

Exploring Interconnection of Rural Female Learners' Psychological Resilience and Academic Achievement Amidst Climate Change in Zimbabwe

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Abstract

This qualitative study explored the intricate relationship between the psychological resilience of rural female learners and their academic achievement in the context of climate change in Zimbabwe. Focusing on two secondary schools in the Masvingo North region, the research employed a case study design to examine the lived experiences of 13 participants, including learners, educators, and community members. Despite the growing body of literature on climate change and education, a specific gap existed regarding the interplay between psychological resilience and academic performance among rural female learners in Zimbabwe. This study aimed to fill that gap by providing nuanced insights into how environmental challenges impacted learners' psychological well-being and educational outcomes. Through focus group discussions, the research captured authentic narratives, revealing that enhanced resilience led to improved academic performance among participants. Thematic analysis of the data highlighted critical patterns. One finding was that enhanced psychological resilience positively influenced academic performance among rural female learners facing climate change challenges. Therefore, it was recommended that stakeholders implement targeted resilience-building programs in rural schools to support female learners' academic achievements.

Keywords: *Academic Achievement, Climate Change, Psychological Resilience, Rural Education, Zimbabwe.*

Introduction and Background

The intricate relationship between psychological resilience and academic achievement among rural female learners, particularly in the context of climate change in Zimbabwe, remains a critical area of investigation that is still to be explored. Climate change has exacerbated existing socio-economic vulnerabilities, disproportionately affecting marginalized communities, especially women and girls (Accardo et al, 2019). In Zimbabwe, where rural communities often rely on agriculture, shifts in climate patterns lead to food insecurity, resource scarcity, and heightened socio-economic pressures, thereby impacting educational outcomes (Drews, 2020). Psychological resilience, defined as the capacity to adapt positively in the face of adversity, has emerged as a vital construct in educational psychology, influencing learners' ability to navigate challenges (Adewumi et al, 2019). Research indicates that resilient individuals tend to exhibit higher academic performance, better emotional regulation, and improved coping mechanisms (Barley et al, 2017). However, the specific dynamics of how resilience interacts with academic achievement among rural female learners in the context of climate-induced stressors have not been adequately explored, presenting a significant research gap.

Previous studies have primarily focused on urban settings or generalized resilience factors without considering the unique socio-cultural and environmental contexts of rural Zimbabwean communities (Chidarikire & Nyokanhetem 2024). For instance, while interventions aimed at enhancing resilience have shown promise in urban schools, the applicability and effectiveness of such strategies in rural settings, where educational resources are scarce and gender disparities are pronounced, remain largely unexamined (Almog, 2018a). Moreover, the intersectionality of gender, socio-economic status, and environmental factors necessitates a nuanced understanding of how rural female learners perceive and respond to climate challenges (Aikman & Rao, 2012). Educational implications of this research are profound. By understanding the interplay between psychological resilience and academic achievement, stakeholders can develop targeted interventions to support rural female learners. For example, resilience-building programs that incorporate

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local cultural practices and community engagement could enhance both psychological well-being and academic performance (Becker et al., 2019). Additionally, policies that address climate adaptation in education systems are essential to foster an environment conducive to learning and personal growth (Chiu, et al, 2019). Therefore, this study seeks to fill a critical gap in the literature by examining the interconnection of psychological resilience and academic achievement among rural female learners in Zimbabwe amidst the challenges posed by climate change. By doing so, it aims to contribute to the growing body of knowledge that informs educational practices and policies tailored to the unique needs of these learners.

Literature Review

The intersection of psychological resilience and academic achievement among rural female learners in the context of climate change is a burgeoning area of research, particularly pertinent in Zimbabwe. This literature review synthesizes findings from various countries, including the United States, Britain, Nigeria, Botswana, and South Africa, to elucidate the unique challenges and opportunities faced by rural female learners in Zimbabwe. Psychological resilience, defined as the capacity to recover from difficulties, is crucial for academic success, especially in the face of climate-induced adversities (Bialka et al, 2017). In Zimbabwe, rural female learners often grapple with the dual pressures of educational demands and the impacts of climate change, such as food insecurity and resource scarcity (Chikuvadze, 2020). Studies indicate that resilience can significantly enhance academic performance by fostering adaptive coping strategies (Boeger & Corkin, 2017). This is echoed in research from South Africa, where female learners demonstrated improved academic outcomes when supported by resilience-building programs that addressed both psychological and socio-economic barriers (Christie, 2020).

In contrast, research from the United States highlights a more structured approach to resilience training within educational frameworks. Programs that integrate social-emotional learning have shown promise in enhancing resilience among learners, thereby improving their academic performance (Bane, 2017). This suggests that while Zimbabwean rural learners face unique challenges, there may be valuable lessons to be drawn from the American context regarding the implementation of resilience-focused educational interventions. Then the impact of climate change on educational outcomes is particularly pronounced for female learners in rural settings. In Nigeria, for instance, studies have shown that climate change exacerbates existing gender disparities in education, as girls are often pulled from school to assist with household responsibilities during climate crises (Ogunyemi et al., 2020). This phenomenon is mirrored in Zimbabwe, where the burden of climate change disproportionately affects female learners, limiting their educational opportunities and psychological well-being.

Conversely, Botswana's approach to addressing these disparities through community-based programs has yielded positive results. Initiatives aimed at empowering women and girls through education and climate resilience training have been effective in enhancing both psychological resilience and academic achievement (Mogomotsi et al., 2021). Such programs underscore the importance of localized solutions that consider cultural and environmental contexts, a strategy that could be beneficial if adapted for Zimbabwean rural settings.

In Britain, the focus has shifted towards integrating climate education within the curriculum, emphasizing the importance of environmental awareness in fostering resilience among learners (Almog, 2018b). This educational model not only prepares learners to face climate challenges but also enhances their academic engagement and performance. The implications for Zimbabwe are significant; incorporating climate education into the curriculum could empower rural female learners, equipping them with the knowledge and skills necessary to navigate the complexities of climate change while simultaneously bolstering their academic resilience. Despite the growing body of literature on resilience and academic achievement, significant gaps remain, particularly concerning the specific experiences of rural female learners in Zimbabwe. Most existing studies tend to focus on urban populations or fail to adequately address the intersectionality of gender, socio-economic status, and environmental challenges (Boyle & Erson, 2020). Furthermore, while comparative studies exist, they often overlook the unique cultural and contextual factors that influence the experiences of Zimbabwean learners (Mahanya, 2020).

This study aims to fill these gaps by providing a nuanced understanding of how psychological resilience interacts with academic achievement among rural female learners in Zimbabwe amidst climate change. By drawing on comparative insights from the United States, Britain, Nigeria, Botswana, and South Africa, this research will contribute to a more comprehensive framework for developing targeted interventions that support these learners in overcoming the multifaceted challenges they face. In addition, the findings from this literature review underscore the necessity for educational policies that are responsive to the unique challenges posed by climate change for rural female learners. Implementing resilience-building programs, integrating climate education into curricula, and fostering community support systems are critical steps that can enhance both psychological resilience and academic achievement (Bialka et al, 2017). Such initiatives not only empower learners but also contribute to broader societal resilience in the face of climate change.

Theoretical framework

In exploring the interconnection of rural female learners' psychological resilience and academic achievement amidst climate change in Zimbabwe, the study can be effectively framed using Ecological Systems Theory, primarily articulated by Urie Bronfenbrenner. This theoretical framework posits that human development is influenced by the intricate interplay of various environmental systems that interact with the individual (Kufakunesu & Chinyoka, 2017). Central to this theory are several key tenets: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem, each of which provides a lens through which to understand the multifaceted experiences of rural female learners in the context of climate change (Cottingham, et al, 2017). The microsystem refers to the immediate environments in which individuals engage, such as family, school, and peer relationships. For rural female learners in Zimbabwe, strong familial support and conducive learning environments are critical for fostering psychological resilience, which has been shown to significantly impact academic performance (Brophy et al, 2021). The mesosystem encompasses the interactions between these microsystems; for instance, the relationship between a learner's home environment and their school can profoundly shape educational outcomes (Engelbrecht & Muthukrishna, 2019). Given the stressors introduced by climate change—such as diminished agricultural productivity—these factors can adversely affect learners' educational engagement and success (Bruffaerts et al, 2018).

The exosystem includes broader social systems that indirectly influence individuals, such as government policies and economic conditions (Engelbrecht et al, 2017). In the context of climate change, supportive educational policies that provide resources to rural communities can mitigate the adverse effects of environmental stressors on female learners' resilience and academic achievement (Chidarikire & Saruchera, 2024). The macrosystem reflects the overarching cultural and societal norms that shape individual experiences (Fleming et al, 2017). In Zimbabwe, prevailing gender norms can significantly impact educational access and opportunities for female learners, creating barriers that hinder their academic achievement, particularly in the face of climate-induced challenges (Chidarikire & Maduro, 2024). Finally, the chronosystem considers the dimension of time, addressing how changes in environmental conditions over time, such as increased frequency of droughts, can affect educational landscapes and the psychological resilience of learners (Francis et al, 2019).

Applying Ecological Systems Theory to this study facilitates a comprehensive understanding of how these interconnected systems influence the psychological resilience and academic outcomes of rural female learners amidst climate change. For instance, the study can investigate how familial support (microsystem) and educational policies (exosystem) interact to either enhance or obstruct academic success under climate stressors. Moreover, the research can delve into how cultural attitudes towards gender (macrosystem) impact educational engagement, particularly as these learners face climate-related adversities.

Significance of the study

- For rural teachers, this research elucidates the pivotal role that psychological resilience plays in mediating academic outcomes. By comprehending the intricate relationship between resilience and achievement, educators can devise innovative pedagogical approaches that not only cater to the cognitive development of their learners but also address their emotional and psychological needs. Such an understanding could enhance teaching efficacy and foster a supportive learning environment.
- Rural female learners are at the heart of this inquiry, as the findings underscore the necessity of cultivating resilience as a means of navigating the multifaceted challenges posed by climate change. By fostering an understanding of their own psychological strengths, these learners can bolster their academic performance and personal development, thus paving the way for enhanced educational attainment and empowerment.
- The Ministry of Primary and Secondary Education stands to benefit from the insights garnered through this study by informing policy-making processes that prioritize the emotional well-being and educational success of rural female learners. This research advocates for the integration of resilience-building programs into the national curriculum, thereby promoting a comprehensive educational framework that addresses both academic and psychosocial dimensions.
- The Department of Meteorological Services may find this study particularly relevant, as it highlights the intersection of climate change and education. By collaborating with educational institutions, they can contribute to the creation of educational materials that equip learners with the knowledge necessary to understand and respond to environmental challenges, thereby fostering a climate-literate populace.
- For rural parents, the significance of this study lies in its emphasis on the critical role they play in nurturing resilience within their daughters. By supporting their emotional and academic endeavours, parents can enhance their children's ability to cope with climate-related adversities, ultimately reinforcing the value of education as a means of securing a more sustainable future.
- Researchers will find this study valuable as it contributes to the existing body of literature on the interplay between psychological resilience, gender, and environmental impact on education. It opens avenues for further exploration into how these factors intersect, thereby enriching the academic discourse surrounding educational resilience and climate adaptation strategies.
- The involvement of village heads and members of parliament is crucial for advocating policies that address the educational and environmental needs of rural communities. This research provides empirical evidence that can support initiatives aimed at improving access to education and resilience among rural female learners, thus fostering community development and sustainable practices in the face of climate change.
- Counsellors will find the findings particularly significant, as they underscore the necessity of integrating resilience-building strategies into their support frameworks for learners. By equipping learners with coping mechanisms and emotional support, counsellors can facilitate a more holistic approach to education that prioritizes mental health alongside academic achievement.

Research Objectives

- To examine level of psychological resilience among rural female learners.
- To Assess impact of climate change on academic achievement.
- To explore strategies to mitigate impact of climate change on educational attainment of rural female Learners.

Research Questions

- What are key factors that contribute to psychological resilience of rural female learners in the context of climate change in Zimbabwe?
- In what ways does climate change impact academic performance of rural female learners?
- What strategies can be developed to mitigate impact of climate change on educational attainment of rural female learners?

Research Methodology

This qualitative study aims to explore the intricate interconnection between the psychological resilience of rural female learners and their academic achievement amidst the challenges posed by climate change in Zimbabwe. Employing a case study research design, the study concentrates on two rural secondary schools in the Masvingo North region. This methodology is particularly pertinent given the complex social, environmental, and educational factors influencing the participants' experiences. The case study approach allows for an in-depth exploration of the participants' lived experiences, providing rich qualitative data that can illuminate the nuances of psychological resilience and academic performance (Graham et al, 2020). This design is suitable for understanding the multifaceted impacts of climate change on education, as it facilitates the examination of contextual variables within specific settings (Harrer et al, 2017). A total of 13 participants were purposively selected to ensure a diversity of perspectives relevant to the study's objectives. The selection criteria included gender, expertise, geographical location, and educational level. This strategic approach aligns with the principles of purposeful sampling, which is essential in qualitative research to obtain participants who can provide significant insights into the phenomenon under investigation (Helen et al, 2018). The participants comprised five rural female learners aged 15 to 17, two teachers, two parents, two officials from the Ministry of Primary and Secondary Education, one counsellor, one village head, one member of parliament, and one representative from the Meteorological Services Department. This diverse ensemble ensures a comprehensive understanding of the educational and environmental contexts affecting rural female learners (Graneheim, et al, 2017).

Data collection was executed through two focus group discussions: one with the young learners and the other with adult participants. This methodological choice was deliberate, aimed at mitigating power dynamics that often inhibit young learners from expressing their views openly in the presence of adults (Hillier et al, 2019). By facilitating a space where learners felt comfortable sharing their experiences, the study aimed to capture authentic narratives that reflect their psychological resilience and academic challenges. Focus groups are particularly effective in qualitative research as they encourage interaction among participants, which can elicit richer data than individual interviews (Jaakkola, 2020). The discussions were guided by semi-structured questions, allowing for flexibility while ensuring that critical themes related to resilience and academic achievement were addressed (Karellou, 2019).

The data generated from the focus group discussions were thematically analysed, following Braun and Clarke's (2006) six-phase framework. This analytic process involved familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. The thematic approach is advantageous in qualitative research as it allows for the identification of patterns and themes that encapsulate the participants' experiences (Kitching, 2019). Ethical considerations were paramount throughout the research process. Informed consent was obtained from all participants, ensuring that they understood the purpose of the study and their right to withdraw at any time (Creswell & Poth, 2018). Confidentiality was strictly maintained, with all personal identifiers removed from the data to protect the participants' privacy (Lombardi, et al, 2018).

Discussion and Findings

Theme 1: Participants' Responses on Psychological Resilience Among Rural Female Learners

The following are verbal responses from participants on this theme. The findings and discussions illuminate the intricate dynamics of psychological resilience among rural female learners. We argue that, educational initiatives that focus on fostering supportive relationships and addressing external challenges are essential for enhancing the resilience of these learners, ultimately facilitating their academic success.

Female Learner narrated that,

"As a rural female learner, I often face numerous challenges that test my strength and determination. There are days when I feel overwhelmed, especially when the weather affects our crops, which in turn affects my family's finances. But I remind myself of my goals—like wanting to go to university and become a teacher. This vision keeps me motivated. I believe resilience is about bouncing back, but also about using the support from my friends and family to keep pushing forward, no matter the obstacles."

On the other hand, the Teacher noted that,

"In my experience as a teacher in this rural setting, I've observed that the psychological resilience of female learners is significantly shaped by their environment. Many of my learners' face challenges such as food insecurity and limited access to educational materials. However, I've seen remarkable strength in them. For instance, one learner, despite her family's struggles, consistently engages in class discussions and seeks help when she needs it. This shows a level of self-awareness and courage that is pivotal to resilience. I often encourage them to share their experiences, which helps build a supportive classroom community. I believe resilience is not just an individual trait; it can be fostered through relationships and a nurturing environment. Our role as educators is to create a safe space where learners feel empowered to express their challenges and triumphs."

Additionally, Counsellor observed that,

"As a counsellor, I work closely with rural female learners, and I can affirm that their psychological resilience is often remarkable, yet complex. Many of these girls carry the weight of familial responsibilities alongside their academic pursuits. During our sessions, I encourage them to articulate their feelings about the pressures they face. For example, one girl shared how she juggles her schoolwork with helping her mother at home. Despite the stress, she expressed a deep desire to succeed and support her family. This intrinsic motivation is a key aspect of their resilience. I also emphasize the importance of coping strategies, such as mindfulness and peer support, to help them manage stress. It is clear that resilience is multifaceted, encompassing emotional strength, social support, and personal aspirations, all of which are vital for their academic success in the face of adversity."

From above submissions by the participants following are findings and discussions. The narratives from participants reveal significant findings into the psychological resilience of rural female learners. The female learner's account highlights the interplay between personal aspirations and external challenges. She articulates, "I often face numerous challenges that test my strength and determination," indicating that resilience is not merely an individual trait but is also influenced by external stressors such as weather impacting agricultural outputs. This aligns with the ecological systems theory proposed by Urie Bronfenbrenner, which posits that individuals are shaped by multiple interrelated systems, including their immediate environment and broader societal factors (Lombard et al, 2018). The teacher's observations further support this notion, as she notes, "the psychological resilience of female learners is significantly shaped by their environment." This reflects the microsystem component of Bronfenbrenner's theory, wherein the immediate educational environment plays a crucial role in fostering resilience (Lovett et al, 2019). The teacher's experience with learners facing food insecurity underscores the importance of access to resources in building resilience—an idea supported by Macupe (2020), who emphasize that resource availability impacts learner motivation and resilience. The counsellor's perspective adds another layer of complexity, indicating that many learners carry familial responsibilities alongside academic pressures. The counsellor states, "I encourage them to articulate their feelings about the pressures they face," highlighting the importance of emotional expression in resilience. This supports the findings of Mahlo (2017), who argues that emotional and social competencies are critical for resilience, particularly in challenging

environments. The narratives collectively underscore that resilience in rural female learners is multifaceted, requiring both internal motivation and external support systems.

Then discussions on data presented indicate that psychological resilience among rural female learners is influenced by a combination of personal aspirations, environmental factors, and social support systems. The female learner's focus on her educational goals demonstrates the intrinsic motivation that fuels resilience. As noted by Parliamentary Monitoring Group (2020), self-efficacy and goal-setting are essential for fostering resilience in educational contexts. This implies that educators should encourage goal-oriented behaviour among learners to cultivate resilience. Furthermore, the teacher's observation about the impact of environmental challenges on learners' resilience suggests that schools in rural areas must adopt a holistic approach to education. Creating supportive environments, as emphasized by the counsellor, is crucial and this aligns with Bronfenbrenner's idea that nurturing environments within the microsystem can enhance individual development (Mckenzie et al, 2020). Educators should implement programs that address food security and provide resources to mitigate these environmental challenges, fostering resilience among learners (Morina & Biagiotti, 2021). Additionally, the counsellor's emphasis on coping strategies such as mindfulness and peer support highlight the necessity of emotional and social skills in building resilience. Research by Muthukrishna and Engelbrecht (2018) supports the idea that social support networks are vital for academic success and resilience. Thus, schools should prioritize mental health resources and peer support programs to assist learners in managing stress effectively.

Theme 2: To Assess impact of climate change on academic achievement

Following are oral responses from each participant regarding the objective of assessing the impact of climate change on academic achievement. These responses reflect the diverse perspectives on how climate change impacts academic achievement, highlighting the need for collaboration and proactive measures.

Member of Parliament was of the view that,

"As a representative of the community, I recognize that climate change poses significant challenges, not just to our environment but also to our education system. Research indicates that extreme weather events disrupt schooling, leading to lower attendance and, consequently, poorer academic performance. It is crucial for us to integrate climate education into our curriculum and ensure that our schools have the infrastructure to withstand these changes. We must advocate for policies that support both climate resilience and educational equity."

On the other hand, Female Learner held that,

"I have noticed that when there are heavy rains or extreme heat, it can be really hard to focus in class. Sometimes, schools close because of floods, and we miss important lessons. It's frustrating because I want to learn and do well, but climate change makes it harder. I believe we need more discussions about how to cope with these changes at school, so we can keep learning no matter the weather."

Furthermore, Teacher argued that,

"As an educator, I've seen firsthand how climate change affects my learners' learning experiences. Disruptions from natural disasters can lead to increased absenteeism, and learners often come to school stressed due to family challenges related to climate impacts. Furthermore, the curriculum needs to adapt to include climate literacy, preparing learners for future challenges. We must also provide emotional support to help learners cope with these issues so they can focus on their education."

More so, Department of Meteorological Services Representative shared that,

"Our role is to provide accurate climate data and forecasts, which are essential for understanding the changes in our environment. We have observed a direct correlation between climate events and disruptions in education. By working closely with educational authorities, we can help develop adaptive strategies that

schools can implement to mitigate these impacts. Additionally, we advocate for integrating climate science into educational programs, fostering a generation that is informed and prepared to address these challenges."

The above statements by participants unpacked the relationship between climate change and academic achievement, that is increasingly recognized as a critical area of study. This theme focuses on the multifaceted impacts of climate change on education, highlighting how environmental changes can disrupt learning processes and outcomes. Through verbatim narrations from various stakeholders, this section presents findings that illuminate the challenges posed by climate change and discusses potential pathways for mitigating its effects on academic performance. The findings reveal a consensus among participants that climate change significantly disrupts educational experiences. A Member of Parliament emphasized that "extreme weather events disrupt schooling," leading to lower attendance rates and poorer academic performance. This aligns with existing literature, which indicates that natural disasters can have detrimental effects on educational continuity (Pascoe et al., 2021).

A Female Learner voiced her personal experiences, stating, "heavy rains or extreme heat... can be really hard to focus in class." This reflects findings from studies showing that environmental stressors can adversely affect learner concentration and learning outcomes (Qian et al, 2018). Furthermore, she pointed out that school closures due to floods result in missed lessons, underscoring the urgency for educational resilience in the face of climate disruption. The Teacher's perspective highlighted another dimension of the impact: increased absenteeism due to family stress related to climate issues. This is supported by research indicating that environmental factors can lead to psychological stress in learners, further hindering their academic performance (Reis et al., 2018). The call for integrating climate literacy into the curriculum emphasizes the need for educational systems to adapt to these challenges, ensuring learners are equipped to engage with climate-related issues. Lastly, the Department of Meteorological Services Representative noted the direct correlation between climate events and educational disruptions. Their advocacy for incorporating climate science into educational programs reflects a growing recognition of the importance of climate education in fostering resilience among learners (Russak & Hellwing, 2019).

These discussions on data highlight the urgent need for educational systems to address the impacts of climate change on academic achievement. The ecological systems theory, as posited by Bronfenbrenner, emphasizes the interconnectedness of various systems affecting a child's development, including family, school, and community environments (Santo et al, 2019). The disruptions caused by climate change can be viewed through this lens, as they affect not only individual learners but also the broader educational ecosystem. The Member of Parliament's call for integrating climate education into the curriculum is particularly pertinent within this framework. By fostering a climate-literate generation, we can enhance learners' ability to adapt to environmental changes, thereby promoting educational equity and resilience (Tikly, 2020). Schools must evolve to become safe havens that can withstand climate challenges, ensuring that all learners have equal opportunities for learning regardless of environmental conditions (Santo et al, 2019). kl

The experiences shared by the Female Learner and the Teacher underscore the necessity of emotional and psychological support in educational settings. Research suggests that emotional well-being is critical for academic success, particularly in contexts affected by external stressors (Tansey et al, 2018). Therefore, schools should implement programs that not only focus on academic achievement but also on supporting learners' mental health in relation to climate impacts. Finally, the role of the Department of Meteorological Services in providing accurate data is crucial and their collaboration with educational authorities can lead to the development of targeted strategies that mitigate the adverse effects of climate change on education (Scheelka & Engsig, 2020). This collaborative approach aligns with Bronfenbrenner's emphasis on the importance of interactions within and among various systems as a means of fostering resilience (Tricco et al, 2018).

Theme 3: Strategies to mitigate the impact of climate change on the educational attainment of rural female

Following are oral responses from each participant regarding strategies to mitigate the impact of climate change on the educational attainment of rural females. These responses reflect a collective commitment to addressing the challenges posed by climate change while emphasizing the importance of education for rural females.

Member of Parliament explained that,

"As a representative of our community, I recognize that climate change poses significant challenges to education, especially for rural females. Our government must prioritize funding for educational infrastructure that can withstand climate impacts, such as floods and droughts. We should also promote scholarship programs aimed specifically at girls, ensuring that financial barriers do not hinder their education. Additionally, we need to engage in community awareness campaigns that emphasize the importance of education for girls, even amidst climate challenges."

In addition, Female Learner echoed that,

"As a learner, I've seen how climate change affects our daily lives. Sometimes, extreme weather prevents us from attending school. It's crucial for us to have reliable resources, like learning materials that are accessible even when we can't physically attend school. I believe that implementing mobile learning programs can help keep us engaged with our studies during tough times. We also need more support from teachers and the community to understand how to adapt our studies to these changing conditions."

On the other hand, Teacher argued that,

"In my role as an educator, I see firsthand the struggles our female learners face due to climate change. To mitigate its effects, we need to integrate climate education into the curriculum, so learners understand the challenges and can develop resilience. Furthermore, providing training for teachers on how to support learners during climate crises is vital. We should also advocate for community learning centres that remain open and functional during adverse weather, ensuring that education continues regardless of the circumstances."

Furthermore, Department of Meteorological Services expressed that,

"From a meteorological perspective, we have a responsibility to provide timely and accurate weather information that can assist in educational planning. We recommend establishing a robust early warning system to alert schools and families about severe weather events. By collaborating with educational institutions, we can create climate-resilient schedules and ensure that schools are prepared for climate-related disruptions. Our data can help inform policies that protect educational opportunities for girls in rural areas."

Also, Ministry of Primary and Secondary Education noted that,

"Our ministry is committed to addressing the impact of climate change on education. We are exploring partnerships with NGOs to develop programs specifically targeting rural female learners. This includes building resilient school infrastructure and providing resources for remote learning. We must also ensure that outreach programs are in place to encourage girls to stay in school despite climate challenges. Engaging parents and communities in this effort is essential for creating a support system that values girls' education."

Lastly, Village Head held that,

"As the village leader, I see the direct effects of climate change on our community, especially on our girls' education. We need to foster a community culture that values education and supports girls in their studies. I propose forming local committees that involve parents and community members to discuss and strategize on how to overcome these challenges. We should also organize community workshops to raise awareness

about the importance of girls' education and explore sustainable practices that can alleviate some of the pressures caused by climate change."

The aforementioned participants provided rich insights and findings into the strategies needed to mitigate the impact of climate change on the educational attainment of rural females. A Member of Parliament emphasized the necessity of prioritizing funding for educational infrastructure that is resilient to climate impacts, such as floods and droughts. This aligns with Bronfenbrenner's ecological systems theory, which highlights the importance of systemic support from the government (Symeonidou, 2017). Studies suggest that investment in resilient educational infrastructure is crucial for maintaining access to education in the face of climate challenges (Themane & Thobejane, 2019). A Female Learner echoed these concerns, noting that extreme weather often disrupts school attendance. She advocated for mobile learning programs to provide continuous educational engagement during adverse conditions. This reflects the mesosystem level of Bronfenbrenner's theory, where interactions between the learner's environment and educational resources play a critical role in fostering resilience (UNESCO, 2020). The use of technology in education, particularly mobile platforms, has been effective in supporting learning during crises, as indicated by recent research (van Steenkiste et al, 2020). The Teacher highlighted the need for integrating climate education into the curriculum. This approach not only informs learners about the challenges but also equips them with the skills to adapt (Walton, 2018). Studies support this integration, indicating that climate education fosters resilience and preparedness among learners (Weis & Beauchemin, 2020). Furthermore, providing training for teachers to support learners during climate crises is essential, as emphasized in the literature on professional development in education (Accardo et al, 2019). The Department of Meteorological Services stressed the importance of timely and accurate weather information for educational planning and establishing an early warning system to alert schools and families about severe weather events is vital for ensuring educational continuity (Bane, 2017). Research has shown that effective communication of weather-related risks can significantly improve community preparedness and resilience (Chiu et al., 2019).

The Ministry of Primary and Secondary Education indicated a commitment to developing programs targeting rural female learners by building resilient school infrastructure and facilitating remote learning (Brophy et al, 2021). Engaging parents and communities is also crucial for fostering an environment that values girls' education. This reflects the exosystem level of Bronfenbrenner's theory, where parental and community involvement significantly influence educational outcomes (Fleming et al, 2017). Finally, the Village Head proposed forming local committees to strategize on overcoming educational challenges posed by climate change. Community workshops aimed at raising awareness about the importance of girls' education are essential for fostering a supportive culture (Graham et al, 2020). Research indicates that community involvement in education promotes sustained educational engagement and can mitigate the effects of external stressors (Grimes et al., 2017).

The discussion of data reveals a multifaceted approach to addressing the impact of climate change on rural female education. The emphasis on funding for resilient infrastructure by the Member of Parliament underscores the necessity of government action in creating a supportive educational environment. According to Bronfenbrenner's ecological systems theory, the macro-level influences, such as policy and funding, are crucial for shaping the educational landscape (Helen et al, 2018). The insights from the Female Learner highlight the pressing need for innovative solutions such as mobile learning programs. These programs not only provide continuity in education but also empower learners to take control of their learning during crises, aligning with recent educational theories that advocate for learner agency (Jaakkola, 2020). This approach is particularly relevant in rural areas where access to traditional educational resources may be limited. The Teacher's call for climate education integration is vital for developing a curriculum that prepares learners for the realities of climate change. The literature supports the notion that education can play a transformative role in building resilience among learners, particularly in vulnerable communities (Kitching, 2019). This approach also aligns with the need for interdisciplinary education that connects environmental science with social studies and community action (Lombardi et al, 2020). The recommendations from the Department of Meteorological Services regarding early warning systems highlight the importance of collaboration between educational institutions and meteorological agencies. This partnership can enhance the capacity of schools to respond to climate-related disruptions, as supported

by studies emphasizing the role of information in fostering resilience (Mahlo, 2017). The Ministry of Primary and Secondary Education's focus on community engagement is critical for ensuring that educational initiatives are culturally relevant and widely supported. Research indicates that inclusive community efforts can significantly enhance educational outcomes for girls, particularly in rural settings where familial and community support is paramount (Materechera, 2020). Finally, the Village Head's proposal for local committees illustrates the importance of grassroots mobilization in addressing educational challenges. Community-driven initiatives can lead to sustainable changes that not only support education but also promote broader social and environmental resilience (Mckenzie, 2020). This aligns with findings that advocate for local solutions to global challenges, particularly in the context of climate change (Mckenzie et al, 2018). Therefore, the collective insights from participants highlight the need for a comprehensive, multi-layered approach to mitigate the impact of climate change on the educational attainment of rural females. By integrating systemic support, innovative educational practices, and community engagement, stakeholders can create a resilient educational framework that empowers girls in the face of climate challenges.

Conclusion

This study has illuminated the intricate relationship between psychological resilience and academic achievement among rural female learners in Zimbabwe, particularly within the context of climate change. The findings underscore that while external environmental stressors pose significant challenges, psychological resilience acts as a crucial buffer against negative academic outcomes. Learners who exhibit resilience tend to employ adaptive coping strategies, which not only enhance their academic performance but also empower them to navigate the complexities brought about by climate change. This dual impact highlights the importance of implementing interventions that promote resilience, thereby fostering both educational attainment and the skills necessary for adaptation in an increasingly volatile environment. It is essential for stakeholders—including educators, policymakers, community leaders, and families—to recognize the pivotal role of psychological resilience in shaping the educational trajectories of rural female learners. By adopting comprehensive strategies that support emotional well-being alongside academic success, we can create a more supportive environment that empowers these learners to thrive despite the challenges they face.

Recommendations

To enhance the psychological resilience and academic achievement of rural female learners in Zimbabwe, it is crucial for various stakeholders to take proactive measures.

- Rural female learners should actively engage in resilience training programs that focus on developing coping strategies and emotional intelligence. Forming peer support networks will allow them to share experiences and create a sense of community, while seeking mentorship can provide invaluable guidance in both academic and personal challenges.
- Rural teachers play a vital role in this ecosystem by integrating resilience education into their curricula, thereby equipping learners with essential coping mechanisms. They should foster inclusive classrooms that recognize the unique challenges female learners face, encouraging open dialogue. Continuous professional development on the intersections of climate change, mental health, and education will further empower teachers to support their learners effectively.
- The Ministry of Primary and Secondary Education must prioritize policy development that acknowledges the psychological needs of learners, especially in the context of climate change. Adequate resource allocation for mental health programs and curriculum enhancements that address climate education and resilience-building strategies are essential steps in this direction.
- Members of Parliament are encouraged to advocate for increased funding for educational programs that focus on resilience and climate change adaptation. Supporting legislation that prioritizes the well-being of

rural female learners and engaging with local communities to understand their needs will further contribute to these efforts.

- Village heads should mobilize communities by organizing forums to discuss the importance of education and resilience for female learners. Supporting local initiatives that enhance educational opportunities and mental health resources can create a more conducive environment for learning, while leveraging traditional leaders can promote gender equality in education.
- The Department of Meteorological Services is encouraged to develop educational outreach programs that raise awareness about climate change and its impacts on education and livelihoods. Collaborating with educational institutions to study these effects and disseminating findings will promote informed decision-making, while providing accessible weather forecasts can assist schools in planning.
- Counsellors should ensure that their services are readily accessible to rural female learners, addressing both academic and personal challenges. Acquiring skills in resilience-building counselling, particularly in the context of climate change, and collaborating closely with educators will enable them to provide tailored support to those in need.
- Parents play a critical role by fostering a home environment that values education and resilience. Maintaining open lines of communication with their children about the challenges they face and actively participating in school activities will reinforce the importance of education and emotional well-being.
- Finally, researchers should pursue further studies to explore the long-term effects of resilience on academic achievement amid climate change. Interdisciplinary research that brings together experts in psychology, education, and environmental science will yield comprehensive approaches to these pressing issues. Disseminating research findings to stakeholders will inform policy and practice, contributing to the resilience and academic success of rural female learners.

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