Journal of
Education and Practice
(JEP)

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CARI Journals

Journal of Education and Practice
ISSN 2520-467X (Online)
Vol. 10, Issue No. 8, pp. 1 - 16, 2026
www.carijournals.org

Challenges Faced by School Administrators in Managing Infrastructure in Selected Secondary Schools in Chadiza District, Zambia

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Accepted: 24th Aug, 2026, Received in Revised Form: 4th Sep, 2026, Published: 14th Sep, 2026

Abstract

Purpose: The purpose of this study was to examine the major challenges faced by school administrators in managing infrastructure in selected secondary schools in Chadiza District, Zambia.

Methodology: The study adopted a qualitative descriptive approach to obtain an in-depth understanding of school administrators' experiences in managing infrastructure. Data were obtained from administrative experiences, school records and the contextual realities of the selected secondary schools. The qualitative approach enabled the study to examine infrastructure management challenges from the perspectives of those directly involved in the administration and day-to-day management of school facilities. The information generated was analysed thematically to identify recurring patterns and issues relating to infrastructure planning, maintenance, financing and management.

Findings: The findings revealed that school administrators face multiple and interconnected challenges in managing infrastructure. These included inadequate and unreliable funding, bureaucratic procurement processes, overcrowding resulting from increasing enrolment, ageing and deteriorating infrastructure, limited access to technical expertise, inadequate water and sanitation facilities, weak security systems and environmental pressures. These challenges constrained administrators' ability to undertake timely maintenance and infrastructure development and, in some instances, resulted in a reactive rather than planned approach to infrastructure management. The study further established that inadequate infrastructure negatively affects the quality and safety of the teaching and learning environment and contributes to persistent disparities between rural and urban schools.

Unique Contribution to Theory, Policy and Practice: The study contributes to understanding infrastructure management as an important component of effective school administration, particularly within resource-constrained rural secondary schools. The findings demonstrate that infrastructure challenges cannot be addressed solely through school-level administrative efforts but require coordinated institutional and stakeholder support. From a policy perspective, the study highlights the need for predictable and adequate infrastructure financing, streamlined procurement processes, stronger technical support and policies that respond to the specific infrastructure needs of rural schools. In practice, the study recommends strengthening the capacity of school administrators in infrastructure planning and maintenance, promoting preventive maintenance systems, improving stakeholder participation and establishing coordinated mechanisms for infrastructure development and management. These measures can contribute to more sustainable school infrastructure and improved teaching and learning environments in Chadiza District and other comparable rural settings.

Keywords: *School Infrastructure, Educational Administration, Facilities Management, Rural Secondary Schools, Zambia*

1. Introduction

School infrastructure is a fundamental component of an effective education system because it provides the physical spaces, services and facilities in which teaching, learning and school administration take place. It includes classrooms, laboratories, libraries, offices, staff accommodation, sanitation facilities, water supply, electricity, furniture, ICT facilities and other structures that support the delivery of education. The quality, adequacy, safety and functionality of these facilities can influence teachers' ability to implement the curriculum, learners' participation and attendance, and the overall effectiveness of schools (Barrett et al., 2019; World Bank, 2023). Contemporary approaches therefore view school infrastructure not simply as a physical input, but as part of the learning environment that must be planned, maintained, monitored and adapted to changing educational needs.

At the global level, the provision and management of adequate school infrastructure remain important dimensions of efforts to achieve quality, inclusive and equitable education. Sustainable Development Goal 4 and Target 4.a call for learning environments that are safe, inclusive and effective, while also being responsive to the needs of children, gender and disability (UNESCO, 2023). However, progress in access to education has not always been accompanied by comparable improvements in the quality and availability of learning facilities. Evidence from low- and middle-income settings indicates that shortages of classrooms, water and sanitation facilities, electricity, furniture, laboratories and other learning spaces continue to constrain the development of conducive learning environments (World Bank, 2023). The World Bank further emphasises that physical learning environments can affect educational outcomes and should therefore be designed and managed to be healthy, safe, inclusive, resilient and supportive of teaching and learning (World Bank, 2024).

Effective infrastructure management is consequently an important responsibility of school leadership and administration. It involves identifying infrastructure needs, setting priorities, mobilising and allocating resources, supervising construction and rehabilitation, monitoring the condition of facilities, organising preventive maintenance and ensuring that infrastructure is used appropriately. When maintenance is delayed or infrastructure needs are addressed only after serious deterioration has occurred, schools may face higher repair costs, disruptions to teaching and learning and increased safety risks. Infrastructure management is therefore both an operational and a governance concern because the effectiveness of school-level decisions depends on the availability of resources, technical support, institutional authority and accountability mechanisms (Bush et al., 2022; Oketch & Rolleston, 2023).

The challenge is particularly pronounced in many African education systems, where rapid growth in school enrolment has increased pressure on existing facilities. Across the region, schools in rural and underserved communities frequently experience shortages of classrooms, laboratories, libraries, water and sanitation facilities, electricity and other basic services. Such shortages may

contribute to overcrowding and the use of spaces for purposes for which they were not originally designed. The World Bank (2023) notes that adequate learning conditions, including appropriate school facilities and basic services, are important for enabling learners to engage effectively in education. In addition, infrastructure constraints may place additional pressure on teachers and school administrators, who must continue providing educational services while responding to maintenance, safety and resource limitations.

The Zambian education system faces similar pressures as demand for secondary education continues to increase. Government investment has sought to expand access through the construction and expansion of secondary schools. The Zambia Education Enhancement Project (ZEEP), for example, initially targeted the construction of 82 secondary schools, while additional financing supports the construction of a further 120 secondary schools across the country (Ministry of Education, 2024). The Ministry of Education indicates that the additional financing is intended not only to increase access to secondary education but also to improve teaching and learning conditions and strengthen institutional capacity (Ministry of Education, 2024). These interventions demonstrate the national recognition that adequate infrastructure is central to expanding access and improving the quality and safety of secondary education.

Despite these investments, infrastructure provision and management remain uneven across schools and regions. Zambia's Education Statistics Bulletin provides evidence of continuing infrastructure needs in secondary schools, including differences in the availability of classrooms and other facilities across provinces (Ministry of Education, 2023). The existence of a physical structure does not, however, necessarily mean that the facility is functional, adequate for current enrolment, safe or properly maintained. Infrastructure management therefore extends beyond construction to include routine inspection, preventive maintenance, rehabilitation, effective utilisation and long-term sustainability. This distinction is particularly important in rural schools, where geographical distance, limited technical expertise, constrained financial resources and delays in accessing support can make routine maintenance more difficult.

Within this national and regional context, school administrators in Chadiza District are required to manage infrastructure while also performing responsibilities related to teaching and learning, financial administration, human resources and general school governance. Teachers who perform administrative functions, including heads of departments and other senior staff, may also become involved in monitoring facilities, reporting defects, supervising maintenance and mobilising support. Where responsibility is not matched by adequate authority, training, funding and technical assistance, infrastructure management may become reactive rather than preventive. Increasing enrolment can further intensify pressure on classrooms and other facilities, while inadequate maintenance can accelerate the deterioration of buildings, furniture, water and sanitation systems and other essential infrastructure.

Although existing studies and policy reports have documented broad infrastructure deficits, financing constraints, rural–urban disparities and the importance of school facilities to educational quality, there remains a need for context-specific evidence on how these challenges are experienced and managed at school level in rural Zambia. Much of the available literature focuses on infrastructure provision, access or educational outcomes, with comparatively less attention to the day-to-day administrative processes through which school leaders and teachers respond to infrastructure constraints. In particular, limited empirical attention has been given to the experiences of school administrators in selected secondary schools in Chadiza District and to the interaction between funding, procurement procedures, technical capacity, maintenance responsibilities and stakeholder support. This gap provides a basis for the present study, which seeks to explore and analyse the challenges faced by school administrators in managing infrastructure in selected secondary schools in Chadiza District, Zambia.

Statement of the Problem

Effective infrastructure management is fundamental to the provision of quality secondary education because adequate classrooms, laboratories, sanitation facilities, water supply, staff accommodation, furniture and other learning resources contribute to safe and conducive learning environments. However, schools in rural Zambia continue to experience infrastructure constraints associated with inadequate resources, ageing facilities, overcrowding, delayed maintenance and limitations in technical and administrative support (Ministry of Education, 2023; World Bank, 2023). These challenges can reduce the capacity of schools to provide appropriate learning spaces and may place additional responsibilities on administrators who must manage infrastructure alongside their other educational duties.

Although previous research has established the importance of school infrastructure and has identified broad challenges related to financing, facilities and educational quality, an important empirical gap remains concerning the practical experiences of administrators managing these challenges within rural secondary schools in specific Zambian districts. Existing evidence provides limited detail on how financial constraints, procurement procedures, technical capacity, maintenance demands and institutional arrangements interact at school level, particularly in Chadiza District. There is also limited attention to teachers who undertake administrative responsibilities related to infrastructure. Addressing this gap is important because understanding the day-to-day realities of infrastructure management can assist education authorities and school leaders in developing contextually appropriate strategies for maintenance, resource mobilisation, accountability and infrastructure development. The present study therefore focuses on the challenges faced by administrators in selected secondary schools in Chadiza District and the implications of those challenges for effective school management and teaching and learning.

Previous studies have established that inadequate school infrastructure, limited financing, weak maintenance systems and insufficient institutional support can constrain educational quality,

particularly in resource-constrained settings (Barrett et al., 2019; World Bank, 2023). However, the literature reviewed for this study indicates a contextual and empirical gap. Existing research tends to emphasise the availability of infrastructure, access to education or the relationship between physical learning environments and educational outcomes, while giving less attention to the everyday administrative processes through which infrastructure is planned, maintained, monitored and utilised in rural secondary schools. In Zambia, available policy and statistical reports document infrastructure needs at national and provincial levels, but they provide limited insight into how school-level administrators experience and respond to these constraints in specific rural districts (Ministry of Education, 2023, 2024). The present study addresses this gap by examining the challenges faced by school administrators in selected secondary schools in Chadiza District, with attention to financing, procurement, maintenance, technical capacity, stakeholder support and the roles of teachers involved in administration.

Purpose of the Study

This study examines challenges faced by administrators in managing infrastructure in selected secondary schools in Chadiza District, exploring how financial constraints, administrative procedures, technical capacity, and institutional arrangements affect teaching, learning, and school effectiveness.

Significance of the Study

This study is significant in several ways. First, it contributes empirical evidence to the limited body of knowledge on school infrastructure management in rural Zambian secondary schools. By focusing on the lived experiences of administrators, it provides context-specific insights into the operational realities of infrastructure management.

Second, the findings are valuable to policymakers and education planners, highlighting the need for improved financing mechanisms, decentralized decision-making, and capacity-building initiatives. The study underscores the importance of aligning policy intentions with practical implementation at the school level.

Third, it benefits administrators and teachers by drawing attention to their critical yet often overlooked role in infrastructure governance. Recognizing teachers as administrative actors informs professional development programs and supports the institutionalization of preventive maintenance practices.

Finally, the study contributes to academic discourse by linking infrastructure management to leadership theory, resource dependency theory, and systems thinking, thereby strengthening theoretical understanding of school infrastructure governance in developing contexts.

Theoretical Framework

This study was informed by Systems Theory**,** Resource Dependency Theory, and Distributed Leadership Theory, which together provide a comprehensive lens for understanding school infrastructure management.

1. Systems Theory

Systems theory conceptualises schools as interrelated systems in which infrastructure functions as a core subsystem supporting teaching, learning, and administration. According to this perspective, deficiencies in physical facilities disrupt the functioning of the entire school system (Bush, Bell, & Middlewood, 2022). In this study, deteriorating infrastructure was found to affect instructional delivery, learner safety, and administrative efficiency, confirming the relevance of systems thinking in analysing school infrastructure management.

2. Resource Dependency Theory

Resource dependency theory explains how organisations rely on external resources for survival and effectiveness. Schools in rural Zambia depend heavily on government grants and donor support to maintain infrastructure. When resources are delayed or inadequate, administrators adopt short-term coping strategies rather than sustainable planning approaches (Oketch & Rolleston, 2023). The findings show that financial dependency limits school-level autonomy and reinforces reactive infrastructure management practices.

3. Distributed Leadership Theory

Distributed leadership theory emphasizes shared responsibility and collaborative leadership. In rural secondary schools, infrastructure management is distributed among headteachers, deputies, and senior teachers. However, this distribution often occurs without formal authority or adequate training, weakening accountability and effectiveness (Bush & Glover, 2020). The theory provides a useful framework for understanding both the potential and limitations of teacher involvement in infrastructure governance.

2. Review of Related Literature

2.1 School Infrastructure and Educational Quality

Recent literature demonstrates that school infrastructure is a critical determinant of educational quality and learner outcomes. Adequate facilities improve attendance, concentration, and instructional effectiveness, while poor conditions—such as overcrowding, inadequate ventilation, insufficient lighting, and unsafe buildings—negatively affect cognitive performance and psychological well-being (Barrett et al., 2019; World Bank, 2023; UNESCO, 2023). In low-income and rural contexts, deficiencies are linked to absenteeism, dropout, and reduced teacher motivation. Infrastructure should therefore be viewed not merely as a physical input but as a foundation for educational quality and equity.

2.2 Infrastructure Management in Rural Education Contexts

Research highlights that rural schools face disproportionately severe infrastructure challenges compared to urban institutions. Rural secondary schools often operate with limited resources, geographical isolation, and weak institutional support (Mulkeen & Higgins, 2020; UNICEF, 2024). Expansion of access to secondary education has not been matched by proportional investment, resulting in overcrowding and accelerated deterioration (World Bank, 2023). In Sub-Saharan Africa, including Zambia, administrators manage aging infrastructure with irregular funding and minimal technical assistance, constraining sustainability (UNESCO, 2023).

2.3 Administrative Capacity and Infrastructure Sustainability

Scholarship increasingly conceptualises infrastructure management as a leadership and governance issue rather than a purely technical concern. Bush, Bell, and Middlewood (2022) argue that effective leadership must integrate infrastructure planning into broader school improvement strategies. Yet, most rural administrators lack formal training in facilities management, despite supervising construction, maintenance, and rehabilitation projects (Mwanza & Mulenga, 2024). Bureaucratic procurement systems and delayed funding further undermine sustainability. Oketch and Rolleston (2023) note that rigid regulations restrict autonomy and encourage reactive practices, increasing long-term costs and safety risks.

2.4 Water, Sanitation, Equity, and Safety in Schools

Recent studies emphasise that water, sanitation, and hygiene (WASH) facilities are central to learner health, participation, and educational equity. Inadequate sanitation disproportionately affects rural schools and female learners, particularly at the secondary level, due to insufficient menstrual hygiene support (UNICEF, 2024; UNESCO & UNICEF, 2024). Poor WASH conditions contribute to health-related absenteeism and undermine sustained participation.

Weak security systems—including lack of perimeter fencing, security lighting, and secure storage—expose infrastructure to vandalism and theft. Such losses divert scarce resources from development and maintenance, further constraining effective management.

2.5 Climate Resilience and Emerging Infrastructure Risks

Recent literature highlights the growing impact of climate variability on infrastructure sustainability. Extreme weather events such as flooding, prolonged rainfall, and heat stress increasingly damage rural school facilities where construction standards are weak (World Bank, 2024). Schools lacking climate-resilient designs face repeated failures and disruptions. UNESCO and UNICEF (2024) stress integrating climate-resilient planning into education systems. Without targeted guidance and financing, deterioration will escalate, undermining quality and equity.

2.6 Policy and Institutional Framework

Infrastructure management is shaped by national policies and institutional arrangements governing funding, authority, and accountability. Although decentralisation aims to enhance autonomy, decisions remain centralised in Zambia (MoE, 2022; World Bank, 2023). This limits administrators' flexibility and contributes to inconsistent, reactive practices.

2.7 Theoretical Perspectives

Multiple theories inform infrastructure management. Systems theory views schools as interdependent entities where infrastructure supports teaching, learning, and administration; inadequacy causes dysfunction (Bush, Bell, & Middlewood, 2022; Schneider & Stern, 2020). Resource dependency theory highlights reliance on external funding, constraining autonomy and sustainability (Oketch & Rolleston, 2023; World Bank, 2023). Instructional leadership theory underscores administrators' responsibility to ensure infrastructure aligns with curriculum demands, particularly in science and technology (Bush & Glover, 2020; Mwanza & Mulenga, 2024).

2.8 Community Participation and Stakeholder Engagement

Stakeholder engagement is critical for addressing infrastructure challenges. Community participation fosters accountability, ownership, and sustainability (UNESCO, 2023; World Bank, 2021). Teachers often act as intermediaries, coordinating maintenance and mobilising support. However, poverty, limited technical capacity, and unclear governance constrain effectiveness. Parent–teacher associations and school development committees vary in impact (Mulkeen & Higgins, 2020; Chibomba & Phiri, 2023). Partnerships with NGOs and private actors supplement funding but require strong oversight and transparent accountability, roles often fulfilled by senior teachers and school leaders (UNESCO & UNICEF, 2024).

2.9 Digital Infrastructure and Technological Readiness in Rural Secondary Schools

The integration of digital technologies in education has heightened the importance of ICT infrastructure in secondary schools. Access to electricity, internet connectivity, computer laboratories, and digital devices is increasingly essential for curriculum delivery, assessment, and administration (UNESCO, 2023; World Bank, 2023). In rural schools, however, deficits in digital infrastructure remain pronounced.

Teachers with administrative responsibilities often oversee ICT facilities but face challenges such as high maintenance costs, unreliable power supply, and limited technical support. Consequently, digital initiatives frequently fail to achieve their intended pedagogical impact, reinforcing rural–urban disparities (Schneider & Stern, 2020; World Bank, 2024). Inadequate digital infrastructure also constrains administrative efficiency, as schools struggle to implement electronic reporting and data management systems mandated by education authorities.

2.10 Teachers as Administrators in School Infrastructure Management

In many rural secondary schools, teachers occupy dual roles as instructional staff and administrators responsible for infrastructure oversight. Senior teachers, heads of departments, boarding masters or mistresses, and committee chairpersons routinely supervise classrooms, laboratories, hostels, and sanitation facilities. In this context, teachers are not merely users of infrastructure but key administrative actors in its management.

Research indicates that teachers' administrative involvement enhances early identification of deterioration and safety risks due to their constant interaction with learning spaces (Asiabaka, 2020; Mwanza & Mulenga, 2024). However, these responsibilities are often undertaken without formal training in facilities management or clear authority to initiate repairs. This mismatch between responsibility and authority limits effectiveness and contributes to reactive maintenance practices.

2.11 Distributed Leadership and Infrastructure Governance in Schools

Distributed leadership theory provides a useful lens for understanding teachers' administrative roles in infrastructure management. It emphasises shared responsibility, collaboration, and the utilisation of diverse expertise within the school organisation (Bush, Bell, & Middlewood, 2022). In rural secondary schools, management is distributed among headteachers, deputies, senior teachers, and heads of departments.

While distributed leadership has potential to enhance governance, its success depends on institutional coherence and support. Studies in Sub-Saharan Africa reveal that distributed roles are often informal and poorly resourced, resulting in fragmented decision-making and weak accountability (Oduro & MacBeath, 2019; Oketch & Rolleston, 2023). Teachers serving as infrastructure administrators frequently lack financial autonomy and technical guidance, undermining sustainability.

3. Methodology

3.1 Research Design

The study adopted a qualitative descriptive design, appropriate for exploring participants' experiences, perceptions, and contextual realities related to infrastructure management. This approach allows for in-depth understanding of administrative practices, challenges, and decision-making processes within natural settings (Creswell & Poth, 2018). It was chosen to generate rich, contextualised insights rather than measure variables or test hypotheses.

Qualitative descriptive designs are particularly useful in educational research where the aim is to capture real-life experiences of administrators and interpret how institutional and environmental factors influence practice (Sandelowski, 2010). In rural secondary schools, this approach enabled documentation of infrastructure challenges as experienced by administrators.

3.2 Study Context

The study was conducted in selected secondary schools in Chadiza District, Eastern Province of Zambia. The district is predominantly rural, characterised by dispersed settlements, limited infrastructure development, and high dependence on government funding. Schools serve wide catchment areas and face persistent resource constraints, particularly regarding physical infrastructure.

Rural contexts are often associated with inadequate facilities, delayed maintenance, and limited technical support, which significantly affect management practices (Mulkeen & Higgins, 2020; World Bank, 2023). Chadiza District therefore provided an appropriate setting for examining infrastructure challenges in resource-constrained schools.

3.3 Data Sources

Data were obtained from multiple qualitative sources, including administrators' professional experiences, school records, and direct observations of facilities. Using multiple sources enhanced credibility and depth through triangulation (Creswell & Poth, 2018).

Administrators provided experiential data on planning, maintenance challenges, and constraints. School records, such as maintenance logs and reports, offered documentary evidence of facility conditions. Observations enabled assessment of classrooms, sanitation facilities, staff housing, and security structures.

The combination of these sources allowed for a holistic understanding of infrastructure management practices and strengthened the trustworthiness of findings (Yin, 2018).

3.4 Data Analysis

Data were analysed using thematic analysis, a systematic qualitative technique for identifying, analysing, and interpreting patterns within textual data (Braun & Clarke, 2019). The process involved familiarisation with the data, initial coding, theme generation, theme review, and final interpretation.

Emerging themes were organised into key dimensions of infrastructure management: financial, administrative, technical, environmental, and institutional factors. This approach enabled the researcher to connect the empirical findings with existing literature and theoretical perspectives on school leadership and infrastructure management.

Thematic analysis was considered appropriate because it allows flexibility in interpreting qualitative data while maintaining analytical rigour. It also facilitated the identification of recurring challenges faced by administrators and the broader implications for educational planning and policy (Nowell et al., 2017).

4. Findings

This section presents an integrated analysis of the findings, combining empirical evidence with relevant scholarly literature. The discussion demonstrates how financial, administrative, technical, and institutional factors collectively shape infrastructure management in Chadiza District secondary schools. It further highlights the central role of teachers as administrative actors in sustaining infrastructure under resource-constrained conditions.

4.1 Inadequate and Unreliable Funding

Inadequate and inconsistent funding emerged as the most significant constraint. Administrators reported insufficient allocations for maintenance, rehabilitation, or expansion. Delays in disbursement disrupted planning cycles and forced schools to defer repairs. One participant noted: "Even when problems are identified early, action is delayed because funds are either insufficient or not yet released." This aligns with World Bank (2023) and Oketch and Rolleston (2023), who highlight chronic underfunding in rural schools. Financial instability encourages reactive management, undermining sustainability and increasing long-term costs.

4.2 Bureaucratic Procurement and Inefficiencies

Bureaucratic procurement procedures further constrained management. Lengthy approval processes delayed repairs, even when safety was compromised. One informant explained: "By the time approvals come, the problem has already become bigger and more expensive to fix." These findings support Bush, Bell, and Middlewood (2022), who argue that excessive centralisation weakens responsiveness. Bureaucratic rigidity discourages initiative, making infrastructure management procedural rather than strategic.

4.3 Overcrowding and Pressure on Facilities

Rapid enrolment growth without proportional infrastructure development led to overcrowding. Classrooms designed for fewer learners often accommodated more than sixty students. This negatively affected teaching effectiveness, learner participation, and facility conditions. The findings corroborate Barrett et al. (2019) and UNESCO (2023), which link overcrowding to reduced instructional quality and accelerated deterioration. Administratively, overcrowding increased maintenance demands and complicated management.

4.4 Aging Infrastructure and Limited Capacity

Much of Chadiza's school infrastructure is aging and poorly maintained, with leaking roofs, cracked walls, broken furniture, and inadequate ventilation. One informant noted: "Most of these buildings have never been renovated since they were constructed." This supports Earthman (2019), who argues that deteriorating infrastructure compromises safety and performance. Preventive maintenance was absent, allowing minor defects to escalate into major problems. Schools also lacked qualified technical personnel, relying on untrained workers for repairs, leading to recurring

damage. This reinforces the observation by Mwanza and Mulenga (2024) that limited technical capacity remains a critical constraint in rural infrastructure management.

4.5 Water, Sanitation, and Hygiene (WASH) Challenges

Inadequate WASH facilities emerged as a significant barrier to effective learning, particularly for female learners. Schools reported insufficient toilets, unreliable water supply, and a lack of facilities for menstrual hygiene management. One participant explained: "Girls often miss school when water is not available or when toilets are not usable." This finding aligns with UNICEF (2024) and UNESCO and UNICEF (2024), which emphasise that poor sanitation undermines learner health, dignity, and educational equity. The study also highlights the emotional and administrative burden placed on teachers, who must manage sanitation challenges without adequate resources.

4.7 Teachers as Central Actors in Infrastructure Management

A major contribution of this study is the recognition of teachers as key administrative actors in infrastructure management. Teachers serving as heads of departments, boarding masters, and committee leaders play vital roles in monitoring facilities, reporting damage, and ensuring safety. However, the findings reveal a mismatch between responsibility and authority. One interviewee remarked: *"We are expected to manage buildings, but we have no training and no power to make decisions."* This supports Asiabaka (2020) and Bush & Glover (2020), who argue that distributed leadership without institutional support leads to role overload and reduced effectiveness. Although teachers play a central role in governance, their contributions remain constrained by limited authority, training, and institutional backing.

4.8 Infrastructure, Safety, and Sustainability

The study further revealed that weak security systems and environmental factors pose serious risks to school infrastructure. Lack of fencing, inadequate lighting, and exposure to heavy rainfall and termite infestation were commonly reported. An informant noted: *"When it rains heavily, some classrooms become unsafe, but we have no alternative spaces."* These findings align with World Bank (2024), which identifies climate vulnerability and poor security as major threats to rural education infrastructure. Unsafe environments negatively affect learner concentration, attendance, and institutional stability. Teachers, as frontline administrators, bear responsibility for managing these risks, often without sufficient technical or financial support. This underscores the need for stronger governance and climate-resilient planning.

4.9 Synthesis of Findings

Overall, the findings demonstrate that infrastructure challenges in Chadiza District are systemic and interconnected. Financial constraints, bureaucratic inefficiencies, overcrowding, aging facilities, limited technical capacity, and weak institutional support collectively undermine effective management. The study confirms that infrastructure management is not merely a

technical responsibility but a leadership and governance issue. Teachers emerge as central actors in this process, yet their effectiveness is constrained by limited authority, inadequate training, and weak policy support. The findings reinforce the need for coordinated policy reforms, strengthened administrative capacity, decentralised decision-making, and sustainable financing mechanisms to improve infrastructure management and enhance educational quality in rural secondary schools.

5. Conclusion

The study has demonstrated that school administrators in Chadiza District face complex and interrelated infrastructure management challenges, including inadequate funding, administrative delays, overcrowding, aging facilities, limited technical expertise, weak WASH and security systems, and environmental pressures. Addressing these challenges requires coordinated institutional support, improved financing mechanisms, enhanced administrative capacity, and sustainable maintenance practices.

5.1 Contribution to Knowledge and Practice

This article provides context-specific insights into rural school infrastructure management in Zambia and highlights the need to reconceptualise infrastructure management as a core leadership function.

5.2 Policy Implications for Education Planning and Decentralisation

The findings carry important policy implications for education planning and decentralisation. While decentralisation policies aim to empower schools, infrastructure management remains constrained by centralised funding and approval mechanisms. Clearer policy guidelines are needed to define school-level authority over routine maintenance, minor rehabilitation, and emergency repairs. Enhancing financial predictability and administrative flexibility would enable proactive strategies. Integrating infrastructure indicators into school quality assurance frameworks would strengthen accountability and elevate infrastructure management as a leadership priority.

5.3 Reframing Infrastructure Management as Collective Administrative Practice

The study supports reframing infrastructure management as a collective administrative practice that formally includes teachers. Policy recognition of teachers' roles, clear delegation frameworks, and alignment between responsibility, authority, and accountability are essential. Embedding infrastructure management within school improvement planning would strengthen coordination, enhance ownership, and reduce reliance on crisis-driven interventions.

5.4 Administrative Coordination Between Teachers and School Leadership

Effective management depends on coordination between teachers in administrative roles and senior leadership. Currently, mechanisms are informal and poorly documented, with issues communicated verbally or through ad hoc reports. This weakens accountability and delays decision-making. Formal reporting channels, maintenance logs, and scheduled review meetings

would enhance continuity and reduce dependence on individual initiative, fostering shared ownership across the hierarchy.

5.5 Infrastructure Management and Accountability at School Level

Accountability for infrastructure is diffuse, with overlapping responsibilities among teachers, administrators, and district offices. Teachers reported limited feedback and minimal involvement in decision-making. This discourages proactive management and weakens motivation. Embedding infrastructure indicators within performance monitoring frameworks would strengthen accountability, improve transparency, and legitimise teachers' administrative roles.

5.6 Administrative Ethics and Professional Responsibility

Infrastructure management carries ethical dimensions related to learner safety, health, and dignity. Teachers face dilemmas when supervising unsafe facilities without authority or resources to act. Strengthening governance is therefore essential not only for efficiency but also for upholding ethical standards. Ensuring teachers' concerns are addressed within institutional structures is fundamental to ethical school leadership.

6. Recommendations

6.1 Predictable and Adequate Financing Establish ring-fenced infrastructure funds at school level with clear utilisation guidelines to empower administrators in planning and responding to risks.

6.2 Simplification of Procurement Procedures Decentralise approval thresholds for routine maintenance and minor repairs, granting limited discretionary authority under accountability frameworks.

6.3 Capacity Building Integrate infrastructure management modules into professional development programmes for administrators and senior teachers to strengthen distributed leadership.

6.4 Institutionalisation of Preventive Maintenance Establish maintenance schedules, inspection checklists, and documentation systems, supported by dedicated budgets and clear responsibilities.

6.5 Strengthening Stakeholder Collaboration and Accountability Formalise collaboration through clear governance structures, defined roles, and transparent reporting mechanisms to ensure equitable responsibility and sustainable improvements.

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