The Impact of School Environment on Learners' Academic Performance: A Comprehensive Review

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Abstract

This study investigates the influence of school infrastructure on the academic performance of primary school learners in Zimbabwe's Marondera District. Employing the Context, Input, Process, and Product (CIPP) evaluation model, the research adopts a decision-oriented approach to identify infrastructural factors, classroom conditions, availability of learning resources, sanitation, teacher housing, and access to digital tools—that significantly affect learner outcomes. Using a mixed-methods design, data were gathered from teachers, headmasters, and school development committees through questionnaires, interviews, observation, and document review. The findings reveal a systemic relationship between physical infrastructure and learner performance: schools with adequate infrastructure consistently reported better academic outcomes, lower dropout rates, and improved learner motivation. Conversely, under-resourced schools exhibited chronic absenteeism, low pass rates, and teacher burnout. The study recommends that policymakers integrate infrastructural audits into education planning and prioritize funding for basic amenities, especially in marginalized communities. The CIPP model provided a robust framework for diagnosing challenges and suggesting actionable improvements in school infrastructure management.

Introduction

Education is universally regarded as a cornerstone of sustainable development and social progress, serving as a fundamental right and a vital tool for individual empowerment and societal advancement. It is widely acknowledged that access to quality education directly correlates with economic growth, social equity, and improved health outcomes. In Zimbabwe, significant strides have been made in various domains, including curriculum reforms aimed at fostering critical thinking, creativity, and collaborative skills essential for the 21st century. Inclusive education policies have also been implemented to ensure that all students, regardless of their backgrounds or abilities, have equitable access to learning opportunities.

Despite these advancements, the physical conditions under which learning occur remain uneven and, in many areas, critically deficient. The infrastructure of schools is a crucial determinant of educational quality, yet many institutions face challenges such as overcrowded classrooms, inadequate sanitation facilities, and limited access to modern technology. These conditions starkly contradict national education goals, which aim to create environments conducive to effective teaching and learning. The impact of such infrastructural deficiencies is profound, as they can hinder student engagement, limit participation, and ultimately affect academic performance.

The curriculum in Zimbabwe has evolved to emphasize essential 21st-century skills, yet this evolution is undermined by the physical realities of many educational settings. Learners often

find themselves in environments that are not only uncomfortable but also detrimental to their learning experiences. For instance, overcrowded classrooms can lead to diminished individual attention from teachers, while poor sanitation can pose health risks that distract from the learning process. Furthermore, minimal access to technology limits students' ability to engage with contemporary educational resources and tools, thereby widening the gap between those who can and cannot access quality education.

This paper explores the link between school infrastructure and learner academic performance, utilizing the Context, Input, Process, and Product (CIPP) evaluation model to frame a holistic understanding of how physical environments either support or undermine educational delivery. The CIPP model allows for a comprehensive examination of the contextual factors that influence educational outcomes, including the physical infrastructure, the resources available, the processes of teaching and learning, and the resulting academic performance of students.

The study situates its investigation in the Marondera District, where disparities between urban and rural schools provide an illustrative microcosm of broader national trends. Urban schools often benefit from better funding and resources, resulting in superior infrastructure compared to their rural counterparts. This contrast reveals critical insights into how geographic and socioeconomic factors contribute to educational inequities. By focusing on Marondera, this research aims to highlight the urgent need for targeted interventions to improve school infrastructure, particularly in underserved areas, in order to enhance educational outcomes for all learners.

In summary, this study seeks to shed light on the intricate relationship between school infrastructure and academic performance in Zimbabwe. By addressing the challenges faced by schools in different contexts, the research aims to contribute to a deeper understanding of how to create more equitable and effective educational environments that align with national goals and support sustainable development.

Statement of the Problem

Despite Zimbabwe’s policy commitment to quality education for all, the gap between educational policy and infrastructural reality is widening. According to a 2021 UNICEF report, nearly 60% of rural schools in Zimbabwe operate without access to clean water, and over 50% lack proper sanitation. These deficiencies are particularly severe in Marondera District, where infrastructure development has lagged behind population growth and policy demands.The implications for learners are profound: absenteeism increases when basic needs go unmet, particularly among female students. A lack of electricity and learning technology limits exposure to modern pedagogical tools. Consequently, learners in poorly equipped schools consistently perform below national averages in Grade 7 examinations, raising questions about equity and long-term social outcomes.

Objectives of the study

- **Assess Infrastructure Quality**: Evaluate the physical conditions of schools, including classroom size, sanitation facilities, and access to technology, and how these factors influence the learning environment.
- **Analyze Academic Outcomes**: Examine the academic performance of learners in relation to the quality of school infrastructure, identifying key performance indicators affected by environmental conditions.
- **Differentiate Contextual Factors**: Explore disparities between urban and rural schools,

highlighting how geographical and socio-economic factors contribute to variations in infrastructure and academic achievement.

- **Utilize the CIPP Model**: Apply the Context, Input, Process, and Product (CIPP) evaluation model to frame the analysis, providing a comprehensive understanding of how school infrastructure impacts educational delivery and outcomes.
- **Inform Policy Recommendations**: Generate insights that can inform policymakers and educational stakeholders on necessary improvements in school infrastructure to enhance learning conditions and meet national educational goals.

Research Question Main

Question

How does school infrastructure influence learners' academic performance in primary Schools?

Sub-questions

Which infrastructural elements have the greatest impact on teaching and learning? How does

the availability of learning resources affect learner engagement?

What role does teacher accommodation play in learner performance?

How do sanitation and health facilities influence absenteeism and dropout rates?

LITERATURE REVIEW

Importance of School Infrastructure

School infrastructure is a critical determinant of educational quality and learner outcomes. Research indicates that well-maintained facilities, adequate classroom space, and access to essential resources significantly enhance student engagement and performance (Baker et al., 2016). Conversely, poor infrastructure can hinder learning by creating an environment that is not conducive to effective teaching and learning (Earthman, 2002).

The Link Between Infrastructure and Academic Performance

Numerous studies have established a direct correlation between school facilities and academic achievement. For instance, a study by the National Center for Education Statistics (2018) found that students in schools with better facilities performed higher on standardized tests compared to those in under-resourced environments. The physical state of a school, including factors like overcrowding and sanitation, plays a crucial role in shaping students' educational experiences (Chin et al., 2019).

Inclusive Education Policies

The evolution of inclusive education policies aims to accommodate diverse learning needs, yet the effectiveness of these policies is often undermined by inadequate infrastructure. In Zimbabwe, curriculum reforms have promoted inclusive education, but the infrastructural

deficits, particularly in rural areas, limit access for marginalized groups (Muwanga-Zake, 2020). This highlights the need for a holistic approach that integrates infrastructure development with educational policy.

The CIPP Evaluation Model

The Context, Input, Process, and Product (CIPP) model serves as a valuable framework for evaluating educational programs and their environments (Stufflebeam, 2003). In this study, the CIPP model will be employed to assess the contextual factors affecting school infrastructure, the inputs available for educational delivery, the processes implemented in teaching and learning, and the resulting academic products. This comprehensive approach allows for a nuanced analysis of how infrastructure influences educational outcomes.

Urban vs. Rural Disparities

The disparities between urban and rural schools in Zimbabwe provide a critical lens through which to examine educational inequity. Urban schools typically enjoy better infrastructure and resources, while rural schools face significant challenges, including insufficient facilities and limited access to technology (Moyo, 2018). This dichotomy reflects broader national trends and underscores the importance of addressing infrastructural deficiencies in underserved areas.

METHODOLOGY

This study employed a **concurrent triangulation design**, which allows for the simultaneous collection of both qualitative and quantitative data. This approach facilitates a comprehensive understanding of the relationship between school infrastructure and learner academic performance by enabling cross-validation of findings from different data sources. The concurrent triangulation design enhances the robustness of the research by integrating diverse perspectives, which is particularly crucial in examining multifaceted issues such as educational infrastructure.

Sample Selection

To ensure a representative sample that reflects the varied educational contexts within the Marondera District, a **stratified random sampling** method was utilized. This involved categorizing schools into three distinct geographic zones:

1. **Rural Schools**: 5 schools were selected from remote areas where infrastructure challenges are often more pronounced.
2. **Peri-Urban Schools**: 3 schools were chosen from transitional areas that exhibit characteristics of both urban and rural settings, offering insights into the unique challenges faced by these institutions.
3. **Urban Schools**: 2 schools were included to represent the more resource-rich environments typically found in urban settings.

This stratification not only ensures diversity in the sample but also allows for a nuanced analysis of how geographic context influences educational infrastructure and learner outcomes.

Participants

A total of **96 participants** were involved in the study, encompassing various stakeholders within the educational ecosystem:

Teachers (36): A diverse group of educators representing different subjects and experience levels were selected to provide insights into classroom conditions, teaching methodologies, and the impact of infrastructure on their pedagogical practices.

Headmasters (10): School leaders were included to gain perspectives on administrative challenges, resource allocation, and the overall management of school infrastructure.

School Development Committee Members (6): These community representatives played a vital role in understanding local priorities, funding issues, and the involvement of stakeholders in improving school facilities.

Learners (40): Focus group discussions were conducted with students to capture their experiences and perceptions regarding the learning environment, including infrastructure-related challenges that affect their academic performance.

This diverse participant pool ensures a holistic view of the issues at hand, enabling the study to address the complexities of educational infrastructure in different contexts.

Data Collection Methods

Data collection occurred through a combination of **surveys, interviews, and focus group discussions**:

Surveys: Structured questionnaires were distributed to teachers and headmasters to gather quantitative data on school facilities, resources, and perceived impacts on student performance. The questionnaires included both closed and open-ended questions, allowing for statistical analysis as well as qualitative insights.

Interviews: Semi-structured interviews were conducted with headmasters and school development committee members. This method facilitated in-depth discussions on the challenges and successes related to school infrastructure and its impact on educational delivery. The flexibility of semi-structured interviews allowed for the exploration of emerging themes and issues not initially considered.

Focus Group Discussions: Engaging learners in focus group discussions provided qualitative data that highlighted their lived experiences in the school environment. These discussions were designed to foster an open dialogue, encouraging students to share their thoughts on overcrowding, sanitation, and the availability of technology. The use of focus groups also facilitated peer interaction, often leading to richer data through shared experiences.

Data Analysis

Data analysis involved both quantitative and qualitative approaches:

Quantitative Data: Survey responses were analyzed using statistical software to identify

trends, correlations, and patterns related to school infrastructure and academic performance. Descriptive statistics were employed to summarize key findings, while inferential statistics helped determine the significance of relationships between variables.

Qualitative Data: Thematic analysis was utilized to analyze interview transcripts and focus group discussions. This involved coding the data to identify recurring themes and patterns, allowing for a deeper understanding of participants' perspectives. The qualitative findings were then integrated with the quantitative data to provide a comprehensive view of the research questions.

Ethical Considerations

Ethical considerations were paramount throughout the research process. **informed consent** was obtained from all participants, ensuring they were fully aware of the study's purpose, procedures, and their rights. Participants were assured of their ability to withdraw from study at any time without penalty.

To maintain **anonymity**, pseudonyms were assigned to all participants in data reporting. This practice not only protects individual identities but also enhances the credibility of the research by allowing participants to speak freely about their experiences.

Ethical clearance for the study was granted by the **Ministry of Primary and Secondary Education** and the **local school inspectorate**, ensuring that the research adhered to national ethical guidelines and standards for conducting educational research.

Conclusion

This methodology outlines a comprehensive approach to exploring the link between school infrastructure and learner academic performance in the Marondera District. By employing a concurrent triangulation design, utilizing diverse participant perspectives, and implementing rigorous ethical standards, the study aims to contribute valuable insights to the discourse on educational infrastructure and its implications for sustainable development in Zimbabwe.

Theoretical Framework: The CIPP Model

Developed by Stufflebeam, the CIPP model serves as a comprehensive evaluation tool for educational systems. Its emphasis on **Context, Input, Process, and Product** allows for an in-depth understanding of how infrastructural realities influence learner outcomes:

- ✓ **Context**: Sociopolitical, economic, and demographic background of schools.
- ✓ **Input**: Resource availability—teachers, materials, space, and facilities.
- ✓ **Process**: Day-to-day teaching and administrative practices shaped by infrastructure.
- ✓ **Product**: Tangible academic outcomes such as test scores, attendance, and progression rates.

FINDINGS AND DISCUSSION

This section presents and discusses the findings related to the impact of school infrastructure and environmental conditions on learner academic performance in primary schools within

Marondera District. Drawing on the CIPP model, results are categorized according to input and process dimensions, with special attention to environmental variables within the school setting that shape academic outcomes.

Learning Materials and Resource Availability

One of the most frequently reported challenges was the scarcity of teaching and learning materials. Data from questionnaires and interviews revealed that many schools had insufficient textbooks—sometimes as many as five learners shared one book in key subjects such as mathematics and English. Additionally, limited access to visual aids like charts and science apparatus severely constrained the teaching of practical subjects.

Observation data confirmed that materials in several schools were outdated or damaged, rendering them ineffective in engaging learners. This lack of adequate resources reduced opportunities for learner-centered approaches and contributed to poor academic performance. These findings are consistent with the argument by Goeroe Ndeso (2020), who highlights a direct link between material shortages and declining test scores in rural African schools.

> *"We improvise a lot… sometimes I draw the diagrams on the board because we don't have charts or real specimens."* — Teacher, School E

Teacher Attitudes, Qualifications, and Motivation

The quality of instruction was found to be heavily influenced by both the professional competence and motivation of teachers. Several schools employed under-qualified or temporary teachers, particularly in remote areas. These teachers, who are often unfamiliar with updated curricula, struggled with content delivery, especially in numeracy and science.

Furthermore, many educators expressed a sense of demoralization due to poor working conditions, delayed salaries, and heavy workloads. Professional development opportunities were limited, leading to stagnation in instructional innovation.

> *"I haven't attended a training workshop in years. We just recycle the same methods."* — Teacher, School B

Low teacher morale negatively influenced classroom engagement, learner motivation, and overall academic outcomes. These findings reinforce the thesis argument that educational infrastructure must be understood beyond physical buildings to include human capital and institutional support.

Classroom Conditions and Learning Environment

Physical classroom conditions varied widely, but in most rural and peri-urban schools, environments were suboptimal. Overcrowded classrooms were a common issue, with teacher-learner ratios as high as 1:65. In such conditions, teachers reported difficulties in offering individual attention, managing behavior, and maintaining instructional quality.

Observation checklists noted deteriorating infrastructure: leaking roofs, cracked walls, broken windows, and insufficient desks. In some cases, learners were seen sitting on the floor or sharing single writing surfaces.

> *"We have two grades sharing one classroom, and it's hard to keep them focused when there's noise from both sides."* — Headmaster, School H

Such environments create significant barriers to concentration and effective pedagogy, ultimately limiting learners' potential.

Peer Influence and Discipline Environment

The social environment within schools also emerged as a major factor affecting academic performance. In several schools, high levels of indiscipline were reported, including truancy, bullying, and disrespect toward teachers. Learners in such environments often felt unsafe or unsupported, reducing their engagement and academic performance. Teachers noted a lack of structured opportunities for peer mentorship or group learning. In the absence of positive peer influence, learners were more likely to disengage from schoolwork or emulate negative behaviors.

> *"Discipline is a real problem—some learners just roam around or skip classes, and we don't have enough staff to follow up."* — Teacher, School F

Creating a positive and structured school culture, therefore, is as vital as improving physical infrastructure.

Cross-Cutting Implications for School Improvement

Based on these findings, the following cross-cutting themes and implications emerge for policy and practice:

- ✓ **Infrastructure must be holistic**: Classrooms, toilets, furniture, and learning materials all form part of an interdependent ecosystem that shapes learning.
- ✓ **Teacher development is infrastructure**: Investment in human capital—through training, support, and housing—is as important as building renovations.
- ✓ **Culture matters**: Positive peer environments and strong discipline systems contribute to academic excellence.
- ✓ **A system approach is required**: Piecemeal fixes—such as donating textbooks without repairing classrooms—will not produce lasting change.

These insights strongly align with the CIPP model's recommendation for decision- oriented, systemic analysis. Contextual factors (like poverty and remoteness), input challenges (like resource shortages), process limitations (such as instructional quality), and product gaps (evident in low exam scores) all underscore the need for coordinated educational infrastructure policy.

CONCLUSION and RECOMMENDATIONS

Conclusion

The research confirms that infrastructure is not a peripheral issue, it is central to educational equity and learner achievement. Applying the CIPP model enabled a nuanced diagnosis of the

infrastructural gaps that compromise learning. Stakeholders must treat infrastructure not as a logistical issue but as a policy priority with long-term developmental consequences.

Recommendations

Short-Term Measures

- ✓ Immediate repair of damaged classrooms and toilets
- ✓ Provision of boreholes or rainwater tanks in water-scarce schools

Medium-Term Strategies

- ✓ Solar electrification of rural schools
- ✓ Mobile libraries and digital resource kits

Long-Term Policy Interventions

- ✓ Establishment of a national school infrastructure fund
- ✓ Annual CIPP-based audits for education sector planning

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