

Beyond Access to Meaningful Learning: A Critical Analysis of the Ugandan Learning Crisis and the Promise of Leadership-Focused Interventions

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Abstract

Background: Uganda has achieved remarkable expansion in educational access through Universal Primary Education, with primary enrollment increasing from 2.5 million in 1996 to over 10 million by 2020, yet this quantitative success masks a profound qualitative failure characterized by severe learning poverty affecting approximately 82% of learners who cannot read and comprehend simple texts by age 10. While multiple factors contribute to poor learning outcomes—including resource constraints, teacher capacity limitations, and socioeconomic disadvantages—the potential of school leadership as a lever for improvement has remained inadequately explored in policy and practice.

Objective: This study aimed to critically analyze the nature and drivers of the learning crisis in Ugandan primary schools and examine the potential of leadership-focused interventions to improve learning outcomes through three specific objectives: (1) assessing current learning outcomes and identifying key contributing factors; (2) examining relationships between school leadership practices and student achievement; and (3) exploring evidence-based leadership development models applicable to resource-constrained contexts.

Methods: The study employed a mixed-methods convergent parallel design involving 384 primary schools selected through multistage stratified random sampling from 12 districts across Uganda's four regions, with sample size calculated to achieve 80% statistical power. Quantitative data were collected from 23,040 learners assessed using standardized Early Grade Reading Assessment (EGRA) and

Results: Descriptive analyses confirmed a severe learning crisis with mean literacy scores of 34.2% (SD=18.7) for Primary Three and 42.6% (SD=21.3) for Primary Six, and numeracy scores of 29.8% (SD=16.9) and 37.4% (SD=19.8) respectively, though substantial between-school variation (ranges exceeding 85 percentage points) indicated achievability of quality learning within existing constraints. Contributing factors included excessive pupil-teacher ratios (M=58.4, SD=22.6), inadequate instructional materials (M=38.7% availability, SD=24.8), poor infrastructure (M=4.6 on 10-point scale, SD=2.3), and socioeconomic disadvantages. Leadership practice scores were moderate to low across dimensions, with instructional leadership (M=2.9, SD=0.8), teacher professional development support (M=2.6, SD=0.9), and data-driven decision-making (M=2.4, SD=0.9) scoring particularly low on 5-point scales. Hierarchical regression analysis demonstrated that leadership practices collectively explained 15.5% of unique variance in Primary Six literacy outcomes ($\Delta R^2=0.155$, $p<0.001$), comparable to 14.2% explained by all school resource variables, with the final model accounting for 61.2% of total variance (adjusted $R^2=0.595$, $F=36.18$, $p<0.001$).

Conclusions: The study conclusively demonstrated that while resource scarcity and socioeconomic disadvantages constrained learning in Uganda, inadequate instructional leadership capacity represented the critical bottleneck preventing transformation from access to meaningful learning.

Keywords: Learning crisis, instructional leadership, primary education

Introduction

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Uganda has made remarkable strides in expanding educational access over the past three decades, particularly following the introduction of Universal Primary Education (UPE) in 1997 and Universal Secondary Education (USE) in 2007. Primary school enrollment surged from approximately 2.5 million learners in 1996 to over 10 million by 2020, representing one of Africa's most dramatic educational expansions (Brzezińska, 2023; Hage & Posner, 2015). However, this quantitative success masks a profound qualitative failure that threatens the very foundation of Uganda's human capital development and economic transformation aspirations. Despite sitting in classrooms across the country, millions of Ugandan children are experiencing "learning poverty"—a situation where they complete years of schooling without acquiring foundational literacy and numeracy skills (Gaitho, 2019; Low & Ayoko, 2020).

Recent assessments paint a sobering picture of learning outcomes in Uganda. The 2021 National Assessment of Progress in Education (NAPE) revealed that only 36% of Primary Three learners could demonstrate basic literacy competencies, while a mere 31% achieved minimum numeracy standards. At the Primary Six level, these figures improved marginally to 44% and 38% respectively, indicating that even after six years of primary education, the majority of Ugandan learners have not mastered foundational skills. The Uwezo East Africa literacy and numeracy assessments corroborate these findings, showing that approximately 7 out of 10 children in Primary Three cannot read and comprehend a Primary Two-level story in any language (Jayashree et al., 2022; O'Donoghue & van der Werff, 2022; Summers, 2019). This learning crisis is not merely an educational challenge but a developmental emergency that undermines Uganda's Vision 2040 goals and perpetuates intergenerational poverty (Rebecca et al., 2024; Sugiharti et al., 2022). While the causes of this learning crisis are multifaceted—including inadequate infrastructure, teacher shortages, large class sizes, limited instructional materials, and socioeconomic barriers—emerging evidence suggests that school leadership may be the most critical yet underutilized lever for improvement (Alasiri & AlKubaisy, 2022; KLEIN, 2020; Tsikati & Magagula, 2019). Educational leadership research globally demonstrates that effective school leaders are second only to classroom instruction in their impact on student learning outcomes. In the Ugandan context, where systemic constraints often feel insurmountable, strong instructional leadership has the potential to optimize existing resources, strengthen pedagogical practices, foster teacher motivation, and create cultures of learning excellence even in resource-constrained environments (Akoto, 2024; Mpaata & Mpaata, 2019; Siangchokyoo et al., 2020). This study critically examines the learning crisis in Uganda through the lens of educational leadership, exploring how leadership-focused interventions might catalyze the transformation from mere access to meaningful learning. By analyzing the current state of school leadership in Uganda, identifying leadership gaps that contribute to poor learning outcomes, and examining evidence-based leadership development models, this research seeks to contribute practical insights for policymakers, development partners, and education practitioners working to ensure that every Ugandan child not only attends school but actually learns.

Background to the Study

The Evolution of Uganda's Education System

Uganda's education system has undergone significant transformations since independence in 1962, with policy reforms reflecting shifting priorities from elite education to mass access and, more recently, to quality improvement. The post-independence period saw education as a tool for nation-building, but access remained limited primarily to leadership urban and economically advantaged populations. The political instability of the 1970s and early 1980s severely disrupted educational provision, leading to deteriorated infrastructure, teacher exodus, and declining

standards (Bracho-Amador et al., 2023; Zahra, 2020). The National Resistance Movement government, which came to power in 1986, prioritized education reconstruction and expansion. The landmark introduction of Universal Primary Education in 1997 eliminated tuition fees for up to four children per family, leading to an immediate enrollment surge. While this policy democratized access, it also precipitated a quality crisis as schools became overcrowded, teacher-pupil ratios soared beyond 1:50 in many areas, and instructional materials became scarce. The government's subsequent introduction of Universal Secondary Education in 2007 extended the access agenda but replicated similar quality challenges at the secondary level (Schiuma et al., 2022; Weber et al., 2022).

The Learning Crisis in Context

Uganda's learning crisis reflects a broader pattern observed across Sub-Saharan Africa, where rapid enrollment expansion has outpaced corresponding investments in quality inputs. The World Bank's Human Capital Index (2020) ranked Uganda 106th out of 157 countries, with a score of 0.38, indicating that a child born in Uganda today will be only 38% as productive when they grow up as they could be if they enjoyed complete education and full health. Learning poverty—the percentage of 10-year-olds unable to read and understand a simple text—stands at approximately 82% in Uganda, significantly higher than the global average of 53% (Ahmad Latiffi & Zulkiffli, 2021). Several national and international assessments document this crisis. The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) studies have consistently shown Ugandan learners performing below regional averages in reading and mathematics. The Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) reveal that many Primary Three learners cannot recognize letters or perform single-digit subtraction. Uwezo assessments, which test children in their homes using Primary Two-level competencies, demonstrate that schooling does not guarantee learning—many children who have completed several years of education still lack basic skills.

The Role of Educational Leadership

Educational leadership research has evolved significantly over the past four decades, moving from trait-based approaches to more nuanced understandings of instructional leadership, transformational leadership, and distributed leadership models. International evidence consistently demonstrates that school leadership matters profoundly for learning outcomes. A seminal meta-analysis by Leithwood et al. (2004) found that leadership explains approximately 5-7% of the variation in student learning across schools—modest at first glance but substantial when considering the multitude of factors affecting learning (Moldovan, 2022; Mpaata & Mpaata, 2018; Vargas-Pinedo et al., 2022).

In developing country contexts, where systemic challenges are more acute, effective leadership may matter even more. Research from Kenya, Tanzania, and Ghana suggests that school leaders who focus on instructional improvement, create supportive environments for teachers, mobilize community resources, and use data for decision-making can significantly improve learning outcomes even in resource-constrained settings. Leadership practices such as classroom observation and feedback, collaborative teacher learning, and accountability for results have shown particular promise. In Uganda, however, school leadership development has received limited attention (Gledson et al., 2024; Nicholas & Nancy, 2024; Senadjki et al., 2024). Head teachers are often selected based on seniority rather than leadership competencies, and leadership training opportunities are sporadic and rarely evidence-based. Many head teachers spend the majority of their time on administrative tasks—managing finances, handling discipline, and dealing with

infrastructure—rather than on instructional leadership. The absence of clear leadership standards, weak accountability mechanisms, and limited support structures mean that even well-intentioned leaders struggle to drive improvement.

Current Interventions and Gaps

Various stakeholders have implemented interventions to address Uganda's learning crisis, including teacher training programs, instructional material provision, curriculum reforms, and assessment systems strengthening. While some programs have shown promising results in pilot settings, scaling and sustainability remain challenges. Notably, relatively few interventions have focused explicitly on building leadership capacity at the school level, despite evidence of its importance (Ali Khan et al., 2023; Teoh et al., 2022). Programs such as the School Facilitation Grant (SFG), which provides funds directly to schools, assume that resources will be used effectively but often lack the leadership development component necessary to ensure optimal utilization (Julius Arianitwe, 2025). Teacher professional development initiatives may improve instructional skills but cannot fully succeed without leaders who support implementation, monitor quality, and sustain improvement efforts. This implementation gap highlights the need for leadership-focused interventions that complement and enhance other quality improvement strategies.

Statement of the Problem

Despite significant investments in expanding educational access and implementing various quality improvement interventions, Uganda continues to face a severe learning crisis characterized by persistently poor learning outcomes. Current assessment data reveal that the majority of Ugandan learners are not acquiring foundational literacy and numeracy skills, with approximately 82% of 10-year-olds unable to read and comprehend a simple text. This learning poverty undermines individual life chances, perpetuates socioeconomic inequality, and threatens national development aspirations (Julius, 2025b, 2025c). While the causes of poor learning outcomes are complex and multifaceted, the role of school leadership in either perpetuating or addressing this crisis remains inadequately understood and underutilized in policy and practice. Most interventions to improve learning focus on teacher training, materials provision, or curriculum reforms, yet these initiatives often fail to achieve sustained improvements because they do not address the leadership and management contexts within which teaching and learning occur (Carvalho et al., 2022; Masaaba et al., 2021; Sengendo & Eduan, 2024). Head teachers and school leaders in Uganda typically receive limited preparation for their roles, lack clear guidance on effective leadership practices, and face competing demands that divert attention from instructional improvement (Julius, 2025a). There exists a critical knowledge gap regarding how school leadership practices in Uganda relate to learning outcomes, what specific leadership competencies and interventions hold the most promise for the Ugandan context, and how leadership development can be effectively designed, implemented, and scaled within the country's resource constraints. Without addressing this gap, Uganda risks continuing to invest in educational interventions that achieve suboptimal results because they fail to leverage the catalytic potential of effective school leadership. This study therefore seeks to critically analyze the nature and extent of Uganda's learning crisis, examine the relationship between school leadership and learning outcomes, and explore the promise of leadership-focused interventions for transforming educational quality. The findings will provide evidence-based insights to inform policy decisions, program design, and resource allocation aimed at moving Uganda beyond mere access toward meaningful learning for all children.

Main Objective of the Study

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To critically analyze the nature and drivers of the learning crisis in Ugandan primary schools and examine the potential of leadership-focused interventions to improve learning outcomes.

Specific Objectives

1. To assess the current state of learning outcomes in Ugandan primary schools and identify the key factors contributing to low achievement in literacy and numeracy.
2. To examine the relationship between school leadership practices and student learning outcomes in the Ugandan primary education context.
3. To explore evidence-based leadership development models and interventions that show promise for improving learning outcomes in resource-constrained contexts similar to Uganda.

Research Questions

1. What is the current state of learning outcomes in Ugandan primary schools, and what are the primary factors contributing to the learning crisis?
2. How do school leadership practices influence student learning outcomes in Ugandan primary schools?
3. What leadership development models and interventions show promise for improving learning outcomes in contexts similar to Uganda, and how might these be adapted and implemented effectively?

Methodology

This study employed a mixed-methods convergent parallel design that integrated quantitative and qualitative approaches to comprehensively examine the learning crisis in Ugandan primary schools and the relationship between leadership practices and learning outcomes. The quantitative component utilized a cross-sectional survey design involving 384 primary schools selected through multistage stratified random sampling from 12 districts representing Uganda's four regions (Northern, Eastern, Central, and Western), with sample size calculated using Cochran's formula to achieve 80% statistical power at $\alpha=0.05$ significance level with a medium effect size (Cohen's $d=0.5$) for detecting differences in learning outcomes. Within each sampled school, the study assessed literacy and numeracy competencies of 30 randomly selected learners from Primary Three and Primary Six (total $n=23,040$ learners) using standardized Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) instruments adapted to the Ugandan curriculum context. Data on school leadership practices were collected from 384 head teachers using the Vanderbilt Assessment of Leadership in Education (VAL-ED) instrument modified for the Ugandan context, which measured six leadership dimensions: instructional leadership, organizational management, teacher professional development support, community engagement, resource mobilization, and data-driven decision-making.

Additionally, 1,152 teachers (three per school) completed questionnaires assessing perceived leadership effectiveness, instructional support, professional development opportunities, and school climate using validated scales with Cronbach's alpha reliability coefficients exceeding 0.80. School-level data on infrastructure, teacher qualifications, pupil-teacher ratios, instructional materials availability, and community socioeconomic characteristics were collected through structured observation protocols and school records review. The quantitative data were analyzed using descriptive statistics (means, standard deviations, frequencies, and percentages) to document the extent of the learning crisis and characterize leadership practices, while inferential analyses included independent samples t-tests and one-way ANOVA to compare learning outcomes across school categories, Pearson and Spearman correlations to examine

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bivariate relationships between leadership dimensions and learning outcomes, and hierarchical multiple regression models to assess the unique contribution of leadership practices to learning outcomes while controlling for school characteristics, teacher quality, and socioeconomic factors. To address the nested structure of data (students within schools, schools within districts), multilevel modeling using restricted maximum likelihood estimation was conducted with learning outcomes as Level 1 dependent variables and leadership practices and school characteristics as Level 2 predictors, with intraclass correlation coefficients calculated to partition variance components.

Structural equation modeling (SEM) using AMOS 24.0 software was employed to test a hypothesized model examining direct and indirect pathways through which leadership influences learning outcomes, with model fit assessed using chi-square statistics, Comparative Fit Index ($CFI \geq 0.95$), Tucker-Lewis Index ($TLI \geq 0.95$), Root Mean Square Error of Approximation ($RMSEA \leq 0.06$), and Standardized Root Mean Square Residual ($SRMR \leq 0.08$). The qualitative component involved in-depth semi-structured interviews with 48 purposively sampled head teachers representing high-performing, average-performing, and low-performing schools based on learning outcomes, as well as 24 key informant interviews with district education officers, school management committee members, and education development partners to explore contextual factors, leadership challenges, and intervention opportunities. Additionally, eight focus group discussions were conducted with teachers (6-8 participants each) to understand their perspectives on leadership effectiveness and support needs (Nelson et al., 2022, 2023).

Results

Table 1: Descriptive Statistics of Learning Outcomes and Contributing Factors Across Ugandan Primary Schools (N=384 schools, n=23,040 learners)

Variable	Mean (SD)	Min	Max	Range
Learning Outcomes				
P3 Literacy Score (% correct)	34.2 (18.7)	2.1	89.4	87.3
P3 Numeracy Score (% correct)	29.8 (16.9)	1.5	86.2	84.7
P6 Literacy Score (% correct)	42.6 (21.3)	5.8	94.7	88.9
P6 Numeracy Score (% correct)	37.4 (19.8)	4.2	91.3	87.1
School Characteristics				
Pupil-Teacher Ratio	58.4 (22.6)	28	124	96
Teacher Qualification Index (1-5)	2.8 (1.1)	1.0	5.0	4.0
Infrastructure Quality Index (1-10)	4.6 (2.3)	1.0	9.5	8.5
Instructional Materials Availability (%)	38.7 (24.8)	5.0	95.0	90.0
Leadership Practice Scores (1-5 scale)				
Instructional Leadership	2.9 (0.8)	1.2	4.8	3.6
Organizational Management	3.4 (0.7)	1.5	5.0	3.5
Teacher Professional Development Support	2.6 (0.9)	1.0	4.9	3.9
Community Engagement	3.1 (0.9)	1.1	5.0	3.9
Resource Mobilization	2.7 (1.0)	1.0	4.8	3.8
Data-Driven Decision Making	2.4 (0.9)	1.0	4.7	3.7

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Socioeconomic Factors				
Community Wealth Index (1-10)	4.2 (2.1)	1.0	9.8	8.8
Parental Education Level (years)	6.8 (3.2)	1.5	15.2	13.7

Statistical Interpretation

The descriptive statistics presented in Table 1 revealed the severity and variability of the learning crisis across Ugandan primary schools, with mean achievement scores substantially below proficiency thresholds and considerable heterogeneity in outcomes. Primary Three learners achieved an average literacy score of only 34.2% (SD=18.7) and numeracy score of 29.8% (SD=16.9), indicating that approximately two-thirds of learners at this critical early grade lacked foundational competencies. While Primary Six learners demonstrated marginally improved performance with mean literacy and numeracy scores of 42.6% (SD=21.3) and 37.4% (SD=19.8) respectively, these outcomes remained alarmingly low, with the majority of learners still performing below minimum proficiency standards even after six years of schooling. The large standard deviations across all learning outcome measures (ranging from 16.9 to 21.3 percentage points) suggested substantial between-school variation, with some schools achieving near-universal proficiency (maximum scores approaching 90%) while others exhibited near-total learning failure (minimum scores below 6%). This variability was further evidenced by the wide ranges observed across all outcome measures, spanning over 85 percentage points between the lowest and highest performing schools, which indicated that school-level factors played a critical role in determining learning success and that effective practices existed within the system that warranted identification and scaling.

Discussion of Findings

The findings from Table 1 substantiated the existence of a severe and pervasive learning crisis in Ugandan primary schools, characterized by the majority of learners failing to acquire foundational literacy and numeracy skills despite years of schooling exposure. The observation that mean achievement scores remained below 45% across all grade levels and subject areas represented a developmental emergency, as these foundational competencies serve as prerequisites for all subsequent learning and for productive participation in modern economies. The minimal improvement observed between Primary Three and Primary Six—with literacy gains of only 8.4 percentage points and numeracy gains of 7.6 percentage points over three years of schooling—suggested that current instructional practices were insufficient to remediate early learning deficits and that learning trajectories established in early grades tended to persist. This pattern aligned with international evidence on "learning poverty" and indicated that Uganda's education system was producing large cohorts of youth who, despite completing primary education, lacked the competencies necessary for further learning, employment, or informed citizenship. The wide variation in outcomes across schools, however, provided grounds for optimism, as it demonstrated that high-quality learning was achievable within the Ugandan context when appropriate conditions were present. Schools in the upper quartiles of performance were achieving literacy and numeracy outcomes comparable to international benchmarks despite operating within the same national policy framework and facing similar resource constraints as lower-performing schools, suggesting that modifiable within-school factors—rather than immutable contextual conditions—were primary drivers of learning success.

Table 2: Hierarchical Multiple Regression Analysis Predicting Primary Six Literacy Outcomes (N=384 schools)

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Predictor Variables	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)	Model 4 β (SE)
Control Variables				
Community Wealth Index	0.31*** (0.04)	0.26*** (0.04)	0.22*** (0.04)	0.18*** (0.04)
Parental Education Level	0.28*** (0.04)	0.24*** (0.04)	0.20*** (0.04)	0.16*** (0.04)
Urban Location	0.19*** (0.05)	0.15** (0.05)	0.12* (0.05)	0.09† (0.05)
School Resources (Model 2)				
Pupil-Teacher Ratio		-0.22*** (0.04)	-0.18*** (0.04)	-0.14** (0.04)
Teacher Qualification Index		0.24*** (0.04)	0.19*** (0.04)	0.14** (0.04)
Infrastructure Quality		0.17*** (0.04)	0.13** (0.04)	0.10* (0.04)
Instructional Materials		0.21*** (0.04)	0.16*** (0.04)	0.11** (0.04)
Leadership Practices (Model 3)				
Instructional Leadership			0.34*** (0.05)	0.28*** (0.05)
Organizational Management			0.08† (0.05)	0.06 (0.05)
Teacher Prof. Dev. Support			0.22*** (0.05)	0.18*** (0.05)
Community Engagement			0.14** (0.05)	0.11* (0.05)
Resource Mobilization			0.09* (0.05)	0.07 (0.05)
Data-Driven Decision Making			0.19*** (0.05)	0.15** (0.05)
Interaction Terms (Model 4)				
Instructional Leadership \times PTR				-0.12* (0.04)
Teacher Prof. Dev. \times Teacher Qual.				0.16** (0.04)
Model Statistics				
R ²	0.284	0.426	0.581	0.612
Adjusted R ²	0.278	0.416	0.566	0.595
ΔR^2	0.284***	0.142***	0.155***	0.031**
F-statistic	50.32***	42.78***	38.64***	36.18***
AIC	2847.3	2756.2	2648.9	2631.5

*Note: β = standardized regression coefficient; SE = standard error; *** $p < 0.001$, ** $p < 0.01$, $p < 0.05$, † $p < 0.10$; PTR = Pupil-Teacher Ratio

Statistical Interpretation

The hierarchical multiple regression analysis presented in Table 2 demonstrated that leadership practices explained substantial unique variance in learning outcomes beyond what could be attributed to socioeconomic factors and school resources, providing strong empirical support for the centrality of instructional leadership in addressing Uganda's learning crisis. Model 1, which included only control variables (community wealth, parental education, and urban location), accounted for 28.4% of the variance in Primary Six literacy outcomes ($R^2=0.284$, $F=50.32$, $p < 0.001$), confirming that socioeconomic context exerted significant influence on learning. The addition of school resource variables in Model 2 produced a significant increment in explained variance ($\Delta R^2=0.142$, $p < 0.001$), bringing total explained variance to 42.6%, with pupil-teacher ratio ($\beta=-0.22$, $p < 0.001$), teacher qualifications ($\beta=0.24$, $p < 0.001$),

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and instructional materials availability ($\beta=0.21$, $p<0.001$) all demonstrating significant independent effects. Most notably, the introduction of leadership practice variables in Model 3 yielded the largest incremental contribution ($\Delta R^2=0.155$, $p<0.001$), elevating total explained variance to 58.1% and substantially improving model fit as evidenced by the reduction in Akaike Information Criterion from 2756.2 to 2648.9. Among leadership dimensions, instructional leadership emerged as the strongest predictor ($\beta=0.34$, $p<0.001$), followed by teacher professional development support ($\beta=0.22$, $p<0.001$) and data-driven decision-making ($\beta=0.19$, $p<0.001$), while organizational management ($\beta=0.08$, $p<0.10$) and resource mobilization ($\beta=0.09$, $p<0.05$) showed weaker effects. The inclusion of interaction terms in Model 4 provided additional explanatory power ($\Delta R^2=0.031$, $p<0.01$), with the final model accounting for 61.2% of variance in learning outcomes, representing a remarkably high proportion for educational research and suggesting that the model captured the primary determinants of learning variation across schools.

The regression coefficients in the full model (Model 4) revealed several theoretically and practically important patterns in the relationships between predictors and learning outcomes. First, while socioeconomic variables remained statistically significant predictors in the final model, their standardized coefficients were substantially attenuated compared to Model 1—community wealth declined from $\beta=0.31$ to $\beta=0.18$, and parental education from $\beta=0.28$ to $\beta=0.16$ —indicating that leadership practices and school resources mediated a considerable portion of socioeconomic effects on learning. The urban location advantage became only marginally significant ($\beta=0.09$, $p<0.10$) in the full model, suggesting that urban-rural disparities in learning outcomes were largely attributable to differences in resource availability and leadership quality rather than location per se. Second, instructional leadership maintained the largest standardized coefficient ($\beta=0.28$, $p<0.001$) even after controlling for all other variables, indicating that schools led by head teachers who emphasized instructional improvement, conducted regular classroom observations, provided feedback to teachers, and maintained focus on learning goals achieved substantially higher outcomes regardless of resource constraints. Third, the significant negative interaction between instructional leadership and pupil-teacher ratio ($\beta=-0.12$, $p<0.05$) demonstrated that effective instructional leadership was particularly beneficial in resource-constrained settings—schools with high pupil-teacher ratios benefited more from strong instructional leadership than better-resourced schools, suggesting a compensatory effect. Conversely, the positive interaction between teacher professional development support and teacher qualifications ($\beta=0.16$, $p<0.01$) indicated synergistic effects whereby leadership practices that supported teacher learning were especially impactful when implemented with better-qualified teaching staff. The non-significant coefficient for organizational management in the full model ($\beta=0.06$, $p>0.05$) suggested that administrative competence, while necessary, was insufficient for improving learning outcomes without concurrent emphasis on instructional functions.

Discussion of Findings

The regression results provided compelling evidence that instructional leadership represented a critical leverage point for improving learning outcomes in Uganda's resource-constrained primary education system, with effect sizes rivaling or exceeding those of material inputs such as infrastructure and instructional materials. The finding that leadership practices collectively explained 15.5% of unique variance—comparable to the 14.2% explained by all school resource variables combined—challenged conventional wisdom that prioritizes resource provision over capacity building and suggested that investments in leadership development could yield returns comparable to or greater than investments in physical inputs. The prominence of instructional leadership as the single strongest

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leadership predictor validated international research emphasizing the centrality of pedagogical expertise and learning focus among school leaders, while simultaneously highlighting a critical gap in current Ugandan practice where instructional leadership scored lowest among all leadership dimensions.

The interaction effects documented in Model 4 carried important implications for intervention design and resource allocation strategies in contexts of pervasive scarcity. The negative interaction between instructional leadership and pupil-teacher ratio suggested that effective leadership became increasingly valuable as resource constraints intensified, operating as a compensatory mechanism that helped schools "do more with less" through strategic resource deployment, instructional optimization, and teacher motivation. This pattern implied that leadership development interventions might generate the largest returns when targeted to the most resource-constrained schools, contradicting tendencies to concentrate capacity-building in already better-performing schools. However, the positive interaction between teacher professional development support and teacher qualifications indicated limits to compensation—leadership practices achieved maximum impact when combined with adequate baseline teacher competence, suggesting that leadership development and teacher training should be pursued as complementary rather than substitute strategies. The substantial attenuation of socioeconomic coefficients from Model 1 to Model 4 demonstrated that well-led, adequately resourced schools could largely overcome contextual disadvantages, providing empirical grounds for optimism that education could serve equalizing functions despite broader societal inequalities.

Table 3: Multilevel Model Results Examining Leadership Effects on Learning Outcomes (Level 1: Students n=23,040; Level 2: Schools N=384)

Fixed Effects	Null Model	Model A: Literacy	Model B: Numeracy
Intercept	38.72*** (1.18)	39.14*** (1.42)	35.28*** (1.38)
Student-Level Predictors (Level 1)			
Student Age		-1.24*** (0.14)	-1.18*** (0.13)
Female		2.47*** (0.38)	-1.82*** (0.37)
Home Language Match		4.83*** (0.42)	3.96*** (0.41)
Attendance Rate (%)		0.28*** (0.02)	0.24*** (0.02)
School-Level Predictors (Level 2)			
Community Wealth Index		1.78*** (0.31)	1.64*** (0.30)
Pupil-Teacher Ratio		-0.14*** (0.03)	-0.12*** (0.03)
Teacher Qualification Index		2.34*** (0.52)	2.18*** (0.50)
Instructional Leadership		4.82*** (0.68)	4.26*** (0.66)
Teacher Prof. Dev. Support		2.91*** (0.64)	2.64*** (0.62)
Data-Driven Decision Making		2.38*** (0.61)	2.15*** (0.59)
Community Engagement		1.87** (0.58)	1.69** (0.56)
Random Effects (Variance Components)			
Level 2 (Between-School)	156.42***	62.38***	58.74***
Level 1 (Within-School)	198.56***	142.63***	136.28***

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Model Fit Statistics			
ICC (Intraclass Correlation)	0.441	0.304	0.301
Deviance	186,742	178,234	176,892
AIC	186,748	178,264	176,922
BIC	186,769	178,359	177,017
Proportional Reduction in Variance			
Level 2 (School)	--	60.1%	62.4%
Level 1 (Student)	--	28.2%	31.4%

*Note: Values in parentheses are standard errors; *** $p < 0.001$, ** $p < 0.01$, $p < 0.05$; ICC = *Intraclass Correlation Coefficient*

Statistical Interpretation

The multilevel modeling results presented in Table 3 accounted for the nested structure of students within schools and provided more precise estimates of leadership effects on individual student learning outcomes while partitioning variance across organizational levels. The null model revealed substantial clustering of learning outcomes within schools, with an intraclass correlation coefficient (ICC) of 0.441 indicating that 44.1% of total variance in student achievement occurred between schools rather than between students within schools. This high ICC substantially exceeded typical values observed in developed education systems (which range from 0.10-0.25) and signaled that school-level factors—including leadership, resources, and instructional quality—exerted pronounced influence on learning in the Ugandan context, likely reflecting greater heterogeneity in school quality and fewer family resources to compensate for school inadequacies. The fully specified models (Model A for literacy and Model B for numeracy) demonstrated significant reductions in both between-school and within-school variance components, with school-level predictors explaining 60.1% and 62.4% of between-school variance in literacy and numeracy respectively, while student-level predictors explained 28.2% and 31.4% of within-school variance. The substantial reduction in between-school variance confirmed that the leadership and resource variables examined captured the primary school-level determinants of learning variation, while the more modest reduction in within-school variance suggested that student-level heterogeneity reflected additional factors beyond those measured, such as prior achievement, cognitive abilities, and family support.

The fixed effects estimates revealed consistent patterns of leadership influence across both literacy and numeracy outcomes, with instructional leadership emerging as the strongest school-level predictor in both models. Holding all other variables constant, a one-unit increase in instructional leadership score (on the 5-point scale) was associated with 4.82 percentage point higher literacy scores ($p < 0.001$) and 4.26 percentage point higher numeracy scores ($p < 0.001$), representing effect sizes of approximately 0.26 standard deviations in literacy and 0.24 standard deviations in numeracy. These effect sizes were educationally meaningful and comparable to impacts documented for intensive teacher training interventions in similar contexts. Teacher professional development support ($\beta = 2.91$ for literacy, $\beta = 2.64$ for numeracy, both $p < 0.001$) and data-driven decision-making ($\beta = 2.38$ for literacy, $\beta = 2.15$ for numeracy, both $p < 0.001$) also demonstrated substantial effects, though approximately half the magnitude of instructional leadership. Community engagement showed significant but smaller effects ($\beta = 1.87$ for literacy, $\beta = 1.69$ for numeracy, both

$p < 0.01$), suggesting that while parental involvement and community support contributed to learning, their effects were mediated through school-level processes influenced by leadership. The effects of traditional resource variables, while statistically significant, were comparatively modest—teacher qualification index showed effects of 2.34 and 2.18 percentage points for literacy and numeracy respectively, while pupil-teacher ratio demonstrated small negative effects of -0.14 and -0.12 percentage points per additional student. At the student level, attendance rate emerged as the strongest predictor ($\beta = 0.28$ for literacy, $\beta = 0.24$ for numeracy), indicating that each percentage point increase in attendance was associated with 0.24-0.28 percentage point gains in achievement. Notably, home language match with the language of instruction showed substantial effects ($\beta = 4.83$ for literacy, $\beta = 3.96$ for numeracy), highlighting linguistic barriers facing many Ugandan learners, while gender effects revealed a female advantage in literacy ($\beta = 2.47$) but male advantage in numeracy ($\beta = -1.82$), consistent with international patterns of gendered achievement gaps. The negative age coefficient ($\beta = -1.24$ for literacy, $\beta = -1.18$ for numeracy) indicated that overage students, likely reflecting prior grade repetition or late school entry, achieved lower outcomes on average, controlling for other factors.

Discussion of Findings

The multilevel model results provided robust evidence that school leadership practices exerted substantial causal influence on individual student learning outcomes, with effect magnitudes that justified prioritizing leadership development in efforts to address Uganda's learning crisis. The finding that instructional leadership effects (4.82 and 4.26 percentage points) exceeded those of teacher qualifications (2.34 and 2.18 percentage points) was particularly striking, as it suggested that improving school leadership could generate learning gains comparable to or greater than lengthy and costly teacher education initiatives. When considered across the full scale range of instructional leadership (minimum 1.2 to maximum 4.8), schools with highly effective instructional leaders achieved learning outcomes approximately 17-18 percentage points higher than schools with weak instructional leadership, holding all else constant—a difference sufficient to move a school from the bottom to the middle quartile of performance. This magnitude of effect underscored that leadership was not merely a peripheral or moderating factor but rather a primary determinant of school effectiveness in the Ugandan context. The consistency of leadership effects across both literacy and numeracy domains indicated that instructional leadership operated through general mechanisms—such as establishing learning-focused cultures, improving teacher motivation and effort, ensuring curriculum coverage, and maintaining academic expectations—rather than through subject-specific pathways, suggesting that leadership development interventions need not be highly specialized by content area to achieve broad impacts.

Conclusion

This study systematically addressed its three core objectives through rigorous mixed-methods investigation, yielding compelling evidence that leadership-focused interventions represent a critical pathway for transforming Uganda's education system from mere access to meaningful learning. In fulfillment of the first objective to assess the current state of learning outcomes and identify contributing factors, the findings documented a severe learning crisis with mean literacy and numeracy achievement scores ranging from 29.8% to 42.6% across primary grade levels, confirming that the majority of Ugandan learners failed to acquire foundational competencies despite years of schooling exposure. The descriptive analysis identified multiple interconnected factors contributing to this crisis, including excessive pupil-teacher ratios averaging 58.4 students per teacher, inadequate instructional materials with only 38.7% availability, poor infrastructure quality, insufficient teacher qualifications, and pronounced socioeconomic

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disadvantages reflected in low community wealth indices and parental education levels averaging 6.8 years. However, the substantial between-school variation observed—with achievement scores spanning ranges exceeding 85 percentage points—indicated that these systemic constraints did not uniformly determine outcomes, as some schools achieved near-universal proficiency while others exhibited near-total learning failure under similar resource conditions. Addressing the second objective to examine relationships between leadership practices and learning outcomes, both hierarchical regression and multilevel modeling analyses provided robust empirical evidence that school leadership exerted substantial independent influence on student achievement, with instructional leadership emerging as the single strongest school-level predictor across all models. The hierarchical regression revealed that leadership practices collectively explained 15.5% of unique variance in Primary Six literacy outcomes ($\Delta R^2=0.155$, $p<0.001$)—comparable to the 14.2% explained by all material resource variables combined—with instructional leadership demonstrating the largest standardized coefficient ($\beta=0.28$, $p<0.001$) in the full model that accounted for 61.2% of total variance. The multilevel modeling, which appropriately accounted for the nested structure of students within schools, revealed that 44.1% of total variance in learning outcomes occurred between schools rather than within schools ($ICC=0.441$), with leadership variables explaining over 60% of this between-school variance. Most compellingly, instructional leadership demonstrated effect sizes of 4.82 percentage points for literacy and 4.26 percentage points for numeracy outcomes (both $p<0.001$), which exceeded the effects of teacher qualification improvements (2.34 and 2.18 percentage points respectively) and were approximately equivalent to the combined effects of infrastructure quality and instructional materials availability. These findings confirmed that leadership quality was not merely a peripheral moderating factor but rather a primary determinant of school effectiveness in the Ugandan context, with impacts rivaling or surpassing those of material inputs that typically receive greater policy attention and resource allocation. In response to the third objective to explore promising leadership development models for resource-constrained contexts, the empirical patterns revealed that specific leadership dimensions—particularly instructional leadership, teacher professional development support, and data-driven decision-making—demonstrated substantially larger effects than general organizational management, indicating that effective interventions must emphasize pedagogical expertise and learning-focused practices rather than generic administrative competence. Furthermore, the significant negative interaction between instructional leadership and pupil-teacher ratio ($\beta=-0.12$, $p<0.05$) demonstrated that leadership effects were particularly pronounced in resource-constrained settings, suggesting that effective leaders could optimize limited resources, implement compensatory instructional strategies, and mobilize community support to achieve substantial learning gains even under adverse conditions. This compensatory pattern implied that leadership development interventions would generate largest returns when strategically targeted to the most disadvantaged schools, challenging conventional approaches that concentrate capacity-building resources in already better-performing institutions. The convergence of quantitative findings with qualitative insights from head teachers, teachers, and education stakeholders revealed that current leadership practice in Uganda was characterized by disproportionate emphasis on administrative compliance and routine management rather than instructional improvement, inadequate preparation of head teachers for pedagogical leadership roles, absence of systematic classroom observation and teacher feedback mechanisms, limited use of assessment data for instructional decision-making, and weak accountability for learning outcomes. These qualitative patterns explained why instructional leadership, teacher professional development support, and data-driven decision-making scored

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lowest among all leadership dimensions measured (means of 2.9, 2.6, and 2.4 respectively on 5-point scales) despite demonstrating the strongest empirical relationships with learning outcomes, highlighting a critical implementation gap between evidence-based practice and current reality. Collectively, the study's findings led to the overarching conclusion that while resource scarcity, teacher capacity limitations, and socioeconomic disadvantages posed genuine constraints on learning in Uganda, the most critical bottleneck preventing transformation from access to meaningful learning was the absence of instructional leadership capacity at the school level, and that systematic, evidence-based leadership development—particularly when focused on instructional supervision, teacher coaching, data use, and learning-focused culture development, and when prioritized for the most disadvantaged schools—offered a viable, cost-effective, and scalable pathway for addressing Uganda's learning crisis that could generate improvements comparable to or exceeding those achievable through resource-intensive infrastructure and materials investments.

Recommendations

Establish a National Instructional Leadership Development System

The Ministry of Education and Sports should develop and implement a comprehensive national system for building instructional leadership capacity among primary school head teachers, incorporating competency-based selection criteria that prioritize pedagogical expertise over administrative seniority, mandatory pre-service leadership preparation focused on classroom observation and feedback techniques, ongoing coaching through district-level instructional leadership specialists, and revised accountability frameworks that evaluate head teachers primarily on learning improvement rather than administrative compliance.

Target Leadership Development Resources to Resource-Constrained Schools

Given the empirical evidence that instructional leadership effects were strongest in disadvantaged settings, education planners should strategically prioritize leadership development interventions for schools with the highest pupil-teacher ratios, lowest resource availability, and most severe learning deficits, coupling intensive head teacher coaching with modest resource packages addressing binding material constraints to enable leaders to implement improved practices effectively while simultaneously advancing equity objectives.

Integrate Teacher Professional Development and Data-Driven Decision-Making into Core Leadership Functions

School leadership standards, training curricula, and support systems should explicitly emphasize head teachers' roles in facilitating ongoing teacher learning through regular classroom observation cycles, collaborative lesson planning sessions, and evidence-based pedagogical coaching, while simultaneously building capacity for using formative assessment data to diagnose learning barriers, adapt instruction, and monitor improvement, with structural changes that reduce administrative burdens and allocate dedicated time for these instructional leadership activities.

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