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The Impact of Rainfall–Induced School Closures Teaching and Learning in Mopani District, South Africa

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Abstract: Heavy rainfall has increasingly disrupted schooling in rural South Africa, causing delayed school reopening and temporary closures. In Mopani District, Limpopo Province, these climate-related disruptions have significantly interrupted teaching and learning, particularly in under-resourced schools. This study explores the impact of heavy rainfall–induced school closures on teaching and learning in Mopani District, South Africa. Adopting a qualitative research approach, teachers from affected schools were purposively selected to provide in-depth insights into their experiences during periods of school closure. Data were collected solely through telephone interviews due to ongoing heavy rainfall. Thematic analysis was employed to interpret the findings. Results indicate that heavy rainfall–induced school closures negatively affect curriculum coverage, learner attendance, assessment practices, and learner engagement. Teachers reported increased pressure to recover lost instructional time, challenges in supporting learners who fell behind academically, and limited preparedness at both school and district levels to manage climate-related disruptions. The study underscores the need for proactive school-level and district-level strategies to ease learning loss during weather-related interruptions. Recommendations include strengthening disaster preparedness plans, providing flexible curriculum support, and enhancing teacher capacity to manage interrupted teaching and learning. The study contributes to the growing body of literature on environmental factors affecting education and provides context-specific insights relevant to rural and flood-prone schooling environments.

Keywords: *Heavy Rainfall, School Closures, Teaching and Learning, Mopani District, Climate-Related Disruptions.*

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I. INTRODUCTION

- *Introduction and Background of the Story*

Education is a vital foundation for personal and societal development. However, in rural areas of South Africa, schooling is frequently disrupted by environmental challenges, particularly extreme weather events. Heavy rainfall has increasingly posed serious threats to the continuity of learning, infrastructure, and community well-being (Department of Basic Education [DBE], 2019). Mopani District in Limpopo Province is a rural area that has experienced severe disruption due to persistent and intense rainfall, which has had a direct impact on teaching and learning. Schools in the district were scheduled to reopen on 14 January 2026 following the school holiday period. Before learners could return, heavy rainfall caused widespread flooding, making roads impassable, sweeping away bridges, and destroying homes (Intergovernmental Panel on Climate Change [IPCC], 2022). Vehicles and even community members were reported missing. Environmental hazards, including stagnant water, mud, and the presence of snakes and crocodiles, heightened fear and vulnerability. Learners were left without uniforms, food, and shelter, while teachers struggled to protect their learners and manage the disruption of teaching and learning.

The human impact of this disaster has been profound. Families have been displaced, communities left in fear, and learners' education interrupted. The scale of the flooding has drawn comparisons to the terrible rains that affected Mozambique and South Africa in 2000. Many community members have expressed despair, questioning how such destruction could occur despite long-held beliefs in divine protection, referencing the story of Noah. The emotional toll on learners and teachers alike is significant, highlighting the human and educational consequences of climate-related disasters (UNICEF, 2021). In response, the South African Department of Education suspended school operations, and Mopani District was officially declared a disaster area. Visits from the President of South Africa and the Premier of

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Limpopo Province underscored the harshness of the situation. Despite these interventions, teaching and learning continue to be severely disrupted, with curriculum coverage, assessment practices, and learner engagement all adversely affected.

This study examines the impact of heavy rainfall–induced school closures on teaching and learning in Mopani District. By exploring the experiences of teachers during these disruptions, the research seeks to understand how such climate-related events affect curriculum delivery, learner participation, and overall teaching effectiveness. The study also aims to provide insights into strategies that schools and education authorities can adopt to mitigate the negative effects of such disruptions, ensuring continuity of learning even in the face of extreme weather events.

➢ *Problem Statement*

Despite the critical role of education in personal and societal development, rural schools in South Africa remain highly vulnerable to environmental disruptions. In Mopani District, heavy rainfall has caused severe flooding, leading to prolonged school closures, unsafe travel conditions, and significant damage to infrastructure and homes (Sondlo, 2025). Learners have been left without access to education, food, and basic shelter, while teachers face overwhelming challenges in supporting learners and managing prolonged interruptions to teaching and learning.

The ongoing floods of January 2026 have not only caused physical destruction but have also created high levels of fear, stress, and uncertainty among learners, teachers, and community members. These disruptions have negatively affected curriculum coverage, assessment practices, and learner engagement. Despite the growing frequency of climate-related disasters, there is limited research examining the specific impact of heavy rainfall–induced school closures on teaching and learning in rural South African contexts. Understanding teachers' experiences during such events is essential for developing effective strategies to mitigate learning loss and ensure continuity of education in vulnerable communities.

➢ *Purpose of the Study*

The purpose of this study is to explore the impact of heavy rainfall–induced school closures on teaching and learning in Mopani District, Limpopo Province. The study seeks to gain an in-depth understanding of teachers' experiences during periods of prolonged school closure caused by heavy rainfall and flooding. The study aims to examine how these disruptions affect curriculum coverage, learner engagement, and assessment practices, as well as the challenges teachers face in managing interrupted teaching and learning. By focusing on teachers' perspectives, the study intends to generate insights that can inform school-level and district-level strategies to mitigate learning loss and improve preparedness for future climate-related disruptions.

➢ *Research Objectives*

The objectives of the study are to:

- Examine the effects of heavy rainfall–induced school closures on curriculum coverage in Mopani District schools.
- Explore how learner attendance and engagement are affected during periods of school closure caused by heavy rainfall.
- Investigate the challenges teachers face in managing teaching and learning during and after rainfall-induced school closures.
- Identify strategies used by teachers and schools to mitigate the impact of interrupted teaching and learning.

➢ *Research Questions*

This study is guided by the following research questions:

How do heavy rainfall–induced school closures affect curriculum coverage in Foundation Phase classrooms in Mopani District?
In what ways do heavy rainfall–induced school closures influence learner attendance and engagement?
What challenges do teachers experience in managing teaching and learning during and after periods of school closure caused by heavy rainfall?
What strategies do teachers use to mitigate the impact of interrupted teaching and learning resulting from heavy rainfall–induced school closures?

➢ *Significance of the Study*

This study is significant as it provides an in-depth understanding of how heavy rainfall–induced school closures affect teaching and learning in a rural South African context. By focusing on Mopani District, the study offers context-specific insights into the challenges faced by teachers and learners during prolonged disruptions caused by extreme weather events. These insights contribute to the limited body of literature on climate-related educational disruptions in rural and under-resourced settings.

The findings of this study may assist teachers by highlighting practical strategies used to manage interrupted teaching and learning, which could inform future classroom planning during similar disruptions. For school management teams, the study provides evidence that can support improved preparedness, contingency planning, and learner support mechanisms during periods of school closure. At a policy and district level, the study may inform the Department of Education and disaster management authorities about the educational consequences of heavy rainfall–induced school closures. This knowledge can contribute to the development of responsive policies, flexible curriculum support, and disaster preparedness plans aimed at minimising learning loss during climate-related emergencies.

The study contributes academically by foregrounding teachers' lived experiences during a declared disaster, thereby enriching qualitative research on education in crisis contexts and offering a foundation for future studies on climate resilience in schooling.

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➢ *Theoretical Framework*

This study is grounded in Bronfenbrenner's Ecological Systems Theory, which provides a useful lens for understanding how multiple environmental systems influence teaching and learning. The theory posits that a learner's development and educational experiences are shaped by interactions within and across interconnected systems, namely the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1979).

At the microsystem level, heavy rainfall–induced school closures directly affect learners' immediate learning environments, including the classroom, home, and interactions with teachers. Disruptions to daily routines, loss of instructional time, and limited access to learning resources negatively influence learner engagement and academic progress. The mesosystem involves relationships between different microsystems, such as interactions between home and school. School closures weaken communication and collaboration between teachers and parents, making it difficult to support learners' educational needs during prolonged disruptions.

The exosystem includes external environments that indirectly affect learners, such as district education offices and disaster management structures. Decisions regarding school closures, disaster declarations, and the availability of support resources significantly influence how teaching and learning are managed during periods of heavy rainfall (Venegas Marin, Schwarz & Sabarwal, 2024). At the macrosystem level, broader social, economic, and policy contexts shape educational responses to climate-related disruptions. Socio-economic inequalities, rural underdevelopment, and national education and disaster management policies affect the capacity of schools and communities to respond effectively to extreme weather events.

The chronosystem finally, captures the role of time and historical context. The flooding of January 2026 represents a critical event that disrupted schooling and altered teaching and learning trajectories. Comparisons with previous disasters, such as the floods experienced in Southern Africa in 2000, further highlight how repeated environmental crises shape educational experiences over time. By applying Bronfenbrenner's Ecological Systems Theory, this study examines how heavy rainfall–induced school closures influence teaching and learning across multiple environmental levels. The framework enables a holistic understanding of teachers' experiences and highlights the interconnected factors that contribute to educational disruption in rural contexts.

➢ *Research Methodology (Overview)*

This study adopted a qualitative research approach to explore the impact of heavy rainfall–induced school closures on teaching and learning in Mopani District, Limpopo Province. A qualitative approach was considered appropriate as it allows for an in-depth understanding of teachers' experiences, perceptions, and challenges during prolonged school disruptions caused by extreme weather conditions (Kazim, 2024). The study focused on four selected Foundation Phase schools within Mopani District that were affected by flooding and school closures in January 2026. Teachers were purposively selected from these schools because of their direct involvement in teaching and learning and their firsthand experience of the disruptions caused by the heavy rainfall.

Data were collected exclusively through semi-structured telephone interviews, as ongoing flooding made physical access to schools impossible due to damaged roads, collapsed bridges, and unsafe conditions. Telephone interviews allowed the researcher to safely engage with participants while obtaining detailed insights into their experiences during school closures. Ethical considerations, including informed consent, confidentiality, and voluntary participation, were strictly observed throughout the research process. This approach enabled the study to capture authentic teacher perspectives and provide valuable insights into how climate-related disasters disrupt teaching and learning in rural school contexts.

➢ *Organisation of the Article*

The article is organised as follows: the introduction presents the background, problem statement, purpose, and significance of the study. The next section reviews relevant literature related to climate-related school disruptions and teaching and learning. This is followed by a description of the research methodology. The findings are then presented and discussed, and the article concludes with recommendations and implications for policy and practice.

➢ *Data Analysis and Trustworthiness*

Data collected through semi-structured telephone interviews were carefully organised, transcribed, and reviewed to ensure accuracy and completeness. Although the study relied solely on verbal data, every effort was made to capture participants' experiences authentically and to maintain the richness of their responses.

To ensure trustworthiness**,** the study applied key principles of qualitative research:

- *Credibility:*

The researcher engaged directly with participants using in-depth telephone interviews, allowing teachers to describe their experiences in their own words.

- *Dependability:*

All interviews were conducted using a consistent set of guiding questions to ensure reliability of the data collection process.

- *Confirmability:*

The researcher maintained clear records of all interviews and transcriptions, providing transparency and auditability of the findings.

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- *Transferability:*

Detailed descriptions of the study context, participants, and data collection process allow readers to assess the applicability of the findings to similar settings.

This approach ensured that, despite the limitations imposed by flooding and restricted access to schools, the study produced rigorous and trustworthy insights into the impact of heavy rainfall–induced school closures on teaching and learning in Mopani District (Creswell & Poth, 2018).

➢ *Scope and Limitations of the Study*

- *Scope of the Study*

This study focuses on the impact of heavy rainfall–induced school closures on teaching and learning in four selected Foundation Phase schools within Mopani District, Limpopo Province. The study specifically explores teachers' experiences, challenges, and strategies for managing interrupted teaching and learning during and after periods of flooding in January 2026. The research is limited to Foundation Phase teachers, as they play a central role in early learner development and are directly affected by school closures.

The study is geographically confined to Mopani District, a rural area that has been severely affected by flooding, which allows for an in-depth understanding of the local context and the particular challenges faced by rural teachers and learners during extreme weather events.

- *Limitations of the Study*

✓ Data collection constraints: Due to ongoing flooding, the researcher was unable to access schools physically. Data were collected exclusively via telephone interviews, which may limit the richness of non-verbal cues and in-class observations.
✓ Sample size: The study involved teachers from only four schools, which limits generalisability of the findings to all schools in Mopani District or other regions.
✓ Time constraints: The study captured experiences during a specific flooding event in January 2026, which may not reflect experiences during other disasters or at different times.
✓ External factors: Other socio-economic and environmental factors (e.g., poverty, household responsibilities) may also influence learner attendance and engagement, but this study focuses specifically on the impact of heavy rainfall–induced school closures.

Despite these limitations, the study provides valuable insights into the effects of climate-related disruptions on teaching and learning, particularly in rural and flood-prone contexts. The findings can inform strategies for mitigating learning loss and improving preparedness for future extreme weather events.

➢ *Definition of Key Concepts*

- *Heavy Rainfall*

Refers to periods of intense and prolonged precipitation that result in flooding, waterlogged areas, and damage to infrastructure (IPCC, 2022). In this study, it specifically relates to the rainfall that occurred in Mopani District in January 2026, which led to school closures.

- *School Closure*

The temporary suspension of school activities due to circumstances that make it unsafe or impossible for learners and teachers to attend, such as extreme weather events (UNESCO, 2021). In this study, school closure refers to the suspension of teaching and learning during and after heavy rainfall in Mopani District.

- *Teaching and Learning*

The interactive processes between teachers and learners that facilitate knowledge acquisition, skills development, and learner engagement (Darling-Hammond et al., 2020). This study focuses on the continuity and disruption of teaching and learning during heavy rainfall–induced school closures.

- *Learner Engagement*

The degree of attention, participation, and involvement demonstrated by learners in educational activities (National Center on Safe Supportive Learning Environments [NCSSLE], 2025). In this study, learner engagement is examined in the context of school closures and the challenges teachers face in maintaining learning continuity.

- *Foundation Phase*

The first phase of formal schooling in South Africa, typically comprising Grades R to 3, where learners develop foundational literacy, numeracy, and life skills. This study focuses on Foundation Phase teachers and learners affected by heavy rainfall–induced disruptions.

- *Teacher Experiences*

The perceptions, challenges, strategies, and emotional responses of teachers as they navigate teaching and learning during periods of school closure. This study explores these experiences to understand the impact of heavy rainfall on educational processes.

II. LITERATURE REVIEW

➢ *Introduction to the Literature Review*

This section reviews existing research on the effects of extreme weather and climate-related events on education systems, with a focus on how school closures impact teaching and learning. The review includes global and regional evidence on school disruptions due to climate hazards such as floods, storms, and heavy rainfall, and highlights gaps in the literature regarding rural and under-resourced contexts like Mopani District, South Africa.

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➢ *Global Evidence on Climate-Related School Closures*

Climate change and extreme weather events are increasingly disrupting education systems worldwide. A recent World Bank report highlights that more than 400 million learners have been affected by climate-related school closures since 2022, with low- and middle-income countries bearing the greatest burden. The report notes that climate shocks can cause significant learning losses, with learners in affected regions losing an average of 18 school days annually due to extreme weather events, such as floods and storms.

A review of evidence on the impact of extreme weather on education found that events such as floods, tropical cyclones, and wildfires precipitate school closures that halt learning. These disruptions not only reduce instructional time but also negatively affect educational outcomes through mechanisms such as increased health risks, displacement, and loss of teaching continuity.

Additional global data from UNICEF reports that in 2024 alone at least 242 million learners experienced interrupted schooling because of climate crises, including flooding. These disruptions were especially pronounced in low-resource settings, where infrastructure and emergency preparedness are limited.

➢ *Impact of Weather Events on Teaching and Learning*

Studies show that school closures due to environmental hazards directly impact both teaching and learning processes (Sondlo, 2025). When schools close, curriculum coverage is interrupted, making it difficult for teachers to complete planned content and meet expected learning outcomes within an academic year. Research in contexts with frequent extreme weather events demonstrates that even short-term closures can lead to measurable learning loss, as learners miss essential instructional time.

In addition to instructional loss, extreme weather also affects learners' ability to attend school regularly (Venegas Marin, Schwarz, & Sabarwal, 2024). Flooded or damaged roads and infrastructure can make travel unsafe or impossible, increasing absenteeism and limiting engagement. A study on climate change and education in rural Zambia found that floods and heavy rains made roads impassable and disrupted regular attendance, which negatively influenced academic performance, particularly in subjects requiring consistent practice such as mathematics and literacy.

Beyond physical access to school, climate hazards can have indirect effects on learning. Learners affected by floods or storms may face food insecurity, health risks, and displacement from their homes, conditions that reduce concentration, memory, and overall, well-being, further undermining educational outcomes.

➢ *Teachers' Experiences and Challenges During Disruptions*

While much of the literature focuses on learners, research also highlights the challenges teachers face during climate-related school closures. Teachers often struggle to adapt lesson plans, maintain learner engagement, and support learners who fall behind academically when schools are closed unexpectedly. Evidence from studies in diverse contexts, including developed and developing regions, suggests that teachers need support, training, and resources to manage instructional continuity during and after extreme weather events (Darling-Hammond et al., 2020).

In Australia, for example, research on localised weather emergencies demonstrated that school principals and teachers often lack adequate support systems and standardised protocols for managing classroom safety and communication during extreme events, underscoring the need for policy-level intervention and disaster preparedness in education (Gibbs et al., 2020).

➢ *Climate Vulnerability in Rural Education Contexts*

Rural schools are especially vulnerable to climate hazards due to poor infrastructure, limited access to resources, and lower levels of institutional support. Research in South Africa shows that rural and township schools frequently suffer disproportionately from environmental disruptions because of older infrastructure, lack of climate-resilient buildings, and weak connections between educational departments and local government disaster responses (Sundararajan, & Cloete, 2022). These vulnerabilities often translate into greater educational disruption and slower recovery after disasters, further widening educational inequalities between rural and urban settings. Effective responses require long-term planning, infrastructure investment, and community engagement to ensure that education systems are resilient in the face of climatic shocks.

➢ *Summary of Literature Gaps*

Despite growing evidence that climate-related events significantly disrupt schooling, there are still gaps in research on how these disruptions specifically affect teaching practices, teacher experiences, and instructional strategies, especially in rural and under-resourced settings like Mopani District. Few studies have focused on qualitative insights from teachers themselves, highlighting a need for research that captures how teachers manage curriculum delivery, engagement, and assessment under conditions of prolonged school closures due to heavy rainfall and flooding.

III. RESEARCH METHODOLOGY

➢ *Research Approach*

This study adopted a qualitative research approach to explore the impact of heavy rainfall–induced school closures on teaching and learning in Mopani District, Limpopo Province. A qualitative approach was considered appropriate as it allows for an in-depth understanding of teachers' experiences, perceptions, and challenges during periods of prolonged school disruption caused by extreme weather conditions.

➢ *Study Setting*

The study was conducted in four Foundation Phase schools in Mopani District, a rural area severely affected by heavy rainfall in January 2026. Persistent flooding disrupted access to schools, destroyed infrastructure, and caused

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significant community displacement, creating an urgent context for understanding the effects of school closures on teaching and learning.

➢ *Population and Sampling*

The population comprised Foundation Phase teachers from the four selected schools. Purposive sampling was used to select participants who had direct experience of teaching during the flood-related school closures, ensuring the study captured rich and relevant insights.

➢ *Data Collection*

Data were collected exclusively through semi-structured telephone interviews, as physical access to schools was impossible due to flooded roads, collapsed bridges, and unsafe conditions. Telephone interviews enabled the researcher to safely engage with participants and obtain detailed descriptions of their experiences during school closures.

Each interview lasted approximately 30–45 minutes, following a set of guiding questions focused on teaching challenges, curriculum disruption, learner engagement, and coping strategies. Participants were informed about the purpose of the study and provided verbal consent, ensuring ethical compliance.

➢ *Data Analysis*

Interview data were carefully transcribed, organised, and coded to identify recurring patterns and themes. The analysis focused on understanding teachers' experiences and the effects of school closures on teaching and learning. Despite the reliance on verbal data alone, the study maintained the richness and depth of of participants' perspectives.

IV. PRESENTATION OF FINDINGS

➢ *Introduction*

This section presents the qualitative findings of the study, which explored the experiences of Foundation Phase teachers during the heavy rainfall–induced school closures in Mopani District in January 2026. The purpose of this section is to provide a detailed account of teachers' experiences, focusing on the effects of school closures on curriculum coverage, learner engagement, academic performance, and teacher coping strategies. Data were collected through semi-structured telephone interviews with teachers from four schools in the district. Thematic analysis (Braun & Clarke, 2021) was used to identify four main themes that reflect the challenges, impacts, and responses associated with the closures. Figures and tables are included to illustrate patterns and support the qualitative narrative.

➢ *Effects of School Closures on Curriculum Coverage*

Teachers reported that prolonged school closures significantly disrupted curriculum delivery, leaving them under pressure to complete planned lessons in a shorter timeframe once schools reopened.

- *Teacher A (School 1):*

"We lost almost two weeks of teaching before the learners could even return. Catching up with the syllabus has become a daily struggle, and I have to rush through topics to meet the year plan."

- *Teacher B (School 3):*

"Some lessons had to be shortened, and practical activities were reduced. Learners couldn't fully grasp concepts, especially in Mathematics and Science, because we had to move faster."

- *Teacher C (School 2):*

"Even with extra lessons, some learners are falling behind because they didn't get enough time to practice what they learned. Catching up is not easy, especially for slow learners."

Teachers reported using remedial strategies such as combining topics into single lessons, peer-assisted learning, and increasing homework assignments. However, accelerated teaching often compromised learner comprehension, particularly in literacy and numeracy.

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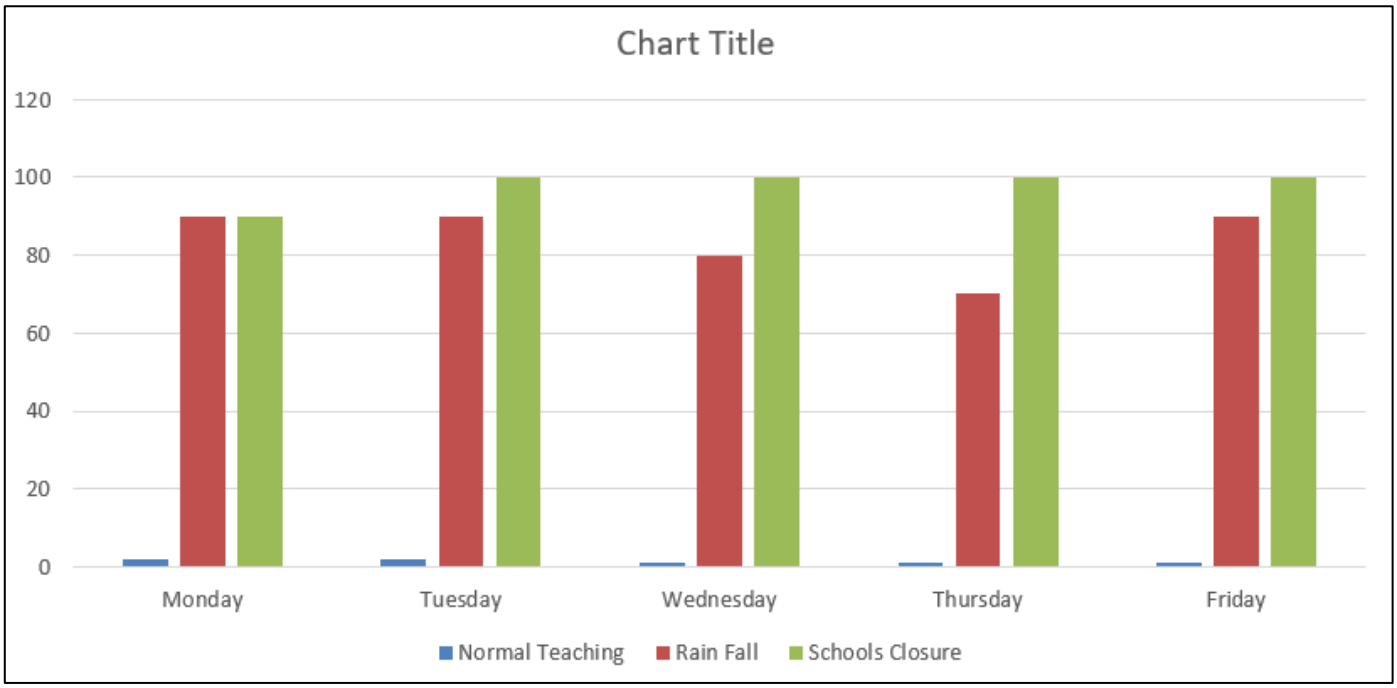

Fig 1 Timeline of School Closures and Lost Instructional Days

➢ *Learner Engagement During and After Closures*

Teachers observed a decline in learner engagement during the closures and in the immediate period after schools reopened. Many learners had limited access to learning resources at home, leading to uneven learning progress.

- *Teacher D (School 4):*

"Some learners did not study at home during the closure. When they returned, they were less confident and struggled to participate in class activities."

- *Teacher E (School 1):*

"The learners were restless, and motivation was low. Even simple exercises took longer because many forgot what we had taught before the closures."

Teachers implemented additional engagement strategies such as interactive group work and peer tutoring to rebuild learners' confidence and participation.

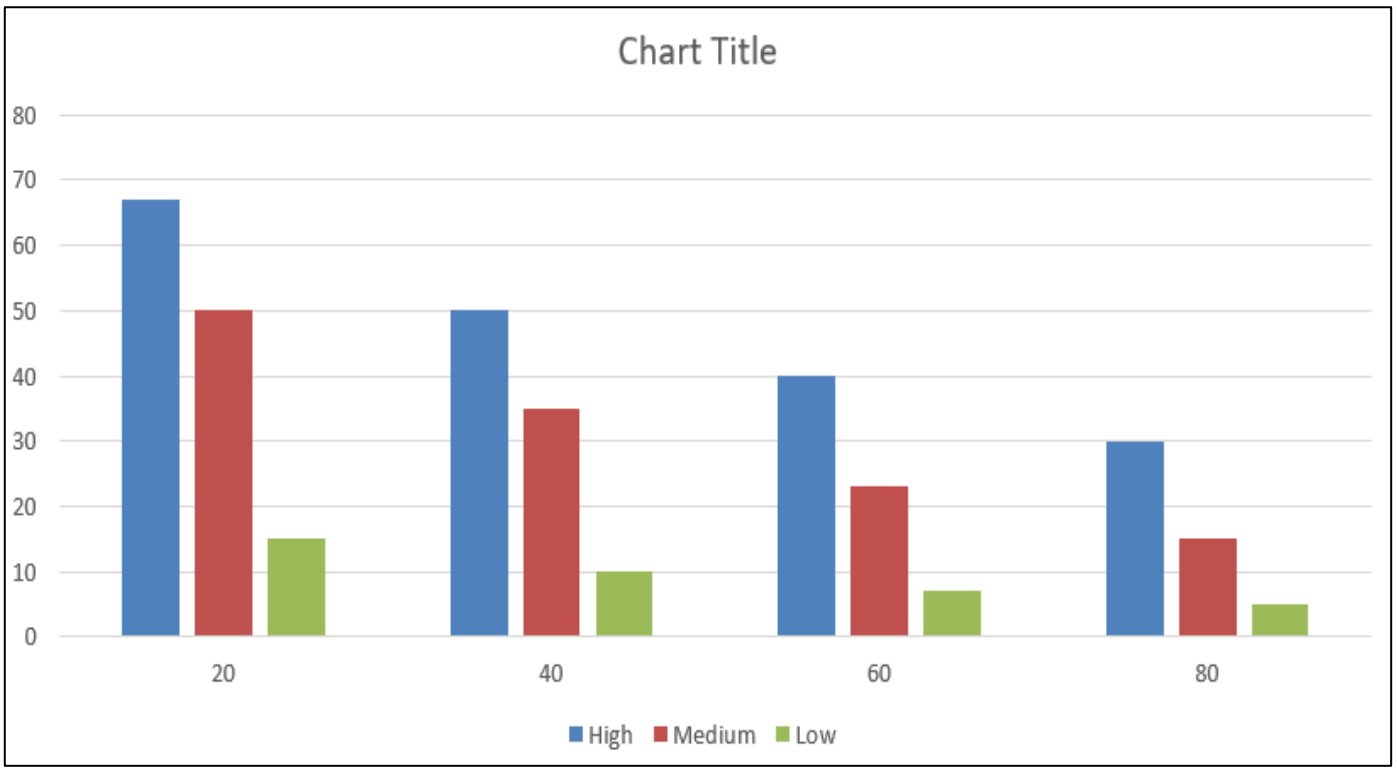

Fig 2 Teacher Perceptions of Learner Engagement Before and After Closures

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➢ *Impact on Learner Academic Performance*

Teachers noted that closures negatively affected learners' academic performance. Post-closure assessments showed lower achievement, particularly in core subjects.

- *Teacher F (School 2):*

"Tests showed a drop in performance, especially in Mathematics and English. Learners forgot key concepts because of the break, which affected their results."

- *Teacher G (School 3):*

"Learners who were already struggling before the closures fell further behind. It widened the gap between high-performing and low-performing learners."

These findings suggest that school closures exacerbate existing educational inequalities, with learners from disadvantaged backgrounds disproportionately affected.

➢ *Teacher Coping Strategies and Adaptations*

Teachers reported implementing several strategies to manage the impact of closures:

- Remedial lessons and extra classes – Conducted after-school or weekend lessons to cover missed content.
- Peer-assisted learning – High-performing learners assisted peers struggling with concepts.
- Integration of topics – Lessons condensed to cover multiple objectives in a single session.
- Use of teaching aids – Reliance on visual aids, worksheets, and group activities to accelerate understanding.

- *Teacher H (School 4):*

"We worked extra hours to ensure learners understand the lessons. It's exhausting but necessary. We also asked learners to help each other, which has been somewhat effective."

- *Teacher I (School 1):*

"Using interactive exercises helped learners catch up faster, but it doesn't replace the lost time. We need contingency plans for future disruptions."

➢ *Summary of Findings*

This section presented the qualitative findings, highlighting the complex challenges arising from heavy rainfall–induced school closures in Mopani District. The findings are summarized under four interconnected themes:

- *Effects on Curriculum Coverage:*

School closures disrupted the planned curriculum, forcing teachers to accelerate lessons and reduce practical activities.

- *Learner Engagement:*

Motivation and participation decreased, with learners returning to school with knowledge gaps.

- *Academic Performance:*

Assessments showed declines in learner achievement, particularly among low-performing learners, widening achievement gaps.

- *Teacher Coping Strategies:*

Teachers adopted remedial lessons, peer-assisted learning, condensed lessons, interactive exercises, and increased homework. While partially effective, these strategies could not fully replace lost instructional time.

Overall, the findings emphasize the multidimensional and interconnected impact of school closures on teaching, learning, and learner outcomes. They underscore the need for proactive planning, school support systems, and contingency measures to minimize disruption during extreme weather events.

V. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

➢ *Introduction*

This section discusses the findings presented in section 4 in relation to the study's objectives, the theoretical framework (Bronfenbrenner's ecological systems theory), and existing literature. The section also presents conclusions drawn from the study and provides recommendations for policy, practice, and future research.

➢ *Discussion of Findings*

The discussion is organised around the main themes from section 4: curriculum coverage, learner engagement, academic performance, and teacher coping strategies.

- *Curriculum Coverage*

The study found that heavy rainfall–induced school closures disrupted the planned curriculum. Teachers were forced to accelerate lessons, reduce practical activities, and condense topics to meet the syllabus requirements.

✓ *Link to Theory:*

Bronfenbrenner's ecological systems theory highlights how external environmental factors (macrosystem: weather/climate) influence the microsystem (school classroom). School closures, an external stressor, affected classroom interactions and learning experiences.

✓ *Literature Support:*

Similar findings in South African studies (e.g., Ntuli, 2023) indicate that unplanned school closures often result in incomplete syllabus coverage and increased teacher workload.

- *Learner Engagement*

Learner engagement declined during and after the closures. Teachers reported decreased motivation, attention, and participation, especially among learners lacking support at home.

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✓ *Theory Link:*

According to Bronfenbrenner, disruptions in the exosystem (community/family challenges during rainfall) affect learner engagement in the microsystem (classroom).

✓ *Literature Support:*

Studies in Kenya and Nigeria show that environmental disruptions, including weather-related school closures, reduce learner engagement and participation (Omondi, 2020; Adebayo, 2021).

- *Academic Performance*

Assessments conducted after reopening showed a decline in learner achievement, particularly in Mathematics and English. Low-performing learners were disproportionately affected, widening achievement gaps.

✓ *Theory Link:*

The mesosystem interaction (school, home, and teacher strategies) influences learner outcomes. Limited home support during closures exacerbates performance gaps.

✓ *Literature Support:*

International studies in the United States and Australia have documented similar outcomes where school closures negatively affect academic performance, particularly for learners in disadvantaged communities (Patton, 2022).

- *Teacher Coping Strategies*

Teachers demonstrated resilience by implementing remedial lessons, peer-assisted learning, interactive activities, and condensed lessons. While partially effective, these strategies could not fully mitigate lost instructional time.

✓ *Theory Link:*

Bronfenbrenner's theory suggests that teacher agency in the microsystem can partially buffer the negative effects of external disruptions.

✓ *Literature Support:*

Teachers globally adopt similar coping strategies during school closures, emphasizing the importance of proactive planning and support from school management (Borg & Gall, 2020).

➢ *Conclusions*

From the study, the following conclusions can be drawn:

- Heavy rainfall–induced school closures have a significant negative impact on curriculum coverage, learner engagement, and academic performance in Foundation Phase classrooms.
- Learners from disadvantaged backgrounds are disproportionately affected due to limited home support and access to learning resources.
- Teachers' coping strategies are crucial but cannot fully compensate for lost instructional time, highlighting the need for structured contingency plans.
- The findings confirm that environmental factors, such as weather disruptions, are key determinants of educational outcomes, aligning with Bronfenbrenner's ecological systems theory.

➢ *Recommendations*

- *Policy Recommendations*

✓ Develop district-level contingency plans for school closures due to extreme weather.
✓ Provide digital or printed learning materials for learners to use at home during closures.
✓ Ensure that schools in vulnerable areas receive additional resources to mitigate learning losses.

- *School-Level Recommendations*

✓ Implement remedial classes and accelerated catch-up programs after closures.
✓ Train teachers in adaptive teaching strategies for handling curriculum disruptions.
✓ Foster stronger school–home partnerships to support learners during closures.

- *Recommendations for Future Research*

✓ Conduct longitudinal studies to assess long-term academic effects of school closures.
✓ Explore the impact of digital learning tools in mitigating learning disruptions.
✓ Investigate the psychosocial impact of repeated school closures on learners.

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