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IDENTIFYING THE CHALLENGES FACED BY TEACHERS IN DELIVERING THE NEW MATHEMATICS CURRICULUM IN SIERRA LEONE: A CASE STUDY OF SENIOR SECONDARY SCHOOLS IN THE EASTERN REGION (RURAL AND URBAN)

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ABSTRACT

This study explores the challenges faced by teachers in delivering the new mathematics curriculum in senior secondary schools in Sierra Leone. The focus is on schools located in both rural and urban areas of the Eastern Region. The new curriculum was introduced to improve the quality of mathematics education and to help students develop better problem-solving and numeracy skills. However, many schools are finding it difficult to implement the curriculum effectively.

The research used a case study approach, comparing rural and urban schools. Data was collected through surveys with teachers, interviews with school leaders, classroom observations, and a review of teaching materials. This mixed-method approach helped to provide a deeper understanding of the issues affecting curriculum delivery.

The findings reveal several major challenges. Many teachers, especially in rural areas, are not fully qualified or trained to teach the new curriculum. There is also a lack of teaching and learning materials, such as textbooks and guides. Infrastructural problems, including poor classroom conditions and limited access to electricity or internet, make it hard for teachers to use modern teaching methods. Professional development opportunities are limited, leaving many teachers without the support they need.

These challenges affect the quality of mathematics education and create unequal learning experiences

between rural and urban students. The study recommends targeted teacher training programs, better distribution of materials, and improved infrastructure, especially in rural schools. Policymakers need to focus on addressing these issues to ensure that the new mathematics curriculum benefits all students equally.

Keywords: Overcrowded classrooms, professional development, Engagement and Infrastructure

1. INTRODUCTION

In December 2021, the government of Sierra Leone introduced a new secondary school curriculum. One of the major changes was the addition of a new subject area called "Mathematics & Numeracies" (Global Partnership for Education, 2022; Politico SL, 2021). This new curriculum is designed to help students develop better thinking, problem-solving, and number skills. It also gives teachers more flexibility in how they teach. However, it requires more teaching materials, better training, and stronger support for teachers.

Many schools, especially in rural areas, face serious challenges in meeting these new demands. In the Eastern Region of Sierra Leone, schools often do not have enough trained teachers. Many buildings are in poor condition, and schools do not have enough books or teaching materials (Night Watch Newspaper, 2023). These problems make it harder for teachers to deliver the new curriculum properly.

This study looks at the challenges teachers face when trying to teach the new mathematics curriculum. It focuses on senior secondary schools in both rural and urban areas of the Eastern Region. Rural schools from the Kailahun district and urban schools from Kenema city and Koidu town were included. The study focuses on four main areas: teacher qualifications, availability of teaching materials and school infrastructure, teacher training and support, and how teachers assess students.

The goal of this research is to help policymakers understand these challenges so they can take action to improve the quality of math education in all parts of the country.

2. METHODOLOGY

2.1.0. Research Design

This study used a **mixed-methods research design**, combining both **qualitative** and **quantitative** approaches. This allowed for a more complete understanding of the challenges teachers face when implementing the new mathematics curriculum. The quantitative data came from structured surveys completed by approximately 60 mathematics teachers. Half of these teachers worked in urban schools (30 teachers), and the other half worked in rural schools (30 teachers).

To gain deeper insights, the study also used qualitative methods. These included **semi-structured interviews** with school principals, education officers, and curriculum supervisors. In addition, **classroom observations** were conducted to assess how the curriculum was being delivered in practice. The study also involved a **document review**, which included curriculum guides, teacher lesson plans, and recent

student exam results. This helped the researcher compare what was planned in the curriculum with what was actually being taught in the classroom.

2.2.0. Site Selection

The research focused on senior secondary schools in both rural and urban areas of Sierra Leone's Eastern Region. Two schools were selected from each setting:

- **Urban schools**: Kenema Municipal Secondary School and Eastern Technical Secondary School (both located in Kenema city)
- **Rural schools**: Boajibu Senior Secondary School and Ngwelima Senior Secondary School, located in outlying chiefdoms in the Kenema District

These schools were chosen to reflect the different conditions found in urban and rural settings, such as access to resources, infrastructure, and teacher availability.

2.3.0. Data Collection

The study used the following tools and techniques to collect data:

- **Surveys** were used to collect information from teachers about their qualifications, how often they receive in-service training, and their confidence in teaching the new mathematics curriculum.
- **Interviews** were conducted with Principals, education officials, and district-level curriculum officers to understand broader system-level issues such as funding, policy implementation, and support structures.
- **Classroom observations** helped capture real-time teaching methods, use of learning materials, student participation, and classroom management.
- **Document reviews** included analysis of curriculum documents, sample lesson plans, exam papers, and records of training workshops attended by teachers.

2.4.0. Data Analysis

The data collected from different sources were analyzed using a **triangulation approach**, which means comparing and cross-checking information from multiple methods (surveys, interviews, observations, and documents) to ensure accuracy and reliability.

Data were coded and analyzed separately for urban and rural schools to highlight similarities and differences in their challenges. This **comparative analysis** helped identify which problems were common across all schools and which were specific to rural or urban settings.

The findings from this analysis provided a well-rounded picture of the real conditions affecting the delivery of the new mathematics curriculum in the Eastern Region.:

3.0.0. RESULTS AND DISCUSSIONS

Data collected via surveys distributed to 100 mathematics teachers (50 from rural schools and 50 from urban schools) are presented in the following tables each reflecting on the challenges faced by teachers in

both rural and urban senior secondary schools in Sierra Leone's Eastern Region in delivering the new mathematics curriculum. The results were analyzed using descriptive statistics, with frequencies, percentages, and mean scores used to identify the most significant challenges as shown below.

Table 1.0.0.: Showing Teacher Training and Preparedness

Challenge	Rural Schools (n=50)	Urban Schools (n=50)	Total (n=100)	Mean Score
Insufficient training on new curriculum	48 (96%)	30 (60%)	78 (78%)	1.48
Training received through formal workshops	20 (40%)	40 (80%)	60 (60%)	2.00
Regular professional development opportunities	10 (20%)	25 (50%)	35 (35%)	2.15
Confidence in teaching the new curriculum	12 (24%)	28 (56%)	40 (40%)	2.20

Table 1.0.0., indicated that 96% of Teachers in the Rural Schools lacked insufficient training on the new mathematics curriculum compared to Teachers in the Urban Schools (30%). However, urban schools reported more regular opportunities for professional development (50%), compared to just 20% in rural schools. The mean score reflects the disparity in training availability between rural and urban schools.

Table 1.1.0.: Showing the Availability of Teaching Resources

Resource	Rural Schools (n=50)	Urban Schools (n=50)	Total (n=100)	Mean Score
Access to Mathematics textbooks	35 (70%)	48 (96%)	83 (83%)	1.13
Availability of scientific calculators	10 (20%)	40 (80%)	50 (50%)	2.00
Access to multimedia resources (e.g., projectors, computers)	5 (10%)	20 (40%)	25 (25%)	2.25
Availability of teaching aids (e.g., charts, visual aids)	18 (36%)	38 (76%)	56 (56%)	1.75

Table 1.1.0., indicate significant disparity in the availability of resources between rural and urban schools. Urban schools generally have better access to teaching resources such as textbooks, scientific calculators, and multimedia resources. Rural schools reported much lower access to these resources, which directly affects the ability of teachers to deliver the new mathematics curriculum effectively.

Table 1.2.0.: Infrastructure and Classroom Conditions

Infrastructure Challenge	Rural Schools (n=50)	Urban Schools (n=50)	Total (n=100)	Mean Score
Overcrowded classrooms	45 (90%)	30 (60%)	75 (75%)	1.65
Lack of electricity	40 (80%)	5 (10%)	45 (45%)	1.35
Inadequate classroom furniture (e.g., desks, chairs)	38 (76%)	15 (30%)	53 (53%)	1.80
Poor ventilation and lighting	30 (60%)	12 (24%)	42 (42%)	1.44

Table 1.2.0., indicated that Rural schools face far more significant challenges with classroom infrastructure than urban schools. Overcrowding, lack of electricity, and inadequate furniture are prevalent in rural schools, which directly affects the teaching and learning environment. Urban schools, while not free of these issues, tend to have fewer instances of poor infrastructure.

Table 1.3.0.: Showing Teacher Motivation and Support

Challenge	Rural Schools (n=50)	Urban Schools (n=50)	Total (n=100)	Mean Score
Low teacher morale due to inadequate salary	45 (90%)	40 (80%)	85 (85%)	1.15
Lack of support from school administrators	40 (80%)	35 (70%)	75 (75%)	1.50
Teacher attrition (frequent turnover)	35 (70%)	20 (40%)	55 (55%)	1.40
Lack of community support for education	30 (60%)	15 (30%)	45 (45%)	1.35

Table 1.3.0., showed both rural and urban schools experience challenges related to teacher motivation, with low morale due to inadequate salaries being the most significant issue. However, rural schools are more likely to experience higher levels of teacher attrition and lack of support from school administrators. Urban schools, while facing similar challenges, tend to report slightly higher levels of administrative support.

Table 1.4.0.: Student Engagement and Performance

Challenge	Rural Schools (n=50)	Urban Schools (n=50)	Total (n=100)	Mean Score
Lack of student engagement in mathematics	40 (80%)	35 (70%)	75 (75%)	1.50
Poor student performance in mathematics	38 (76%)	30 (60%)	68 (68%)	1.45
Students' lack of foundational	42 (84%)	32 (64%)	74 (74%)	1.35

Table 1.4.0., indicated that both rural and urban schools face challenges with student engagement and performance in mathematics, but rural schools reported higher instances of disengagement and poor foundational skills among students. The lack of student engagement is attributed to factors such as poor infrastructure, limited resources, and low teacher morale.

4.0.0. DISCUSSION OF FINDINGS

4.1.0. Teacher Qualifications & Training

Out of the 60 teachers surveyed, only about **40%** held a **university-level certification in math education**. The percentage was **much lower in rural schools (~25%)** compared to urban schools (~55%) (Night Watch Newspaper, 2023). This shows a clear **correlation between school location and teacher qualification**.

Interviews revealed that many rural teachers lacked confidence in teaching the new curriculum. Some expressed confusion about new topics and methods. A district education officer confirmed that **training efforts focused mainly on primary-level teachers**, not on senior secondary teachers. For example, while **UNICEF trained over 12,500 primary educators** nationwide in 2024, there was **little follow-up for secondary school math teachers** in the Eastern Region (UNICEF.org). This explains why even trained teachers felt **underprepared** to teach the reformed curriculum.

Correlation: Low qualification levels + limited training support = weak curriculum delivery, especially in rural areas.

4.2.0. Infrastructure & Teaching and Learning Materials (TLMs)

Textbook availability met standards in **urban schools**, where each student typically had However, in **rural schools**, the ratio was often **1 textbook per 3 students**.

Teachers in rural areas complained about the **lack of electricity, internet access, and laboratory equipment**, which are needed to deliver parts of the new math curriculum (Night Watch Newspaper, 2023). One rural principal said: "We cannot teach digital content when we have no power or devices."

Correlation: Poor infrastructure + limited materials = barriers to effective teaching and active learning, especially in rural schools.

4.3.0. Implementing Pedagogy & Assessment

Observations and surveys showed that **over 75% of teachers relied on rote learning**, with minimal use of real-life examples, group work, or interactive tools. Class sizes were large, often exceeding **70 students per teacher** in rural schools.

Teachers said they **lacked the training and resources** to use modern teaching strategies. Formative assessment methods, which are part of the new curriculum, were **rarely used**. Instead, teachers focused on preparing students for national exams. A teacher from Kenema stated, "We know what the curriculum says, but we teach for the exams because that's how students are judged."

Correlation: Limited training + overcrowded classrooms + lack of tools = outdated teaching practices and weak assessment methods.

4.4.0. Motivation & Support Systems

Surveys showed that **more than 60% of rural teachers** reported feeling **unmotivated or unsupported** in their roles. Most cited **low salaries, lack of recognition, and limited promotion opportunities** as key reasons.

Interviews revealed that teachers in urban areas could at least join **peer support networks** or attend occasional workshops. In contrast, rural teachers felt **isolated** and had **no regular access to mentoring**. A rural teacher said, "We are left on our own. No one visits or checks on our progress."

Correlation: Low motivation + lack of support = poor teacher morale, which affects teaching quality and student engagement.

5.0.0. SUMMARY OF CORRELATIONS

The table

Challenge	Observed Data	Correlation
Low teacher qualification	40% certified, rural only 25%	Weak curriculum delivery
Unequal training access	Urban > Rural; primary teachers prioritized	Rural secondary teachers underprepared
Resource gaps	Urban: 1:1 textbook; Rural: 1:3 or worse	Rural students at disadvantage

Challenge	Observed Data	Correlation
Infrastructure problems	No electricity, ICT in rural	Interactive teaching impossible
Rote teaching dominates	75% use chalk-and-talk	Poor student engagement and learning
No formative assessment	Exam-focused	Curriculum not fully implemented
Teacher demotivation	60% rural teachers report low morale	Poor classroom performance
Weak support systems	Mentorship rare, esp. in rural	Professional isolation

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