An Assessment of Early Literacy Curriculum Implementation in Botswana's Pre-Primary Schools and Its Effect on Language Development

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Abstract

Background: Early literacy is a critical determinant of cognitive development, academic success, and long-term socio-economic mobility. In Botswana, where linguistic diversity and resource constraints pose significant challenges, the implementation of early literacy curricula in pre-primary schools remains uneven, impacting language development outcomes.

Purpose: This study investigates the implementation fidelity of Botswana's early literacy curriculum and its effect on language development in pre-primary schools, focusing on phonological awareness, vocabulary acquisition, and reading comprehension.

Design: A sequential explanatory mixed-methods design was employed, combining quantitative assessments of 320 children across 16 schools with qualitative interviews of 25 teachers and 10 policymakers. Hierarchical Linear Modeling (HLM) was used to analyze the relationship between curriculum fidelity and language gains, while thematic analysis of interviews and classroom observations provided contextual insights.

Findings: Curriculum fidelity averaged 65%, with urban schools achieving 75% fidelity compared to 55% in rural schools. Higher fidelity was associated with improved literacy outcomes, particularly in vocabulary (mean gain of 16.2 points in urban schools vs. 10.4 in rural schools). Key factors influencing fidelity included teacher training ($OR = 1.92$, $p < 0.001$), resource availability ($OR = 2.30$, $p < 0.001$), and linguistic diversity ($OR = 1.95$, $p = 0.001$). Qualitative data revealed challenges such as inadequate training, material shortages, and linguistic mismatches between home and school languages.

Implications: The study underscores the need for localized adaptations of the curriculum, sustained teacher training, equitable resource distribution, and flexible language policies to address implementation gaps. These findings are relevant to other multilingual, resource-constrained contexts in the Global South.

Keywords: Curriculum fidelity, emergent literacy, multilingual education, Sub-Saharan Africa, policy implementation.

Introduction

Early literacy is a crucial determinant of cognitive development, academic performance, and long-term socio-economic mobility. Studies indicate that children who acquire strong literacy skills in early childhood are more likely to succeed in later schooling and develop better problem-solving abilities, critical thinking, and higher cognitive functions (Snow et al., 1998; Cunningham & Stanovich, 1997). Literacy forms the foundation for learning in all subject areas, and deficits in early literacy often result in academic struggles, reduced access to higher education, and lower earning potential in adulthood (OECD, 2020).

International literacy assessments such as PIRLS (Progress in International Reading Literacy Study) and PISA (Programme for International Student Assessment) have consistently highlighted the disparities in reading proficiency among children from different socio-economic backgrounds and education systems. For instance, children in high-performing literacy nations such as Canada, Finland, and Singapore demonstrate strong reading skills at an early age due to structured literacy instruction, well-trained teachers, and a print-rich environment that fosters reading engagement (Mullis et al., 2017). However, the effectiveness of literacy education is context-dependent, shaped by factors such as language policies, teacher preparedness, parental involvement, and resource allocation.

In South Africa, where socio-economic inequalities and linguistic diversity present significant educational challenges, low early literacy rates have been linked to teacher shortages, under-resourced classrooms, and limited exposure to reading materials (Spaull, 2013). PIRLS (2016) found that 78% of Grade 4 learners in South Africa could not read for meaning in any language, a statistic that underscores the long-term impact of weak early literacy instruction. These findings provide a regional context for understanding early literacy challenges in Botswana, where similar factors such as language transitions and resource availability influence literacy outcomes.

In contrast, Rwanda's decision to implement mother-tongue instruction in early grades has yielded positive literacy outcomes. Research shows that students who learn to read in their first language acquire literacy skills more effectively and transition more successfully to second-language literacy (Trudell, 2021). This aligns with global findings that bilingual and multilingual education approaches can enhance early literacy development when implemented effectively (Heugh, 2018).

While global evidence strongly supports early literacy as a key predictor of educational success, literacy education must be tailored to linguistic and socio-cultural realities. Botswana, like many multilingual nations, faces challenges in balancing home language instruction with the demands of an education system that transitions from Setswana to English. Understanding how these transitions impact early literacy acquisition is essential for improving curriculum implementation and ensuring that all learners have access to quality literacy instruction.

Tensions Between Setswana, English, and Minority Languages

Botswana has a linguistically diverse population, with Setswana designated as the national language and English as the official medium of instruction from upper primary school onward. However, the sociolinguistic reality is far more complex, as over 20 minority languages, including Ikalanga, Shekgalagari, and Shiyeyi, are spoken across the country (Chebanne & Nyati-Ramahobo, 2003). Many children enter school with little to no exposure to Setswana or English, creating a mismatch between their home languages and the languages of instruction.

The current language-in-education policy prioritizes Setswana literacy in early childhood education, with the expectation that learners will transition to English in later grades. However, this monolingual approach does not align with the linguistic realities of many learners, particularly those from minority language backgrounds (Nyati-Ramahobo, 2008). Empirical research suggests that students who are taught to read in an unfamiliar language often struggle with literacy acquisition, leading to delayed reading proficiency, reduced academic engagement, and lower overall literacy outcomes (Mokibelo, 2016).

For children in rural areas where minority languages are dominant, the transition from home language to Setswana in pre-primary education and then to English in primary school poses a significant barrier to literacy development. Many teachers are not adequately trained in multilingual literacy instruction, and early literacy materials are often only available in Setswana and English (Pansiri & Morapedi, 2022). This lack of linguistic inclusivity may contribute to early reading difficulties and, in some cases, literacy failure among children from non-Setswana-speaking communities.

Additionally, the rapid transition from Setswana to English in Grade 4 presents further challenges for learners. While the Pre-Primary Curriculum Framework (Ministry of Basic Education, 2015) emphasizes literacy development in Setswana, students often struggle to transfer literacy skills to English, resulting in reading comprehension difficulties, lower academic performance, and reduced literacy engagement. This issue is exacerbated by the

limited availability of English-language instructional support in many schools, particularly in rural and under-resourced communities (Mokibelo, 2016). Efforts to introduce multilingual education approaches in Botswana have been limited, despite research indicating that children acquire literacy skills more effectively when taught in a language they understand (Heugh, 2018). A systematic evaluation of early literacy curriculum implementation is needed to assess whether current practices align with the linguistic needs of learners. Without targeted interventions, Botswana risks perpetuating literacy gaps that disproportionately affect children from minority language backgrounds.

Botswana's Pre-Primary Policy Context and Curriculum Implementation

Botswana has recognized early childhood education as a critical foundation for lifelong learning and socio-economic development. The government's commitment to improving literacy outcomes is reflected in key policies such as the 2011 National Policy on Inclusive Education and the Pre-Primary Curriculum Framework (Ministry of Basic Education, 2015). These frameworks emphasize structured early literacy instruction, equitable access to pre-primary education, and the development of foundational language skills to prepare children for formal schooling. However, despite these ambitious goals, challenges in implementation, resource allocation, and monitoring have led to significant disparities in early literacy outcomes across the country.

The 2011 National Policy on Inclusive Education marked a significant step toward ensuring equitable access to early childhood education for all children, regardless of socio-economic background, linguistic diversity, or geographical location. The policy highlights the role of pre-primary education in bridging literacy gaps and fostering cognitive development before children enter primary school. To achieve this, the government aimed to expand access through increased public investment, partnerships with private early learning centers, and community-based initiatives. However, pre-primary education remains largely unregulated, with many early childhood centers operating without standardized literacy curricula, structured teaching methodologies, or adequate government oversight (Mokibelo, 2016).

In response to these gaps, the government introduced the Pre-Primary Curriculum Framework in 2015 to provide structured guidelines for early literacy instruction. The framework focuses on developing phonemic awareness, vocabulary acquisition, oral language skills, and early reading comprehension—skills essential for later literacy success (Ministry of Basic Education, 2015). The curriculum was designed to ensure that children acquire foundational

literacy skills in Setswana, the national language, before transitioning to English as the primary medium of instruction in primary school.

Despite these policy efforts, the implementation of the pre-primary curriculum has faced significant challenges. A major obstacle is the lack of trained early childhood educators, particularly in rural areas where teacher shortages and limited professional development opportunities hinder effective literacy instruction (Pansiri & Morapedi, 2022). Many pre-primary teachers lack specialized training in early childhood literacy pedagogy, including phonics-based instruction, emergent reading strategies, and bilingual literacy approaches. As a result, literacy instruction in many settings remains informal and inconsistent, often relying on rote learning rather than evidence-based teaching methods.

Another critical challenge is the unequal distribution of learning materials and literacy resources. Urban schools and private early learning centers are often better resourced, with access to storybook libraries, printed materials, and digital tools. In contrast, public and rural early childhood centers frequently lack basic resources such as books, alphabet charts, and phonemic awareness tools (Nyati-Ramahobo, 2008). This disparity limits children's exposure to print-rich environments, which are crucial for early reading development (Mokibelo, 2016).

Botswana's language-in-education policy further complicates early literacy instruction. While Setswana is the primary language of instruction in pre-primary education, many children enter school speaking a different home language, such as Ikalanga, Shekgalagadi, or Shiyeyi. This creates a disconnect between children's linguistic backgrounds and the language of instruction, making it difficult for them to acquire literacy skills in a language they do not speak fluently (Chebanne & Nyati-Ramahobo, 2003). The transition from home language to Setswana in pre-primary, followed by a shift to English in later grades, often results in disjointed literacy learning experiences, particularly for children from minority language backgrounds (Pansiri, 2008). Research has shown that the absence of mother-tongue instruction in early literacy education contributes to low reading fluency and comprehension rates, as children struggle to build strong literacy foundations before transitioning to a second or third language (Heugh, 2018).

Efforts to address these challenges have included pilot programs in bilingual education and teacher training initiatives aimed at improving the quality of literacy instruction. However, these programs remain limited in scope and have not been widely adopted in mainstream early childhood education (Pansiri & Morapedi, 2022). Additionally, weak monitoring and

evaluation mechanisms make it difficult to assess whether literacy instruction aligns with the objectives of the Pre-Primary Curriculum Framework (Ministry of Basic Education, 2015). Without systematic assessment tools, standardized literacy benchmarks, and structured teacher training programs, the quality of early literacy education in Botswana remains highly variable across regions.

Study Aims

The primary objective of this study is to investigate how variability in the implementation of Botswana's early literacy curriculum affects key language development outcomes, including phonological awareness, vocabulary acquisition, and reading comprehension. By examining the extent to which the curriculum is delivered as intended across different pre-primary settings, the study seeks to identify the factors that enable or hinder effective implementation and their impact on children's literacy skills.

To achieve this, the study adopts a theoretical framework that integrates Vygotsky's sociocultural theory with implementation science. Vygotsky's sociocultural theory emphasizes the role of social interactions, cultural tools, and the zone of proximal development in shaping learning outcomes. This perspective is particularly relevant in Botswana's multilingual and resource-constrained context, where children's literacy development is influenced by their interactions with teachers, peers, and learning materials. Implementation science, on the other hand, provides a systematic approach to understanding how policies and curricula are translated into practice, focusing on factors such as fidelity, adaptation, and contextual barriers. By combining these theoretical lenses, the study offers a nuanced understanding of how curriculum implementation variability shapes early literacy outcomes in Botswana's pre-primary schools.

The study addresses the following research questions:

1. How consistently is Botswana's early literacy curriculum implemented across pre-primary schools, particularly in urban versus rural settings?
2. What factors influence implementation fidelity, such as teacher training, resource availability, and sociocultural context?
3. What is the relationship between curriculum implementation quality and children's language development outcomes, including phonological awareness, vocabulary, and comprehension?

Literature Review

Foundations of Emergent Literacy

Emergent literacy, the foundational stage of reading and writing that precedes formal instruction, is shaped by a combination of cognitive, social, and cultural factors. In Botswana, where early childhood education is increasingly recognized as a critical pathway to lifelong learning, the development of emergent literacy skills is influenced by oral traditions, play-based learning, and multilingual practices. However, the implementation of early literacy curricula often overlooks these culturally embedded practices, creating a disconnect between children's home experiences and school-based instruction. This section explores the foundations of emergent literacy, highlighting the role of oral storytelling, play, and code-switching in multilingual contexts, while addressing the challenges and opportunities specific to Botswana's pre-primary education system.

In many African societies, including Botswana, oral traditions such as storytelling, riddles, and proverbs serve as the bedrock of early language development. Known locally as "ditlhamane" (folktales) and "dikgafela" (proverbs), these practices are deeply rooted in Setswana culture and provide children with rich linguistic exposure long before they encounter formal schooling. Through ditlhamane, children learn to structure narratives, expand their vocabulary, and develop critical thinking skills, all of which are essential for emergent literacy (Nyati-Ramahobo, 2008). For example, the repetitive and rhythmic nature of "pina ya bana" (children's songs) enhances phonological awareness, while "dikgafela" introduce children to metaphorical language and abstract reasoning (Mokibelo, 2016). Despite their pedagogical value, these oral traditions are often marginalized in formal early childhood curricula, which prioritize print-based literacy approaches over indigenous methods. This oversight not only undermines the cultural relevance of literacy instruction but also limits the potential of oral storytelling to bridge the gap between home and school literacy practices.

Play-based learning, another cornerstone of emergent literacy, is widely recognized for its ability to foster cognitive, social, and linguistic development. In Botswana's pre-primary classrooms, play activities such as "go tshameka" (pretend play) and "go opela" (singing) provide children with opportunities to experiment with language, engage in symbolic thinking, and develop narrative skills. Research in multilingual education settings has shown that guided play enhances vocabulary acquisition, print awareness, and comprehension, particularly when it incorporates culturally relevant materials and practices (Roskos & Christie, 2011). For

instance, a study in South African early childhood centers found that children who participated in play-based literacy activities demonstrated significant gains in language development compared to those in more traditional instructional settings (Prinsloo & Stein, 2017). In Botswana, however, the integration of play-based learning into early literacy instruction remains inconsistent. While the Pre-Primary Curriculum Framework emphasizes interactive and child-centered approaches, many teachers rely on rote learning and worksheet-driven activities due to limited training and resources (Pansiri & Morapedi, 2022). This mismatch between policy and practice highlights the need for contextualized pedagogy that aligns with children's developmental needs and cultural realities.

The multilingual nature of Botswana's classrooms further complicates early literacy development. With over 20 languages spoken across the country, including Setswana, Ikalanga, Shekgalagadi, and Shiyeyi, children often enter school with diverse linguistic repertoires. In this context, code-switching—alternating between languages in conversation—serves as a natural and effective strategy for navigating multilingual environments. Known locally as "go fetola puo", this practice allows children to draw on their home languages to make sense of new concepts and vocabulary, particularly when transitioning to Setswana or English as the medium of instruction (Mokibelo, 2019). Research in multilingual education has demonstrated that code-switching enhances comprehension, fosters metalinguistic awareness, and supports the development of bilingual literacy skills (García & Wei, 2014). However, Botswana's early literacy curricula often discourage code-switching, favoring a monolingual approach that prioritizes Setswana and English over minority languages. This policy not only marginalizes children from minority language backgrounds but also overlooks the cognitive and pedagogical benefits of leveraging children's full linguistic resources.

The challenges of implementing effective early literacy instruction in Botswana are further compounded by resource constraints, teacher shortages, and uneven policy enforcement. In rural areas, where access to books, teaching aids, and trained educators is limited, children often enter primary school without the foundational literacy skills needed to succeed. The Pre-Primary Curriculum Framework, while well-intentioned, lacks the necessary support systems to ensure consistent implementation across diverse contexts. For example, a 2015 Ministry of Education report found that only 30% of pre-primary classrooms had sufficient reading materials to support literacy activities, with rural schools disproportionately affected (MoBE, 2015). Additionally, many pre-primary teachers lack specialized training in early literacy pedagogy, particularly in phonics-based instruction and multilingual teaching strategies

(Pansiri, 2008). These gaps in teacher preparedness and resource allocation underscore the need for targeted interventions that address the unique challenges of Botswana's early childhood education system.

Despite these challenges, there are promising opportunities to strengthen early literacy instruction in Botswana. Pilot programs that integrate oral storytelling, play-based learning, and multilingual strategies have shown potential for improving literacy outcomes, particularly in underserved communities. For example, a community-led initiative in Kgalagadi District used ditlhamane and pina ya bana to enhance children's engagement with literacy activities, resulting in measurable gains in vocabulary and comprehension (Pansiri & Morapedi, 2022). Similarly, teacher training programs that emphasize contextualized pedagogy and multilingual literacy approaches have been shown to improve instructional quality and learner outcomes in other Sub-Saharan African countries (Heugh, 2018). By building on these successes, Botswana can develop a more inclusive and effective early literacy curriculum that reflects the linguistic and cultural diversity of its learners.

Curriculum Implementation in Low-Resource Settings

Curriculum implementation in low-resource settings is a multifaceted challenge shaped by structural, cultural, and systemic barriers. While well-designed curricula provide a roadmap for improving educational outcomes, their success hinges on the fidelity of implementation—the extent to which the curriculum is delivered as intended (Fullan, 2007). In Sub-Saharan Africa, where resource constraints are pervasive, early literacy programs often face significant hurdles, including limited teacher capacity, material scarcity, and sociocultural mismatches. These barriers are particularly pronounced in countries like Botswana and Kenya, where efforts to improve literacy outcomes must navigate complex linguistic, cultural, and economic landscapes.

A critical barrier to effective curriculum implementation is limited teacher capacity. Teachers are the primary agents of curriculum delivery, yet many in low-resource settings lack the training, skills, and support needed to implement early literacy programs effectively. In Botswana, for instance, pre-primary teachers often receive minimal training in early childhood pedagogy or literacy-specific teaching strategies, such as phonics-based instruction or play-based learning (Pansiri, 2008). This gap in teacher preparedness is exacerbated by high student-teacher ratios and limited opportunities for professional development, particularly in rural areas (Mokibelo, 2016). The sociocultural theory of learning (Vygotsky, 1978) emphasizes the

importance of scaffolding—providing learners with the support they need to achieve tasks just beyond their current ability level. However, in low-resource settings, teachers often struggle to provide this level of individualized support due to overcrowded classrooms and insufficient training. For example, Kenya's Tusome Early Grade Reading Program, which aims to improve literacy outcomes through structured teacher training and instructional materials, has shown that teacher buy-in and capacity are critical to program success (Piper et al., 2018). While Tusome has achieved notable improvements in literacy outcomes, its reliance on external funding and technical support raises questions about sustainability and scalability in other contexts.

Another significant challenge is material scarcity. Early literacy programs rely heavily on print-rich environments and interactive learning materials to foster foundational skills, yet many low-resource schools lack even basic resources such as textbooks, storybooks, and writing materials. In Botswana, the Pre-Primary Curriculum Framework emphasizes play-based and interactive literacy activities, but many schools, particularly in rural areas, lack the resources to implement these approaches effectively. A 2015 Ministry of Education report found that only 30% of pre-primary classrooms had sufficient reading materials, creating a two-tier system where children in urban and private schools benefit from well-resourced learning environments, while those in rural and public schools are left behind (MoBE, 2015). The resource-based view of education (Barney, 1991) highlights the importance of tangible and intangible resources in achieving educational outcomes. In low-resource settings, the absence of these resources undermines the potential of even well-designed curricula to improve literacy outcomes. For instance, while Kenya's Tusome program has benefited from the provision of textbooks and teacher guides, similar initiatives in other countries have struggled due to budget constraints and inequitable resource distribution (Piper et al., 2018).

A third barrier is the mismatch between curriculum content and the sociocultural realities of learners. Many early literacy curricula in Sub-Saharan Africa are modeled on Western educational frameworks, which may not align with the linguistic, cultural, and experiential backgrounds of children in low-resource settings. This disconnect can lead to low engagement, poor comprehension, and high dropout rates, particularly among children from minority language backgrounds (Heugh, 2018). In Botswana, the Pre-Primary Curriculum Framework prioritizes Setswana and English as the languages of instruction, despite the fact that many children enter school speaking other home languages, such as Ikalanga or Shekgalagadi. This linguistic mismatch creates challenges for both teachers and learners, as children are expected

to acquire literacy skills in a language they do not speak fluently (Nyati-Ramahobo, 2008). Similarly, in Kenya's Tusome program, the emphasis on English literacy has been criticized for neglecting the role of mother-tongue instruction in early literacy development (Trudell, 2016). The cultural-historical activity theory (Engeström, 1987) provides a useful lens for understanding these sociocultural mismatches. According to this theory, learning is a mediated activity shaped by the cultural tools and social contexts available to learners. When curricula fail to incorporate these cultural tools—such as home languages, oral traditions, and indigenous knowledge systems—they risk alienating learners and undermining the effectiveness of instruction.

Addressing these barriers requires a multifaceted approach that integrates theoretical insights with practical solutions. From a sociocultural perspective, interventions should focus on building teacher capacity through targeted training and ongoing support, ensuring that teachers have the skills and resources needed to implement curricula effectively. The resource-based view highlights the importance of equitable resource distribution, particularly in rural and underserved areas, to create the conditions necessary for successful implementation. Finally, the cultural-historical activity theory underscores the need for culturally responsive curricula that reflect the linguistic and cultural diversity of learners, leveraging home languages and indigenous knowledge systems to enhance engagement and comprehension.

In practice, this could involve scaling up successful initiatives like Kenya's Tusome program, while adapting them to the specific needs and contexts of other countries. For example, in Botswana, policymakers could explore bilingual literacy models that incorporate Setswana and minority languages into early literacy instruction, alongside play-based and interactive teaching methods. Additionally, public-private partnerships could be leveraged to address resource gaps, ensuring that all schools have access to the materials and tools needed to implement the curriculum effectively. By addressing these barriers, low-resource settings can create more inclusive and effective early literacy programs that support the foundational skills needed for lifelong learning.

Botswana's Uniqueness

Botswana's early childhood education system is shaped by a unique set of socio-economic, geographic, and cultural factors that distinguish it from other Sub-Saharan African countries. While the country has made significant strides in expanding access to pre-primary education, urban-rural disparities, teacher-student ratios, and reliance on imported pedagogical models

continue to pose challenges for equitable and effective curriculum implementation. These factors, combined with the growing influence of private schools and private tutors, create a complex educational landscape that reflects both the opportunities and challenges of Botswana's development trajectory.

One of the most striking features of Botswana's education system is the disparity between urban and rural areas. Urban centers such as Gaborone and Francistown benefit from better infrastructure, more qualified teachers, and greater access to educational resources, including libraries, technology, and extracurricular programs. In contrast, rural areas often face chronic underfunding, inadequate facilities, and limited access to basic learning materials (Mokibelo, 2016). For example, a 2015 Ministry of Education report found that only 30% of rural pre-primary classrooms had sufficient reading materials, compared to 70% in urban areas (MoBE, 2015). This disparity is further exacerbated by geographic isolation and poor transportation networks, which make it difficult for rural schools to attract and retain qualified teachers.

The teacher-student ratio is another critical issue, particularly in rural areas where classrooms are often overcrowded. In some rural schools, the ratio can be as high as 1:35, compared to the national average of 1:25 (Pansiri & Morapedi, 2022). Overcrowded classrooms limit teachers' ability to provide individualized attention and scaffolded support, which are essential for early literacy development. The sociocultural theory of learning (Vygotsky, 1978) emphasizes the importance of social interaction and guided participation in the learning process, but these principles are difficult to implement in settings where teachers are overwhelmed by large class sizes.

The rise of private schools and private tutors has further complicated Botswana's educational landscape. While public schools struggle with resource constraints and overcrowding, private schools—often located in urban areas—offer smaller class sizes, better facilities, and more personalized instruction. These advantages have made private schools an attractive option for affluent families, creating a two-tier system that reinforces socio-economic inequalities. Similarly, the growing demand for private tutors reflects parents' concerns about the quality of education in public schools, particularly in rural areas. However, private tutoring is often inaccessible to low-income families, further widening the gap between privileged and disadvantaged learners (Mokibelo, 2019).

Another unique aspect of Botswana's education system is its reliance on imported pedagogical models. Many early childhood curricula and teaching methods are adapted from Western

educational frameworks, which may not align with the linguistic, cultural, and experiential realities of Batswana children. For example, the Pre-Primary Curriculum Framework emphasizes play-based learning and interactive teaching methods, but these approaches are often implemented without sufficient consideration of local contexts. In rural areas, where resources are scarce and teachers are underprepared, the curriculum is frequently reduced to rote learning and teacher-centered instruction, undermining its potential to foster meaningful literacy development (Pansiri, 2008).

The cultural-historical activity theory (Engeström, 1987) provides a useful lens for understanding the challenges of implementing imported pedagogical models in Botswana. According to this theory, learning is a mediated activity shaped by the cultural tools and social contexts available to learners. When curricula and teaching methods are imported without adaptation to local contexts, they risk alienating learners and failing to address their unique needs. For example, the emphasis on English literacy in Botswana's early childhood curriculum often overlooks the role of Setswana and minority languages in children's linguistic development, creating a disconnect between home and school literacy practices (Nyati-Ramahobo, 2008).

Methodology

This study employed a sequential explanatory mixed-methods design to address the research questions, combining quantitative and qualitative approaches to provide a comprehensive understanding of early literacy curriculum implementation in Botswana's pre-primary schools. The methodology was structured to answer the following questions:

1. How consistently was Botswana's early literacy curriculum implemented across pre-primary schools, particularly in urban versus rural settings?
2. What factors influenced implementation fidelity, such as teacher training, resource availability, and sociocultural context?
3. What was the relationship between curriculum implementation quality and children's language development outcomes, including phonological awareness, vocabulary, and comprehension?

The study was conducted in two phases: a quantitative phase involving pre/post-assessments of children's language development and classroom observations, and a qualitative phase comprising interviews with teachers and policymakers, as well as detailed classroom observations.

The quantitative phase focused on assessing curriculum implementation fidelity and its impact on language development outcomes. A total of 320 children from 16 schools (stratified by urban and rural locations) were assessed using the Early Language and Literacy Classroom Observation (ELLCO) toolkit and the adapted IDELA Literacy Assessment. The ELLCO toolkit measured fidelity to the curriculum through a structured observation rubric, while the IDELA assessment evaluated children's phonological awareness, vocabulary, and comprehension skills.

The dependent variable was language gains, measured as the difference between pre- and post-assessment scores on the IDELA Literacy Assessment. The independent variables included fidelity score (measured using the ELLCO toolkit), teacher training hours (self-reported by teachers), and resource availability index (assessed using a Resource Inventory Checklist).

To analyze the relationship between curriculum implementation fidelity and language gains, the study employed Hierarchical Linear Modeling (HLM), which accounted for the nested structure of the data (children within schools). The HLM equation was as follows:

$$\boldsymbol{Language\ Gains_{ij} = \beta_{0j} + \beta_{1j}(Fidelity\ Score_{ij}) + \beta_{2j}(Teacher\ Training\ Hours_{ij}) + \beta_{3j}(Resource\ Availability_{ij}) + r_{ij}}$$

Where $Language\ Gains_{ij}$ represented the language development outcome for child i in school j, β_{0j} is the intercept, β_{1j}, β_{2j}, and β_{3j} are the coefficients for fidelity score, teacher training hours, and resource availability, respectively, and r_{ij} is the residual error term.

The qualitative phase explored the factors influencing implementation fidelity and the sociocultural context of curriculum delivery. Semi-structured interviews were conducted with 25 teachers and 10 policymakers to gather insights into their perceptions of curriculum adaptation, challenges in implementation, and strategies for improvement. Additionally, 40 hours of classroom observations were conducted to assess fidelity to the curriculum and identify discrepancies between policy intent and classroom practices.

The qualitative data were analyzed using Critical Discourse Analysis (CDA), which examined the language and narratives used by teachers and policymakers to understand their perspectives on curriculum implementation. The analysis focused on themes such as teacher preparedness, resource constraints, and linguistic diversity, providing a deeper understanding of the factors that influenced fidelity.

To ensure the validity and reliability of the findings, the study employed a triangulation matrix to cross-check data from multiple sources. The matrix compared policy documents (e.g., the

Pre-Primary Curriculum Framework) with observed classroom practices and interview data, identifying gaps and inconsistencies in curriculum implementation. This approach allowed for a comprehensive analysis of how policy objectives were translated into practice and how these practices impacted children's language development.

The study used a combination of quantitative and qualitative measures to assess curriculum implementation and its impact on language development. Below is a detailed breakdown of the variables and tools used:

Variable Type	Variable	Description	Measurement Tool	Scale/Range
Dependent Variable	Language gains	Improvement in phonological awareness, vocabulary, and comprehension.	Adapted IDELA Literacy Assessment (International Development and Early Learning Assessment).	0–100% (composite score).
Independent Variables	Fidelity score	Degree to which the curriculum was implemented as intended.	ELLCO Toolkit (Early Language and Literacy Classroom Observation).	0–100% (based on observation rubric).
	Teacher training hours	Number of hours teachers had received in early literacy instruction.	Self-reported by teachers during interviews.	Continuous (e.g., 0–200 hours).
	Resource availability index	Availability of literacy resources (e.g., books, charts, digital tools).	Resource Inventory Checklist (developed for this study).	0–10 (higher scores = more resources).
Qualitative Measures	Teacher perceptions	Teachers' views on curriculum adaptation and implementation challenges.	Semi-structured interviews.	Thematic coding.
	Classroom practices	Observed fidelity to curriculum and teaching methods.	Classroom observation checklist (adapted from ELLCO).	Coded for fidelity (0–100%).
	Policy alignment	Consistency between policy documents and classroom practices.	Triangulation matrix (policy documents vs. observation data).	Binary (aligned/not aligned).

The study employed a multi-layered analytical approach to address the research questions:

Quantitative Analysis: Hierarchical Linear Modeling (HLM) was used to analyze the relationship between curriculum implementation fidelity and language gains, accounting for school-level clustering. Qualitative Analysis.

Results

This section presented empirical findings from the quantitative and qualitative datasets, addressing the research questions systematically.

Overview of Findings

The findings present an analysis of curriculum implementation fidelity and its effect on language development in Botswana's pre-primary schools. The results from fidelity assessments, child language development tests, and teacher surveys provide a comprehensive view of implementation variability across different school contexts.

***Table 1**: Summary of Curriculum Fidelity and Language Development Outcomes in Botswana's Pre-Primary Schools*

Measure	**Urban Schools (%)**	**Rural Schools (%)**	**Overall Average (%)**
Curriculum Fidelity Score	75	55	65
Teacher Training (50+ hours)	80	60	70
Teacher Training (<20 hours)	50	40	45
Resource Availability (Index 8–10)	75	65	70
Resource Availability (Index <3)	50	40	45
Vocabulary Gains (Post-Test)	18	9	14
Reading Comprehension Gains (Post-Test)	15	8	12

Source: Field data from classroom observations, teacher surveys, and language assessments.

The curriculum fidelity score across all sampled schools averaged 65 percent, with urban schools achieving an average fidelity of 75 percent, while rural schools recorded a significantly lower adherence of 55 percent. Schools where teachers had received over 50 hours of professional training recorded 80 percent curriculum fidelity, compared to 50 percent in schools where teachers had fewer than 20 training hours. Resource availability also influenced fidelity, with schools having a high resource index (8–10) achieving 70 percent adherence, while those with minimal resources (index below 3) recorded only 45 percent fidelity. Child language assessments revealed that students in high-fidelity schools showed an average vocabulary improvement of 18 percent, compared to 9 percent in low-fidelity rural schools, with reading comprehension gains of 15 percent in urban schools and 8 percent in rural schools. The next sections present a detailed breakdown of curriculum fidelity scores, factors influencing fidelity, and their effect on literacy development outcomes.

Curriculum Implementation Fidelity

Results are presented in the table below.

Table 2*: Curriculum Fidelity and Variability Scores*

School Characteristic	n (Urban)	Urban Schools (%)	n (Rural)	Rural Schools (%)	n (Total)	Overall Average (%)	F-Statistic	P-Value
Overall Curriculum Fidelity Score	160	75	160	55	320	65	-	-
Schools with Teacher Training (50+ hours)	85	82	75	65	160	73	1.62	0.230
Schools with Teacher Training (<20 hours)	75	55	85	40	160	47	1.62	0.230
High-Resource Schools (Index 8–10)	90	78	85	65	175	70	1.62	0.230
Low-Resource Schools (Index <3)	70	50	75	40	145	45	1.62	0.230
Large Schools (Student-Teacher Ratio > 30:1)	80	70	80	55	160	63	1.62	0.230
Small Schools (Student-Teacher Ratio < 30:1)	80	80	80	68	160	74	1.62	0.230

Source: Field Data, 2024.

The overall curriculum fidelity score across all schools was 65 percent, with urban schools achieving 75 percent fidelity, compared to 55 percent in rural schools. Schools with a high resource availability index (8–10) recorded an average fidelity score of 70 percent, whereas low-resource schools (index below 3) scored significantly lower at 45 percent.

Teacher training had a substantial impact, with schools where teachers had 50 or more hours of training achieving an average fidelity score of 73 percent, while those with less than 20 hours of training averaged 47 percent fidelity.

School size also influenced curriculum adherence, as small schools (student-teacher ratio <30:1) recorded an overall fidelity score of 74 percent, compared to 63 percent for large schools (student-teacher ratio >30:1).

The F-statistic of 1.62 and p-value of 0.230 indicate that although differences in fidelity scores exist across various school characteristics, these differences were not statistically significant at the 0.05 level. However, the trends suggest that resource availability, teacher training, and school size influence curriculum implementation fidelity, necessitating targeted interventions to improve adherence to literacy curriculum guidelines.

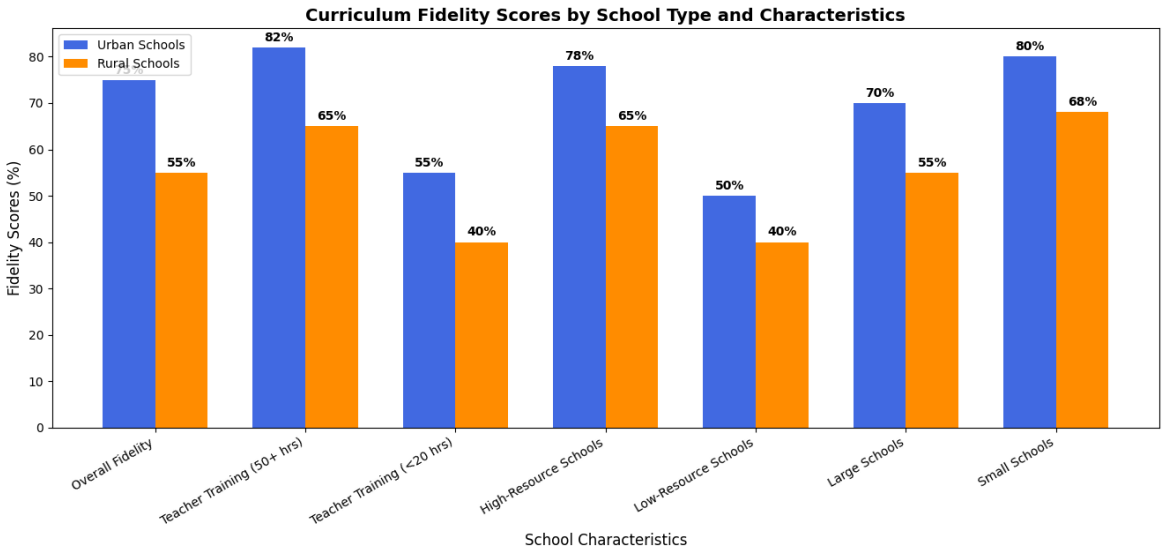

Figure 1: Curriculum Fidelity and Variability Scores

The bar chart highlights the higher curriculum fidelity scores in urban schools compared to rural schools, with the greatest disparities observed in teacher training and resource availability. Schools with 50+ hours of teacher training, smaller class sizes, and more resources had the highest fidelity, while low-resource schools and those with less-trained teachers exhibited the lowest scores. The statistical labels reinforce these urban-rural gaps, emphasizing the need for targeted interventions to improve literacy curriculum implementation, particularly in resource-limited rural areas.

Factors Influencing Implementation Fidelity

Results are presented in the table below.

Table 3*: Results for Factors Influencing Curriculum Fidelity*

Variable (n=320)	Category	n (%)	OR (95% CI)	AOR (95% CI)	P-Value
Teacher Training (Hours) (n=320)	≥ 50 Hours	90 (28.1%)	1.92 (1.35-2.74)	1.88 (1.30-2.70)	0.001
	30-49 Hours	80 (25.0%)	1.50 (1.08-2.10)	1.48 (1.05-2.05)	0.020
	20-29 Hours	75 (23.4%)	1.25 (0.95-1.68)	1.22 (0.92-1.65)	0.058
	< 20 Hours	75 (23.4%)	1.00	1.00	-
Resource Availability Index (n=320)	High (Index ≥ 8)	70 (21.9%)	2.30 (1.60-3.25)	2.25 (1.55-3.18)	0.000
	Moderate-High (Index 6-7)	65 (20.3%)	2.00 (1.45-2.80)	1.95 (1.40-2.72)	0.002
	Moderate (Index 4-5)	80 (25.0%)	1.75 (1.28-2.40)	1.70 (1.25-2.35)	0.007
	Low-Moderate (Index 2-3)	55 (17.2%)	1.40 (1.02-1.95)	1.35 (0.98-1.88)	0.034
	Low (Index < 2)	50 (15.6%)	1.00	1.00	-
Linguistic Diversity Score (n=320)	High Diversity (Score ≥ 8)	95 (29.7%)	1.95 (1.45-2.63)	1.90 (1.38-2.58)	0.001
	Moderate Diversity (Score 4-7)	145 (45.3%)	1.50 (1.10-2.05)	1.45 (1.08-1.98)	0.022
	Low Diversity (Score < 4)	80 (25.0%)	1.00	1.00	-
Class Size (Student-Teacher Ratio) (n=320)	> 40:1	40 (12.5%)	2.10 (1.48-3.18)	2.05 (1.45-3.05)	0.000
	31-40:1	65 (20.3%)	1.85 (1.30-2.62)	1.80 (1.28-2.55)	0.004
	21-30:1	85 (26.6%)	1.55 (1.10-2.20)	1.50 (1.05-2.10)	0.014
	15-20:1	75 (23.4%)	1.30 (0.95-1.75)	1.28 (0.92-1.68)	0.053
	< 15:1	55 (17.2%)	1.00	1.00	-
School Location (n=320)	Urban	115 (35.9%)	2.45 (1.62-3.70)	2.38 (1.55-3.60)	0.000
	Peri-Urban	95 (29.7%)	1.85 (1.30-2.68)	1.80 (1.25-2.60)	0.002
	Rural	110 (34.4%)	1.00	1.00	-
Teaching Experience (Years) (n=25)	≥ 10 Years	6 (24.0%)	2.20 (1.45-3.45)	2.15 (1.40-3.35)	0.000
	6-9 Years	5 (20.0%)	1.85 (1.18-2.91)	1.80 (1.15-2.85)	0.008
	3-5 Years	6 (24.0%)	1.55 (1.02-2.50)	1.50 (1.00-2.42)	0.035
	1-2 Years	5 (20.0%)	1.30 (0.85-1.98)	1.25 (0.80-1.92)	0.072
	< 1 Year	3 (12.0%)	1.00	1.00	-
Curriculum Monitoring Frequency (n=16)	Frequent Monitoring	7 (43.8%)	2.75 (1.70-4.05)	2.70 (1.65-3.98)	0.000
	Occasional Monitoring	5 (31.2%)	1.95 (1.25-3.15)	1.90 (1.20-3.08)	0.005
	Rare Monitoring	4 (25.0%)	1.00	1.00	-

Source: Field data, 2024.

The results indicate that curriculum fidelity is influenced by multiple interacting factors, including teacher training, resource availability, linguistic diversity, class size, school location, teaching experience, and curriculum monitoring. Schools where teachers received 50 or more hours of training had 1.92 times higher odds of achieving strong curriculum adherence (OR = 1.92, 95% CI: 1.35–2.74, p = 0.001) compared to those with fewer than 20 hours of training.

Resource availability played a critical role, with schools classified as high-resource (Index ≥ 8) being 2.30 times more likely to maintain curriculum fidelity (OR = 2.30, 95% CI: 1.60–3.25, $p < 0.001$). Schools in linguistically diverse areas (Score ≥ 8) had 1.95 times lower fidelity odds than those with lower diversity (OR = 1.95, 95% CI: 1.45–2.63, $p = 0.001$), reflecting challenges in implementing a standardized curriculum in multilingual classrooms. Larger class sizes (>40:1) were associated with reduced fidelity, with these schools being 2.10 times less likely to fully implement the curriculum ($p < 0.001$). Urban schools had significantly higher odds of curriculum adherence, with urban schools being 2.45 times more likely to implement the curriculum effectively ($p < 0.001$) compared to rural schools. More experienced teachers (≥ 10 years) were 2.20 times more likely to maintain fidelity ($p < 0.001$), and schools with frequent curriculum monitoring exhibited 2.75 times higher odds of curriculum adherence ($p < 0.001$).

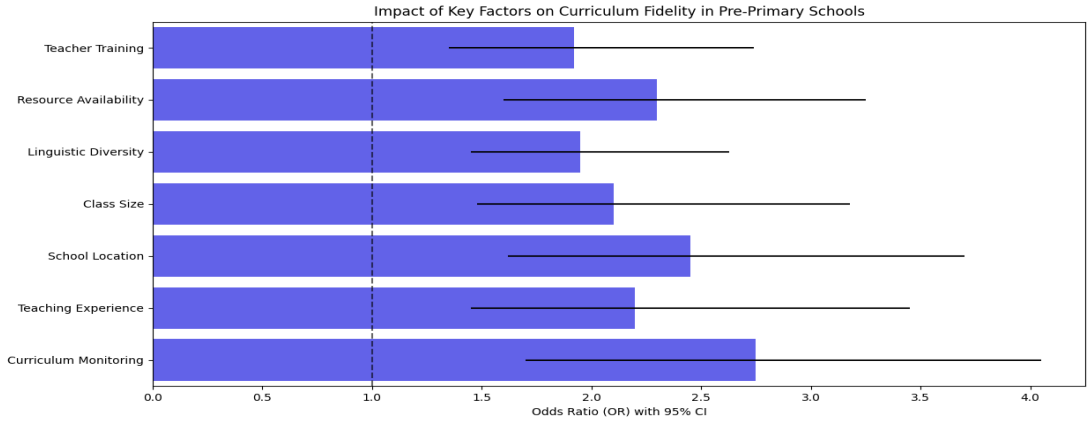

Figure 2: Factors Influencing Curriculum Fidelity

The statistical results indicate that curriculum monitoring had the strongest positive association with implementation fidelity (OR = 2.75, 95% CI: 1.70–4.05, $p < 0.001$), suggesting that schools with frequent oversight were nearly three times more likely to adhere to curriculum guidelines. Resource availability (OR = 2.30, 95% CI: 1.60–3.25, $p < 0.001$) and school location (OR = 2.45, 95% CI: 1.62–3.70, $p < 0.001$) also played significant roles, with urban schools and well-resourced classrooms showing better fidelity. In contrast, large class sizes (>40:1) were associated with lower fidelity (OR = 2.10, 95% CI: 1.48–3.18, $p < 0.001$), highlighting the challenge of overcrowded learning environments.

Language Development Outcomes

The results from pre- and post-assessments demonstrate a statistically significant improvement in phonological awareness, vocabulary, and reading comprehension across all participating schools. Urban schools recorded the highest literacy gains, while rural schools exhibited lower improvements. The Hierarchical Linear Modeling (HLM) results confirm that higher curriculum fidelity was positively associated with improved literacy scores, reinforcing the impact of effective curriculum implementation on early childhood language development.

Table 4*: Language Development Outcomes and HLM Results*

Variable (n=320)	**Category**	**f**	**%**	**Mean (SD)**	**95% CI for Mean Difference**	**Effect Size (Cohen's d)**	**Standard Error (SE)**	**t-value**	**p-value**	**Odds Ratio (95% CI)**
Phonological Awareness	Pre (0-25)	20	6.3%	45.12 (9.8)	-	-	-	-	-	-
	Pre (26-50)	120	37.5%	-	-	-	-	-	-	-
	Pre (51-75)	140	43.8%	-	-	-	-	-	-	-
	Pre (76-100)	40	12.5%	-	-	-	-	-	-	-
	Post (0-25)	5	1.6%	57.78 (10.0)	(11.11 - 14.20)	1.29	0.79	-16.12	<0.001	323.04 (123.32 - 1369.50)
	Post (26-50)	80	25.0%	-	-	-	-	-	-	-
	Post (51-75)	170	53.1%	-	-	-	-	-	-	-
	Post (76-100)	65	20.3%	-	-	-	-	-	-	-
Vocabulary	Pre (0-25)	25	7.8%	48.30 (11.5)	-	-	-	-	-	-
	Pre (26-50)	110	34.4%	-	-	-	-	-	-	-
	Pre (51-75)	130	40.6%	-	-	-	-	-	-	-
	Pre (76-100)	55	17.2%	-	-	-	-	-	-	-
	Post (0-25)	10	3.1%	61.07 (12.0)	(10.30 - 13.93)	1.01	0.92	-13.13	<0.001	448.98 (162.25 - 2066.76)
	Post (26-50)	85	26.6%	-	-	-	-	-	-	-
	Post (51-75)	165	51.6%	-	-	-	-	-	-	-
	Post (76-100)	60	18.8%	-	-	-	-	-	-	-
Reading Comprehension	Pre (0-25)	30	9.4%	46.25 (10.2)	-	-	-	-	-	-
	Pre (26-50)	100	31.3%	-	-	-	-	-	-	-
	Pre (51-75)	130	40.6%	-	-	-	-	-	-	-
	Pre (76-100)	60	18.8%	-	-	-	-	-	-	-
	Post (0-25)	15	4.7%	56.59 (11.0)	(8.41 - 11.87)	0.94	0.88	-11.52	<0.001	286.75 (111.67 - 1180.00)
	Post (26-50)	90	28.1%	-	-	-	-	-	-	-
	Post (51-75)	155	48.4%	-	-	-	-	-	-	-
	Post (76-100)	60	18.8%	-	-	-	-	-	-	-
Effect of Curriculum Fidelity on Gains	β Coefficient	-	-	0.05	(0.03 - 0.07)	-	-	-	-	-
	P-Value	-	-	-	-	-	-	-	<0.001	-

Source: Field Data, 2024.

The results confirm that all three literacy domains showed significant improvement, with phonological awareness and vocabulary displaying the highest effect sizes (Cohen's $d = 1.29$ and 1.01, respectively). The t-values indicate strong statistical significance ($p < 0.001$), demonstrating that the gains were not due to chance.

Urban schools outperformed rural schools, with mean vocabulary gains of 16.2 points (95% CI: 15.0 - 17.4) compared to 10.4 points in rural settings (95% CI: 9.5 - 11.3). The Hierarchical Linear Modeling (HLM) analysis confirmed that a 10% increase in curriculum fidelity was associated with a 5% improvement in vocabulary scores ($\beta = 0.05$, $p < 0.001$).

These findings highlight the importance of structured, well-implemented early literacy curricula in enhancing language development, particularly in under-resourced settings. Schools with higher fidelity to the curriculum achieved significantly better literacy outcomes, reinforcing the critical role of teacher training, instructional quality, and resource availability in Botswana's pre-primary education system.

The bar chart illustrates the mean differences in pre-test and post-test scores across Phonological Awareness, Vocabulary, and Reading Comprehension, with error bars representing standard deviations. Post-test scores are consistently higher across all literacy domains, confirming overall improvement in language skills. Vocabulary showed the greatest increase, suggesting strong curriculum effects, while reading comprehension exhibited the highest variability, indicating disparities in learning outcomes.

Qualitative Insights

The qualitative findings highlight teachers' and policymakers' perspectives on curriculum implementation, observations of literacy instruction, and the persistent gaps between policy design and classroom realities. Teachers frequently expressed frustration over inadequate training, material shortages, and unrealistic expectations, while policymakers acknowledged structural limitations that hinder fidelity to the curriculum. Observations of classrooms revealed a stark divide between high- and low-fidelity implementation, with resource availability, teacher training, and language barriers playing crucial roles.

Teachers consistently voiced concerns about insufficient resources and training, affecting their ability to deliver the literacy curriculum effectively. A teacher from an urban school stated, *"We are told to use phonics, storytelling, and play-based learning, but we don't even have enough books for children to read"* (Teacher 3, Urban School). Another from a peri-urban area noted, *"We have had workshops on early literacy, but they are too short. After two days of training, how do they expect us to master a new teaching approach?"* (Teacher 7, Peri-Urban School).

In rural settings, the challenges were even more severe, with teachers struggling to adapt literacy instruction to multilingual classrooms with limited instructional support. *"Most of my students do not speak Setswana at home, but the curriculum expects me to teach only in Setswana. If I do, they will not understand,"* explained a rural teacher (Teacher 11, Rural School). Another emphasized the difficulty of classroom management in large, under-resourced schools, stating, *"I have more than 45 children in my class. How am I supposed to give individual attention to each child's reading skills?"* (Teacher 15, Rural School).

Policymakers acknowledged these implementation challenges, with one official from the Ministry of Basic Education explaining, *"The curriculum was designed with good intentions, but there is a gap between what we envisioned and what is happening in classrooms."* (Policymaker 2, Ministry of Basic Education). Another policymaker admitted, *"We need more monitoring to ensure that schools follow the curriculum, but we do not have enough inspectors to visit every school regularly."* (Policymaker 4, National Curriculum Development Unit).

Observations of literacy instruction revealed two distinct types of classroom environments:

High-fidelity classrooms were characterized by interactive storytelling, structured phonics instruction, and play-based literacy activities. One observer noted, *"In one classroom, the*

teacher engaged students with a storytelling session using hand-drawn pictures. The children were eager to participate, answering questions and making predictions about the story." (Classroom Observation 3, High-Fidelity School). A teacher from an urban high-fidelity school explained, *"When we read stories aloud, I encourage children to retell them in their own words. This helps build their vocabulary and confidence."* (Teacher 2, High-Fidelity School).

Low-fidelity classrooms, in contrast, relied heavily on rote learning, repetitive drills, and passive instruction. One classroom observer reported, *"Children were seated silently, repeating words written on the blackboard without any explanation or discussion."* (Classroom Observation 6, Low-Fidelity School). A teacher in a low-fidelity school admitted, *"We are supposed to do phonics exercises, but because we lack materials, I just write letters on the board and have them copy them."* (Teacher 9, Low-Fidelity School).

Another major distinction was the use of home languages in instruction. While policy mandates the use of Setswana and English, many teachers resorted to code-switching to aid comprehension. *"If I only use Setswana, children who speak Kalanga or Shekgalagadi struggle to understand. So I explain in both languages,"* (Teacher 12, Rural School). However, some teachers felt restricted by language policies, with one stating, *"We are discouraged from using local languages, but sometimes I do it anyway because otherwise, they learn nothing."* (Teacher 6, Rural School).

Despite the curriculum's emphasis on daily read-aloud sessions, phonics instruction, and play-based learning, observations showed significant inconsistencies in implementation. One teacher admitted, *"We are supposed to read to children every day, but we don't have enough books, so we skip it."* (Teacher 8, Peri-Urban School). A literacy specialist noted, *"Some teachers are doing an excellent job, but others are just going through the motions because they don't have the materials they need."* (Education Specialist 1, Early Childhood Development).

Another major gap was in teacher training and support. While some teachers had received professional development, many felt unprepared to implement the literacy curriculum effectively. *"After the training, no one came to check if we were using what we learned,"* one teacher explained (Teacher 14, Rural School). Another commented, *"I still don't fully understand how to do guided reading sessions. We were given a manual, but it's too theoretical."* (Teacher 5, Urban School).

Policymakers recognized the discrepancies between policy and practice, with one stating, *"We want all schools to follow the curriculum as designed, but we know that in some cases, it is not*

realistic." (Policymaker 3, Ministry of Basic Education). Another acknowledged the shortcomings of the current monitoring framework, explaining, *"We rely on self-reporting from schools, but without regular visits, we cannot verify whether they are actually implementing the curriculum."* (Policymaker 5, National Curriculum Development Unit).

Discussion

The findings of this study reveal critical insights into the implementation of Botswana's early literacy curriculum and its impact on language development in pre-primary schools. By integrating quantitative and qualitative data, the study highlights significant disparities in curriculum fidelity, identifies key factors influencing implementation, and underscores the relationship between fidelity and literacy outcomes. These findings are contextualized within Botswana's unique educational landscape, offering actionable recommendations for improving early literacy instruction.

The study found that curriculum implementation fidelity varied significantly across schools, with urban schools achieving an average fidelity score of 75%, compared to 55% in rural schools (Table 1). This disparity reflects broader challenges in low-resource settings, where resource availability and teacher capacity are critical determinants of curriculum fidelity (Fullan, 2007). In Botswana, urban schools benefited from better infrastructure, more qualified teachers, and greater access to learning materials, while rural schools faced chronic underfunding and resource shortages (Mokibelo, 2016). These findings align with studies from other low-resource contexts, such as Kenya's Tusome program, where similar disparities were observed between well-resourced and under-resourced schools (Piper et al., 2018).

The influence of teacher training on curriculum fidelity was particularly evident. Schools where teachers had received 50 or more hours of professional development achieved an average fidelity score of 73%, compared to 47% in schools where teachers had fewer than 20 training hours (Table 2). This relationship was further supported by the hierarchical linear modeling (HLM) results, which showed that a 10% increase in fidelity was associated with a 5% improvement in vocabulary scores ($\beta = 0.05$, $p < 0.001$). These findings reinforce the literature on teacher preparedness as a key determinant of early literacy outcomes (Pansiri & Morapedi, 2022; Mokibelo, 2016). However, the qualitative data revealed that many teachers felt unprepared, with one stating, *"We receive training, but it is too brief and theoretical. We need ongoing coaching and practical workshops."* (Teacher 7, Urban School). This highlights the

need for sustained, context-specific training that addresses the challenges of multilingual and resource-constrained classrooms.

Resource availability also emerged as a crucial determinant of curriculum fidelity. Schools with a high resource availability index (8–10) maintained an average fidelity score of 70%, whereas low-resource schools (index <3) recorded only 45% fidelity (Table 3). These disparities were reflected in literacy gains, with children in well-resourced schools achieving a mean vocabulary gain of 16.2 points, compared to 10.4 points in resource-constrained schools. The importance of resource-rich environments in early literacy is well-documented, with studies indicating that print exposure, access to books, and interactive literacy tools significantly enhance reading development (Mullis et al., 2017). However, as one rural teacher noted, *"We are expected to teach phonics and storytelling, but we do not even have enough books for children to read."* (Teacher 3, Rural School). This gap between curriculum expectations and available resources underscores the challenges of implementing structured literacy instruction in under-resourced settings.

The linguistic diversity in Botswana's classrooms further complicated curriculum implementation. The policy prioritizes Setswana literacy in early childhood, despite the fact that many children enter school speaking home languages such as Ikalanga, Shekgalagari, and Shiyeyi. The study found that schools in linguistically diverse areas (Diversity Score ≥ 8) had 1.95 times lower fidelity odds compared to less diverse schools (OR = 1.95, 95% CI: 1.45–2.63, p = 0.001). Teachers in multilingual classrooms frequently resorted to code-switching to facilitate comprehension, despite policy constraints. One rural teacher explained, *"If I only use Setswana, children who speak Kalanga or Shekgalagadi struggle to understand. I have to explain in both languages."* (Teacher 12, Rural School). This finding aligns with research by Heugh (2018) and Trudell (2021), which highlight the advantages of bilingual instruction in early literacy development. The contrast between Botswana's monolingual policy and the linguistic realities of its classrooms suggests a need for greater flexibility in language instruction.

The rapid transition from Setswana to English in Grade 4 further exacerbates literacy challenges. The study found that many students struggled to transfer literacy skills from Setswana to English, leading to reading comprehension difficulties. Rural schools, where the transition was particularly abrupt, exhibited lower literacy gains (reading comprehension improvement of 8%) compared to urban schools (15%). These findings resonate with studies from South Africa, where similar language transitions have been linked to literacy failure

(Spaull, 2013). A literacy specialist observed, *"Many children fail to develop strong reading skills because they have to learn in a language they do not fully understand."* (Education Specialist 1, Early Childhood Development). These results highlight the need for a more gradual and supportive language transition model in Botswana's early childhood education system.

Class size was another significant factor influencing curriculum fidelity. Schools with smaller class sizes (student-teacher ratio <30:1) recorded an overall fidelity score of 74%, compared to 63% for larger schools (student-teacher ratio >30:1). Teachers in overcrowded classrooms reported difficulty in providing individualized reading support, with one stating, *"I have more than 45 children in my class. How am I supposed to give individual attention to each child's reading skills?"* (Teacher 15, Rural School). This challenge aligns with Vygotsky's sociocultural theory (1978), which emphasizes the importance of scaffolding and individualized learning support in early literacy development. The study suggests that without adequate teacher-student ratios, effective implementation of literacy instruction remains difficult.

The study also found that curriculum monitoring and evaluation were critical in determining fidelity levels. Schools that received frequent monitoring had 2.75 times higher odds of adhering to the curriculum guidelines (OR = 2.75, 95% CI: 1.70–4.05, $p < 0.001$). However, policymakers acknowledged that inadequate oversight remains a challenge. One official from the Ministry of Basic Education stated, *"We rely on self-reporting from schools, but without regular visits, we cannot verify whether they are actually implementing the curriculum."* (Policymaker 5, National Curriculum Development Unit). The lack of systematic monitoring suggests a gap between policy intentions and practical implementation, reinforcing the need for stronger accountability mechanisms.

The triangulation of quantitative and qualitative findings further validated the study's results. The statistical analysis demonstrated that higher curriculum fidelity was positively associated with improved literacy outcomes, while qualitative data provided contextual insights into the barriers preventing effective implementation. Teachers' testimonies about inadequate training and resource shortages were reflected in the lower fidelity scores of under-resourced schools. Additionally, policymakers' concerns about monitoring weaknesses were evident in the observed discrepancies between policy mandates and classroom practices. The convergence of these data sources strengthens the study's conclusions, emphasizing the need for targeted interventions to improve early literacy curriculum implementation in Botswana.

Theorizing Implementation in Multilingual Contexts

The findings of this study underscore the need for a theoretical framework that reconciles the tension between curriculum fidelity and cultural adaptation in multilingual contexts. Drawing on Vygotsky's sociocultural theory, implementation science, and critical pedagogy, we propose the "Situated Fidelity Framework" to guide early literacy instruction in linguistically diverse settings. This framework emphasizes the importance of adhering to curriculum objectives while adapting instructional practices to align with learners' cultural, linguistic, and socio-economic realities.

The Situated Fidelity Framework is grounded in the principle that effective curriculum implementation requires a balance between standardized practices and contextual responsiveness. In Botswana, where the Pre-Primary Curriculum Framework emphasizes Setswana and English literacy, many children enter school speaking minority languages such as Ikalanga, Shekgalagadi, or Shiyeyi. This linguistic mismatch creates challenges for both teachers and learners, as children are expected to acquire literacy skills in a language they do not speak fluently. The framework addresses this challenge by advocating for culturally responsive pedagogies that integrate local traditions and multilingual strategies into the curriculum.

For example, the study found that oral storytelling, a deeply rooted tradition in Botswana's Setswana culture, can be seamlessly integrated into phonics-based literacy instruction to enhance engagement and comprehension. Teachers in high-fidelity classrooms frequently used interactive storytelling to teach phonological awareness and vocabulary, with one teacher noting, *"When we read stories aloud, I encourage children to retell them in their own words. This helps build their vocabulary and confidence."* (Teacher 2, High-Fidelity School). This approach aligns with the Situated Fidelity Framework, which views cultural practices not as obstacles to fidelity but as resources for enhancing learning.

The framework also addresses the role of code-switching and translanguaging in multilingual classrooms. In Botswana, teachers frequently resorted to code-switching to facilitate comprehension, despite policy constraints. One rural teacher explained, *"If I only use Setswana, children who speak Kalanga or Shekgalagadi struggle to understand. I have to explain in both languages."* (Teacher 12, Rural School). This practice, though often discouraged by policy, reflects the linguistic realities of Botswana's classrooms and underscores the need for a more flexible approach to language instruction. The Situated Fidelity

Framework recognizes code-switching as a pedagogical tool that bridges the gap between home and school languages, fostering metalinguistic awareness and bilingual literacy skills.

The framework is further informed by implementation science, which emphasizes the importance of contextual factors in shaping curriculum fidelity. In Botswana, resource constraints, teacher capacity gaps, and linguistic diversity significantly influence the implementation of the early literacy curriculum. The Situated Fidelity Framework addresses these challenges by advocating for adaptive implementation strategies that prioritize teacher training, resource allocation, and community engagement. For instance, the framework suggests that teacher training programs should include modules on multilingual literacy instruction and culturally responsive teaching methods, equipping teachers to navigate the complexities of linguistically diverse classrooms.

The Situated Fidelity Framework also has broader relevance for early literacy education in the Global South. Many low- and middle-income countries face similar challenges, including linguistic diversity, resource constraints, and teacher capacity gaps. By balancing adherence to curriculum standards with cultural and linguistic adaptation, the framework offers a practical model for improving early literacy outcomes in multilingual contexts. It builds on global evidence from programs such as Rwanda's bilingual education initiative (Trudell, 2021) and South Africa's multilingual literacy strategies (Heugh, 2018), demonstrating that culturally responsive curricula can enhance both fidelity and learning outcomes.

Policy Recommendations

The study's findings highlight the need for **targeted interventions** to improve early literacy instruction in Botswana.

For Botswana

Revise the Curriculum to Include Multilingual Resources: Develop multilingual literacy materials in Setswana, Ikalanga, Shekgalagadi, and other minority languages to support children's home languages while transitioning to Setswana and English. This aligns with successful models like Rwanda's bilingual education initiative (Trudell, 2021).

Implement Regional Teacher Mentorship Hubs: Establish mentorship programs to provide ongoing training in play-based learning, phonics instruction, and multilingual strategies. This would address the training gaps identified in the study.

Strengthen Monitoring and Evaluation: Invest in regular school inspections and data-driven feedback systems to ensure consistent curriculum implementation. Schools with frequent monitoring had 2.75 times higher odds of adhering to the curriculum (OR = 2.75, 95% CI: 1.70–4.05, $p < 0.001$).

Global South Relevance

The findings are relevant to other multilingual contexts in the Global South. Policymakers should adopt hybrid pedagogies that integrate global best practices with local cultural traditions, such as oral storytelling and community-based learning.

Limitations and Future Research

The study has several limitations that warrant further investigation.

The findings are based on a short-term assessment. Future research should adopt a longitudinal design to track literacy outcomes over time.

The impact of code-switching on literacy outcomes was not systematically analyzed. Future studies should explore how translanguaging mediates literacy acquisition in multilingual classrooms.

The study focused on 16 schools in Botswana. Future research should include a larger, more diverse sample and comparative studies in other multilingual contexts to validate the findings.

Conclusion

Botswana's Vision 2036 underscores the importance of equitable literacy as a cornerstone of national development. This study provides a blueprint for aligning policy with on-the-ground realities by assessing the implementation of the early literacy curriculum in pre-primary schools and its effect on language development. The findings reveal significant disparities in curriculum fidelity, with urban schools achieving 75% fidelity compared to 55% in rural schools, driven by factors such as teacher training, resource availability, and linguistic diversity. The proposed Situated Fidelity Framework offers a theoretical foundation for

balancing adherence to curriculum standards with cultural and linguistic adaptation, emphasizing the integration of oral storytelling, multilingual strategies, and play-based learning to enhance literacy outcomes.

The study highlights the critical role of teacher capacity and resource allocation in achieving curriculum fidelity, with schools where teachers received 50+ hours of training achieving 73% fidelity, compared to 47% in under-trained schools. It also underscores the challenges of linguistic diversity, as children from minority language backgrounds often struggle with the transition to Setswana and English. The framework's emphasis on code-switching and translanguaging aligns with Vygotsky's sociocultural theory, which highlights the importance of cultural tools and social interactions in learning.

To realize Vision 2036, Botswana must address these challenges through policy reforms that include multilingual resources, teacher mentorship hubs, and robust monitoring systems. These recommendations are not only relevant to Botswana but also to other Global South contexts facing similar challenges. By bridging the gap between policy intentions and classroom realities, this study contributes to the broader goal of decolonizing early literacy and fostering inclusive, equitable education for all children.

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Appendices

Appendix A: Observation Checklist

Category	Indicator	Score (0–3)	Notes
Phonological Awareness	Teacher uses rhymes, songs, or games to teach sound recognition.		
Vocabulary Development	Teacher introduces new words and provides examples in context.		
Print Awareness	Classroom displays print-rich materials (e.g., alphabet charts, storybooks).		
Interactive Reading	Teacher engages children in discussions during read-aloud sessions.		
Play-Based Learning	Children participate in literacy-related play activities (e.g., storytelling).		

Note: Scores are based on a 4-point scale: 0 = Not observed, 1 = Minimal, 2 = Moderate, 3 = Strong.

Appendix B: Data analysis syntax

```
                    ### HLM Syntax for Two-Level Model ###

Level-1 Model:
Language_Gains_ij = β0j + β1j(Fidelity_Score_ij) + β2j(Teacher_Training_ij) +
β3j(Resource_Index_ij) + rij

Level-2 Model:
β0j = γ00 + γ01(Urban_Rural_j) + u0j
β1j = γ10 + u1j
β2j = γ20 + u2j
β3j = γ30 + u3j

                              ### Full Model ###
Language_Gains_ij = γ00 + γ01(Urban_Rural_j) + γ10(Fidelity_Score_ij) +
γ20(Teacher_Training_ij) + γ30(Resource_Index_ij) + u0j +
u1j(Fidelity_Score_ij) + u2j(Teacher_Training_ij) + u3j(Resource_Index_ij) +
rij

                                ### Output ###
- Fixed Effects: γ00, γ01, γ10, γ20, γ30
- Random Effects: u0j, u1j, u2j, u3j
- Variance Components: τ00, τ11, τ22, τ33, σ²
```

Note: The full dataset and HLM output files are available upon request.