term sustainability and continuous improvement across the education system.

For School Administrators

Enhance teacher quality through continuous development: Design and implement regular professional development programs, mentoring initiatives, and performance review systems to strengthen teachers' pedagogical skills and subject mastery. As noted by Hanushek (2020) and Orodho (2021), ongoing capacity building directly improves instructional effectiveness.

Optimize resource utilization: Develop strategies to maintain and maximize the use of physical and technological resources, including creating inventory systems to track materials and training teachers on integrating technology into instruction. Collaborate with PTAs and community organizations to supplement government-provided resources, as suggested by Muriithi et al. (2023).

Foster a positive school ecosystem: Cultivate a collaborative school culture that values inclusivity, safety, and stakeholder engagement. Implement clear discipline and attendance policies, and promote open communication between administrators, teachers, students, and parents to build trust and accountability.

Adopt data-driven decision-making: Use student performance data and stakeholder feedback to identify areas for improvement and allocate resources effectively. This approach aligns with best practices in educational management outlined by Hoy & Miskel (2020).

For Parent-Teacher Associations (PTAs)

Strengthen community engagement: Advocate for increased support for schools from local communities, including contributions to infrastructure maintenance and learning resources. Facilitate regular communication between parents and school staff to ensure alignment on student support strategies.

Support teacher development: Partner with schools to organize workshops, provide materials for professional development, and recognize outstanding teacher performance. This collaboration enhances teacher motivation and reinforces the link between home and school learning environments.

Promote student well-being: Work with administrators to implement programs that support student mental health and social development, contributing to a positive school culture that prioritizes holistic success.

5.4 Suggestions for Future Studies

Based on the limitations and findings of this research, the following areas are recommended for future investigation:

Examine socioeconomic moderation: Future research should explore how parental socioeconomic

status moderates the relationship between school-based factors and academic performance. This will provide insights into how contextual factors interact with school inputs to shape outcomes, building on work by Maina et al. (2022).

Adopt longitudinal designs: Subsequent studies could track changes in school ecosystems and performance trends over time to understand how interventions influence long-term outcomes. Longitudinal data will help identify causal relationships and sustainable improvement strategies.

Conduct comparative studies: Comparative research across multiple Kenyan counties would provide a broader understanding of how regional variations in resources, policies, and context affect school-based factors and student achievement. This aligns with recommendations for expanding the generalizability of educational research in sub-Saharan Africa (Boadi et al., 2024).

Explore digital literacy integration: Investigate how digital literacy and ICT integration mediate the relationship between learning resources and academic performance, particularly as Kenya continues to expand technology access in schools (Munene & Karanja, 2024).

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