Impacts of Teaching and Learning Resources on Students' Academic Achievements in Different Subjects in Public Secondary Schools in Nairobi County, Kenya

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ABSTRACT

Education plays a central role in national development, with teaching and learning resources forming the core inputs that shape students' academic outcomes. Despite students entering secondary schools in Nairobi County with strong Kenya Certificate of Primary Education (KCPE) performance, some continue to record declining achievement in the Kenya Certificate of Secondary Education (KCSE). This study examined the influence of material resources, physical facilities, and human resources on students' academic achievements in public secondary schools in Nairobi County. A descriptive survey design was employed, targeting a principal, teachers, and students from a selected public secondary school. Data were collected using questionnaires and document analysis, and analyzed through descriptive statistics. Findings revealed that while some teaching and learning materials were available, most were insufficient or overstretched due to increased enrollment linked to the 100% transition policy. Physical facilities—including laboratories, libraries, and sanitation resources—were inadequate and in poor condition. Human resource shortages further contributed to high teacher workloads and limited curriculum coverage. The study concludes that inadequate teaching and learning resources significantly influence students' academic performance. It recommends increased government funding, improved teacher staffing, investment in physical facilities, and greater adoption of professional development programs to enhance instructional quality. Strengthening monitoring and evaluation mechanisms is also essential to ensure effective and accountable utilization of educational resources.

Keywords: Teaching and Learning Resources, Human Resources, Physical Facilities, Academic Achievement, KCSE Performance, Nairobi County, Subjects, Secondary Education.

INTRODUCTION

Background to the Study

Education is widely recognized as a critical pillar of national development, with both human and material resources forming the essential inputs that determine the quality and outcomes of learning. According to Coombs (1970), educational systems operate through inputs such as teachers, facilities and instructional materials and outputs, including student performance and skill acquisition. In Kenya, persistent concerns about declining performance in the Kenya Certificate of Secondary Education (KCSE) examinations continue to shape discussions on educational quality, particularly within public secondary schools.

Despite students entering secondary school with strong KCPE results, some learners in Nairobi County experience a drop in academic performance as they advance through the secondary levels. This situation has prompted concerns regarding the sufficiency, accessibility, and effective use of teaching and learning resources. The implementation of the government's 100% transition policy has further strained existing resources, leading to overcrowded classrooms and overstretched school facilities. This prompted my study in effort to resolve this.

Teaching and learning resources including textbooks, laboratories, libraries, qualified teachers and instructional materials play an essential role in facilitating effective learning. As noted by Maicibi (2003), every institution relies on both human and non-human resources to function effectively. When these resources are insufficient or poorly utilized, students' academic performance is likely to be negatively affected. The need to understand how various categories of resources influence performance has therefore become increasingly urgent in the Kenyan context.

Teaching and learning resources are essential factors in students' academic success. Providing sufficient material supplies, qualified staff, and suitable physical facilities is vital for maintaining high academic standards. Policymakers, school administrators, and educators need to work together to create a well-equipped learning environment that enables all students to reach their full potential.

Purpose of the Study

The purpose of this study was to examine the impacts of teaching and learning resources on students' academic achievements in different subjects in public secondary schools in Nairobi County. Specifically, the study focused on three categories of resources: **Human resources** (teachers and support personnel), **Physical resources** (classrooms, laboratories, libraries, sanitation facilities) & **Material resources** (textbooks, reference materials, instructional aids).

The study aimed to understand why some students with high KCPE entry grades continue to perform poorly in secondary school examinations and to determine the extent to which resource availability contributes to this trend.

Statement of the Problem

Public secondary schools in Nairobi County admit large numbers of high-performing learners annually. However, a notable proportion of these learners experience a drop in academic achievement before completing their KCSE examination. Previous examination analyses indicate that despite entering with strong primary school performance, some students fail to attain grades that reflect their potential. This raises concerns about systemic factors within the school environment.

Research suggests that students' previous academic performance is a key predictor of future achievement (Ali, 2013). When secondary school outcomes do not align with this expected trend, there is a need to investigate the underlying causes. The pressing problem addressed in this study is the persistent decline in academic performance among some students in public secondary schools in Nairobi County despite strong entry behavior. This study therefore explored whether human resource shortages, inadequate teaching and learning materials, and insufficient physical facilities contributed to this decline.

Rationale of the Study

Understanding the link between resource availability and academic performance is essential for improving educational outcomes. Resources such as textbooks, laboratories, qualified teachers, and classroom space shape learners' engagement and academic achievement. Prior studies have shown that limited access to instructional materials and inadequate physical facilities negatively affect academic performance (Wasanga & Kyala, 2007; UNESCO, 2015). In Nairobi County, rapid increases in enrollment have further strained available resources.

This study was motivated by the need to identify gaps in resource allocation, utilization, and accessibility in public secondary schools in the county. By highlighting these gaps, the findings are expected to inform school administrators, teachers, the Ministry of Education, parents, and policymakers on strategies needed to enhance resource sufficiency and optimize academic outcomes.

Research Questions

The study was guided by the following research questions:

1. What impact do material resources have on student learning and academic achievement in public secondary schools in Nairobi County?

2. What is the influence of human resources on students' academic achievement across different subjects?
3. What are students' perceptions regarding the availability and use of school physical facilities and how do these facilities influence academic performance?

Significance of the Study

The findings of this study will benefit multiple educational stakeholders:

- School administrators will gain insights into resource gaps and their impact on academic performance, enabling informed planning and budgeting.
- Teachers will better understand how resource adequacy affects instructional delivery and learner outcomes.
- Students may become more aware of the role of resources in learning, motivating them to utilize available materials more effectively.
- Policy makers and curriculum implementers will obtain evidence that can guide policymaking—particularly in resource allocation, staffing, and infrastructural investment.
- The Ministry of Education can use the findings to evaluate funding structures, staffing norms, and infrastructural needs in public schools.

Ultimately, improving the availability and utilization of teaching and learning resources can help ensure that students with strong academic potential achieve success during their secondary schooling.

LITERATURE REVIEW

Theoretical Framework

This study was guided by **Systems Theory**, developed by Ludwig von Bertalanffy, which conceptualizes schools as interconnected systems composed of inputs, processes, and outputs. In the educational context, teaching and learning resources—including teachers, instructional materials, and school facilities—are considered critical inputs. These resources influence the learning processes that ultimately shape academic outcomes. Coombs (1970) emphasizes that for a school system to function effectively, all components must work harmoniously; deficiencies in one component negatively affect overall performance.

The theory is relevant to this study because public secondary schools in Kenya operate as systems in which resource availability directly impacts the quality of teaching and learning. When resources such as textbooks or qualified teachers are inadequate, the instructional process is disrupted, potentially resulting in poor academic achievement. Therefore, Systems Theory provides a useful lens through which to examine how various resource categories influence performance among students in Nairobi County.

Human Resources and Student Academic Achievement

Human resources—primarily teachers—form the backbone of the learning process. According to Ayeni (2011), teacher competence, workload and professional development significantly affect instructional quality and learner outcomes. Adequate teacher staffing ensures manageable workloads, allowing teachers to offer individualized support, effective assessment, and timely feedback. Conversely, teacher shortages often lead to overcrowded classrooms, limited lesson preparation, and rushed curriculum coverage (UNESCO, 2015).

Empirical studies support this link. Musasia et al., (2012) found that inadequate teacher numbers in Kenyan secondary schools contributed to poor performance in science subjects. Similarly, Adeyemi (2010) established a positive relationship between teacher quality and students' academic achievement. Where teachers are well-trained, motivated and supported with adequate teaching materials, students show greater academic improvement.

In the context of Nairobi County, the increasing enrolment resulting from the 100% transition policy has intensified teacher shortages, stretching workloads and limiting contact time with learners. This shortage may explain why some students, despite strong KCPE performance, fail to sustain academic excellence throughout secondary schooling.

Material Resources and Academic Achievement

Material resources such as textbooks, laboratory equipment, revision materials and instructional aids constitute essential tools in the learning process. According to World Bank (2008), access to adequate and relevant teaching and learning materials enhances student engagement, promotes independent study, and strengthens comprehension. In schools where textbooks are shared among many students, learning becomes less effective, and learners may struggle with assignments and exam preparation.

Agyeman (2010) notes that quality instructional materials improve teaching efficiency and student achievement. Similarly, Orodho (2014) reported that insufficient learning materials in Kenyan secondary schools negatively influenced students' academic performance, especially in subjects requiring specialized resources such as sciences and languages.

Given the increasing student population in Nairobi County schools, existing material resources are often overstretched. When learners lack personal textbooks or adequate laboratory supplies, their ability to engage with the curriculum is compromised. This challenge is particularly significant in practical subjects such as Chemistry, Biology and Physics, where the absence of functional lab equipment directly limits hands-on learning and examination readiness.

Physical Facilities and Academic Achievement

School physical facilities such as classrooms, laboratories, libraries, sanitation facilities, and ICT rooms play an essential role in shaping learning environments. Adequate facilities reduce congestion, promote comfort, and support effective learning. According to Lyons (2012), students perform better in well-maintained and well-equipped learning environments. Similarly, Earthman (2004) found that poor physical conditions, such as inadequate ventilation, insufficient lighting, and limited classroom space, significantly lower student achievement.

In Kenya, several studies confirm the influence of physical facilities on academic performance. Kariuki (2015) established that inadequate laboratory space and outdated equipment contributed to poor performance in science subjects. Wasanga and Kyala (2007) also noted that the absence of well-stocked libraries limits students' access to revision materials, thereby affecting their examination outcomes.

In Nairobi County, the rapid expansion of enrollment has resulted in overstretched facilities in many public secondary schools. Laboratories are often shared by large cohorts, libraries are under-stocked, and classrooms are overcrowded. These conditions hinder effective teaching and learning, especially in practical-oriented subjects.

Summary of Literature Review

The reviewed literature affirms that teaching and learning resources significantly shape students' academic performance. Human resources; particularly teacher quality and adequacy determine the effectiveness of instructional delivery. Material resources support learner engagement and independent study, while physical facilities enhance the overall learning environment. The literature also identifies resource gaps within Kenyan public secondary schools, particularly in urban centers such as Nairobi, where increased enrollment strains existing resources.

However, gaps still exist regarding the specific ways these resources influence performance across different subjects within the Nairobi County context. This study therefore contributes to the empirical understanding of how resource availability and utilization affect student achievement in public secondary schools.

METHODOLOGY

Research Design

This study adopted a **descriptive survey design** to investigate the impacts of teaching and learning resources on students' academic achievement in public secondary schools in Nairobi County. A descriptive survey is

appropriate for educational research because it allows the researcher to obtain accurate descriptions of existing conditions, opinions, and relationships among variables as they naturally occur. This design enabled the study to gather data from teachers and students regarding the availability, adequacy, and influence of instructional resources on learning outcomes.

Target Population

The target population consisted of all teachers and students in public secondary schools in Nairobi County. Public secondary schools in the county serve diverse learners and experience varying levels of resource adequacy, making them suitable for examining how different categories of teaching and learning resources affect academic performance.

Sample Size and Sampling Procedures

Various public secondary schools within Nairobi County was purposively selected for the study based on their student enrollment, diverse subject offerings, and accessibility. From these schools, respondents were selected using stratified and simple random sampling techniques.

- **Students:** Forms 1 to 4 were treated as separate strata, ensuring representation across academic levels. Students were randomly selected from each class to participate in the study.
- **Teachers:** All teachers were considered due to their direct involvement in instructional delivery. A representative sample was drawn using simple random sampling.

This sampling approach ensured inclusivity, diversity of perspectives, and reliable representation of both learners and educators within the school.

Research Instruments

Data were collected using **questionnaires**, which were administered to both teachers and students. Two types of questionnaires were developed:

1. **Teacher Questionnaire**, which sought information on:
    - Availability of teaching and learning materials
    - Adequacy of physical facilities
    - Teacher workload, staffing levels and training
    - Effects of these factors on students' academic performance
2. **Student Questionnaire**, which collected data on:
    - Access to learning materials
    - Perceptions of physical facilities
    - Teachers' use of instructional resources
    - Classroom learning experiences

The questionnaires consisted of both closed-ended and Likert-scale items to allow for quantification and ease of analysis.

Validity and Reliability

Validity

To ensure content validity, the research instruments were reviewed by experts in education, including experienced lecturers and teachers. Their feedback helped refine the clarity, relevance, and alignment of items with the research objectives and questions.

Reliability

A pilot study was conducted in a different public secondary school within Nairobi County to determine the reliability of the questionnaire items. The responses were analyzed using Cronbach's alpha, which confirmed that the instruments were reliable and suitable for the main study.

Data Collection Procedures

Permission to conduct the study was obtained from the school administration. The questionnaires were administered in person to both students and teachers during scheduled school hours. Respondents were informed about the purpose of the study and assured of confidentiality and voluntary participation. Completed questionnaires were collected immediately to maximize response rates and reduce data loss.

Data Analysis

Data were analyzed using **descriptive statistics**, including frequencies, means, and percentages. The results were presented through tables and narrative explanations to provide a clear understanding of the relationship between resource availability and students' academic achievement. The analysis focused on the three study variables: **Material Resources**, **Human Resources** & **Physical Facilities.** The findings were interpreted in relation to existing literature to determine whether patterns observed aligned with or differed from earlier studies.

Ethical Considerations

The study adhered to strict ethical guidelines. Participants were briefed on the purpose of the research and were assured of confidentiality, anonymity, and voluntary participation. No identifying information was collected, and all responses were used solely for academic purposes.

RESULTS

Availability and Adequacy of Material Resources

The study sought to establish the extent to which material resources—such as textbooks, instructional aids and laboratory equipment—were available and adequate for effective teaching and learning.

Findings showed that **most subjects did not have sufficient textbooks**, resulting in sharing ratios of up to **1:3 or 1:4** in some classes. Students reported that inadequate access to personal copies limited their ability to complete homework, revise adequately, and study independently. Teachers further noted that inadequate instructional materials restricted the use of learner-centered teaching methods, especially in science subjects where laboratory resources were insufficient.

Laboratory equipment was available but **insufficient for full class participation**, forcing teachers to conduct demonstrations instead of hands-on experiments. This reduced learners' practical skills development and negatively affected performance in subjects such as Chemistry, Biology, and Physics.

Overall, the study established that **material resources were present but inadequate**, and this inadequacy had a notable negative influence on students' academic achievement.

Influence of Human Resources on Academic Achievement

The second objective examined the role of human resources particularly teachers in shaping academic outcomes.

Teachers indicated that the school experienced a **shortage of teaching staff**, leading to high teacher–student ratios and significant workloads. Many teachers were handling multiple streams and teaching beyond their allocated subject areas. This resulted in: Limited time for lesson preparation, Inadequate student consultation time, Reduced effectiveness in remedial teaching & Slower curriculum coverage

Students also reported that some teachers were overstretched, making it difficult for them to receive individualized support. Despite these challenges, most teachers demonstrated commitment to their duties, although heavy workloads undermined their ability to deliver high-quality instruction consistently.

The findings confirm that **human resource shortages significantly hinder effective teaching**, leading to reduced learner engagement and lower academic performance.

Students' Perceptions of Physical Facilities and Their Influence on Achievement

Table1.1: Students' Response on the Presence, Condition and size of physical facilities

School Facility	Number /Availability	Good Condition	Bad Condition	Satisfied	Dissatisfied
Library	**2**	**30**	**40**	**37**	**33**
Laboratories	**3**	**35**	**35**	**25**	**45**
Classrooms	**16**	**25**	**45**	**40**	**20**
Agriculture Room	**1**	**60**	**10**	**29**	**41**
Dinning	**1**	**50**	**20**	**35**	**35**
Latrines	**7**	**40**	**30**	**28**	**42**

The study also examined students' views on the availability and adequacy of physical facilities, including classrooms, laboratories, libraries, sanitation facilities, and ICT resources.

Students reported that classrooms were **overcrowded**, especially following the introduction of the 100% transition policy. Overcrowding created discomfort, noise interference, and limited teacher mobility during lessons, all of which hindered effective learning. Laboratory facilities were available but inadequate for large class sizes, reducing opportunities for practical engagement.

The school library was functional but **under-stocked** with outdated reference materials. Limited seating capacity also made it difficult for large numbers of students to use the facility simultaneously. Sanitation facilities were stretched, resulting in long queues and reduced hygiene during peak hours.

Teachers echoed these concerns, noting that inadequate physical facilities impeded effective teaching, especially in subjects requiring specialized spaces such as Home Science, Computer Studies, and the sciences.

Overall, the findings demonstrate that **inadequate physical facilities negatively influence students' learning experiences and academic outcomes**.

Summary of Key Findings

1. **Material Resources:**
    - Available but inadequate, especially textbooks and laboratory equipment.
    - Insufficient resources limited independent study and hands-on learning.
2. **Human Resources:**
    - The school faced teacher shortages.
    - High workloads and large class sizes reduced instructional effectiveness.
3. **Physical Facilities:**
    - Overcrowded classrooms, inadequate laboratories, and limited library space.
    - Unsatisfactory sanitation and insufficient ICT facilities affected learners' comfort and academic engagement.

Together, these findings indicate that teaching and learning resources play a significant role in determining students' academic achievement in public secondary schools in Nairobi County.

DISCUSSION

This section interprets the study findings in relation to existing literature, theoretical frameworks, and the research questions. The discussion highlights how teaching and learning resources influence students' academic achievements in public secondary schools in Nairobi County.

Impact of Material Resources on Academic Achievement

The study found that **material resources were insufficient and overstretched**, particularly textbooks, reference books, and laboratory equipment. Students often shared textbooks in ratios exceeding 1:3, limiting opportunities for independent study and revision. Laboratory facilities were under-resourced, restricting hands-on practical learning.

These findings align with prior studies. Orodho (2014) reported that inadequate instructional materials in Kenyan secondary schools hindered learner engagement and reduced performance, especially in science subjects. Similarly, the World Bank (2008) emphasizes that access to adequate learning materials enhances academic outcomes by allowing students to interact actively with content, consolidate knowledge, and practice problem-solving.

The study highlights the practical implication that schools must ensure adequate distribution of textbooks and access to instructional aids to support curriculum coverage and reinforce learning.

Influence of Human Resources on Students' Academic Performance

Teacher shortages and high teacher–student ratios emerged as major constraints on academic achievement. Teachers handled multiple classes and subjects, reducing preparation time, limiting individualized instruction, and curtailing remedial interventions.

These results corroborate findings by Hanushek (1997) and Adeyemi (2010), who argue that teacher quality, adequacy, and workload significantly influence learner performance. Overcrowded classrooms and insufficient teaching staff diminish instructional effectiveness, impacting students' ability to grasp complex concepts.

In line with **Systems Theory**, which guided this study, the human resource component of the school system is critical. Deficiencies in this input create disruptions in the teaching–learning process, leading to lower academic outputs.

Influence of Physical Facilities on Academic Achievement

The study revealed that physical facilities—including classrooms, laboratories, libraries, and sanitation—were inadequate. Overcrowded classrooms and under-equipped laboratories constrained teaching strategies and practical learning. Libraries were limited in both resources and seating, restricting student access to reference materials.

These findings are consistent with Lyons (2012) and Earthman (2004), who contend that learning environments significantly impact academic performance. Well-maintained and adequately equipped facilities motivate students, enhance concentration, and foster effective teaching. Conversely, substandard facilities increase learner discomfort, reduce engagement, and hinder curriculum delivery.

The findings also support earlier studies in Kenya (Kariuki, 2015; Wasanga & Kyala, 2007), indicating that public secondary schools experiencing rapid enrollment increases often face facility shortages that negatively affect academic outcomes.

Integration of Findings with Existing Literature

Across all three categories—material resources, human resources and physical facilities—the study demonstrates a consistent pattern: **inadequate and overstretched resources compromise students' academic achievement**, despite high entry-level performance in KCPE.

The findings reinforce the theoretical premise of **Systems Theory**: when inputs are insufficient or poorly managed, the learning process suffers, resulting in suboptimal academic outcomes. The results suggest that improving resource adequacy across all categories is essential for enhancing students' performance in public secondary schools.

Implications for Policy and Practice

1. **Resource Allocation:**
    - The Ministry of Education should prioritize funding to provide sufficient textbooks, laboratory equipment, and ICT resources.
    - Schools should strategically distribute learning materials to ensure equitable access for all students.
2. **Human Resource Management:**
    - Recruitment of additional teachers is crucial to reduce workload and improve teacher–student ratios.
    - Continuous professional development programs should be implemented to enhance teacher effectiveness.
3. **Infrastructure Development:**
    - Investment in classrooms, laboratories, libraries, and sanitation facilities is necessary to accommodate increasing enrollment.
    - Schools should adopt innovative scheduling and resource management strategies to maximize utilization.

This discussion establishes a clear link between teaching and learning resources and academic performance in public secondary schools in Nairobi County. It provides actionable recommendations for policymakers, school administrators, and teachers to improve learning outcomes.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study investigated the impacts of teaching and learning resources on students' academic achievements in public secondary schools in Nairobi County, Kenya. Findings indicate that **material resources, human resources, and physical facilities** significantly influence academic outcomes.

- **Material resources** such as textbooks, reference books, and laboratory equipment were available but often inadequate, limiting student engagement and practical learning.
- **Human resources** were insufficient, leading to high teacher–student ratios, heavy workloads, and reduced individualized instruction.
- **Physical facilities**—including classrooms, laboratories, libraries, and sanitation—were inadequate and overstretched, creating an unconducive learning environment.

Collectively, these deficiencies contributed to the observed decline in students' academic performance, even among those with strong KCPE entry scores. The study confirms that effective learning is contingent upon the availability, adequacy, and proper utilization of teaching and learning resources.

In line with Systems Theory, the study demonstrates that deficiencies in inputs—human, material, or physical—disrupt the teaching–learning process, resulting in suboptimal academic outputs. Therefore, enhancing resource availability is crucial for improving student achievement in Nairobi County's public secondary schools.

Recommendations

Based on the findings, the study recommends the following measures:

1. **Government and Policy Level:**
    - The Ministry of Education should allocate additional funding to ensure sufficient teaching and learning resources across all public secondary schools.
    - Policies should address teacher recruitment and retention to improve the teacher–student ratio.
2. **School Administration:**
    - Schools should conduct regular audits of teaching and learning resources to identify gaps and prioritize procurement.
    - Strategic scheduling and use of limited resources, such as laboratories and libraries, can optimize student access and engagement.
3. **Teachers:**
    - Teachers should adopt innovative pedagogical strategies to maximize the use of available materials.
    - Participation in continuous professional development programs should be encouraged to enhance instructional effectiveness.
4. **Future Research:**
    - Further studies could explore the integration of ICT and e-learning tools to complement human resources.
    - Comparative studies across multiple public secondary schools in Nairobi County could provide broader insights into resource allocation and its impact on academic performance.

Final Statement

In conclusion, teaching and learning resources are fundamental determinants of students' academic achievement. Ensuring adequate material resources, qualified human resources, and conducive physical facilities is critical for sustaining high academic performance. Policymakers, school administrators, and educators must collaborate to provide a well-resourced learning environment that allows all students to achieve their full potential.

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