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Teaching Practices, Assessment Strategies, and Students' Achievement on the New Senior Secondary School Mathematics Curriculum in Kenema District

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Abstract

Mathematics education is essential for developing scientific literacy, logical reasoning, problem-solving skills, and competencies needed for national development. However, mathematics achievement remains a challenge in Sierra Leone due to factors such as inadequate resources, limited teacher development, large classes, and examination-focused practices. This study investigated the influence of teaching practices and assessment strategies on students' mathematics achievement under the New Senior Secondary School Mathematics Curriculum in Kenema District, Eastern Sierra Leone. A quantitative descriptive correlational survey design was used. The study involved 300 students and 30 mathematics teachers selected through multistage sampling. Data were collected using questionnaires, classroom observations, and students' mathematics achievement scores. Descriptive statistics, Pearson correlation, and multiple regression analyses were used. The findings showed that teachers frequently used effective practices, particularly classroom questioning (M = 3.84), clear lesson objectives (M = 3.78), and real-life applications (M = 3.70). However, the use of instructional materials and collaborative activities was limited. Assessment practices were widely used, with end-of-term examinations (M = 4.11) and homework assignments (M = 4.02) recording the highest scores, while diagnostic, peer, and self-assessment were less common. Students achieved a moderate mean mathematics score of 62.84 (SD = 13.25). Teaching practices had a significant positive relationship with achievement ($r = 0.612$, $p < 0.001$), as did assessment strategies ($r = 0.547$, $p < 0.001$). Regression analysis showed that teaching practices and assessment strategies jointly explained 41.8% of the variation in mathematics achievement ($R^2 = 0.418$, $F(2,297) = 106.64$, $p < 0.001$), with teaching practices being the stronger predictor. The study concludes that effective teaching and assessment practices significantly improve mathematics achievement. It recommends continuous teacher professional development, increased use of learner-centred approaches, improved instructional resources, and better alignment of curriculum goals with classroom assessment to strengthen mathematics learning outcomes in Sierra Leone.

Keywords: Teaching practices; assessment strategies; mathematics achievement; senior secondary mathematics curriculum

1. Introduction

Mathematics education remains central to the development of scientific literacy, logical reasoning, technological competence, and national development. At the senior secondary school level, mathematics provides learners with the analytical and problem-solving skills required for further study in science, technology, engineering, mathematics, business, health sciences, and other professional fields. Despite its importance, students' achievement in mathematics continues to be a major concern in many sub-Saharan African countries, particularly in education systems affected by inadequate teaching and learning resources, overcrowded classrooms, limited instructional materials, insufficient teacher professional development, and examination-oriented classroom practices. These challenges are especially relevant in Sierra Leone, where curriculum reform has become an important strategy for improving the quality, relevance, and outcomes of secondary education.

The introduction of the New Senior Secondary School Mathematics Curriculum in Sierra Leone represents a significant policy effort to strengthen mathematics teaching and learning. The curriculum is expected to promote not only procedural fluency but also conceptual understanding, reasoning, problem-solving, communication, and the application of mathematical knowledge to real-life situations. These goals are consistent with contemporary approaches to mathematics education, which emphasise learner-centred instruction, active engagement, formative assessment, and competence-based learning. However, evidence from comparable low-resource contexts shows that curriculum reform alone does not automatically produce improved learning outcomes. Rather, curriculum success depends on the extent to which curriculum content, classroom pedagogy, assessment practices, teacher capacity, and school resources are coherently aligned (Moses & Saine, 2025).

In the Kenema District, the implementation of the new mathematics curriculum must be examined within the realities of secondary school education. Many schools operate under conditions of limited resources, varying levels of teacher preparation, large class sizes, limited access to technology, and strong pressure to prepare students for public examinations. These conditions may influence the extent to which teachers are able to adopt learner-centred strategies, use formative assessment effectively, and support students' conceptual understanding. Although curriculum documents may recommend innovative teaching methods, classroom practice may remain dominated by traditional approaches if teachers lack adequate training, instructional support, and assessment guidance.

Teaching practices are central to students' mathematics achievement. In many secondary mathematics classrooms, instruction remains largely teacher-centred, with teachers explaining rules, demonstrating examples

2. Literature Review

2.1. Teaching Practices and Pedagogical Approaches in Secondary Mathematics Education

Teaching practices remain central to students' achievement and engagement in secondary mathematics education. The literature shows that mathematics instruction in many sub-Saharan African and low-resource contexts is still dominated by teacher-centred approaches. In such classrooms, teachers usually explain procedures, demonstrate examples, and expect students to reproduce similar solutions. Although this

approach may help teachers complete the syllabus and prepare learners for examinations, it often limits students' opportunities for mathematical reasoning, discussion, inquiry, creativity, and independent problem-solving. Soforon et al. (2024) observed that mathematics teachers in South Sudan frequently solved tasks themselves while students copied the procedures. This reflects a transmission model of instruction in which students become passive recipients rather than active constructors of knowledge. Similarly, Hidayat and Setyawan (2020) found that teachers often return to traditional teaching methods despite curriculum recommendations for innovative pedagogy. This is usually influenced by large class sizes, inadequate teaching materials, weak learner preparedness, limited instructional time, and pressure to complete the curriculum.

In contrast, learner-centred pedagogies such as problem-based learning, inquiry-based instruction, collaborative learning, active learning, and technology-supported teaching have been associated with improved achievement, attitudes, and engagement. Asanre, Sondlo, et al. (2024b) found that problem-based learning significantly improved senior secondary students' mathematics achievement and attitudes compared with traditional instruction. Guided inquiry-based instruction also shows promise because it encourages learners to investigate, reason, explain, and apply concepts. Chengere et al. (2025) reported that guided inquiry improved students' process skills in Ethiopian secondary schools, suggesting its relevance for mathematics learning. Active learning further improves participation by encouraging questioning, group tasks, peer discussion, and reflective problem-solving. Habibulloh (2026) found that combining active learning, formative assessment, and technology-supported instruction improved students' engagement and understanding of abstract concepts. However, learner-centred approaches require careful planning, scaffolding, and teacher competence. Group work or inquiry alone does not guarantee learning unless the teacher provides clear objectives, purposeful tasks, and guided reflection. Technology-enhanced instruction can also support mathematics learning through visualisation, simulations, interactive tasks, and differentiated practice. Okisai and PHD (2025) found that digital tools improved engagement and supported differentiated mathematics instruction in Zambia. However, technology use is limited by poor infrastructure, inadequate access to devices, unreliable electricity, weak internet connectivity, and insufficient teacher training. Therefore, technology should be understood as a support for effective pedagogy, not a substitute for sound teaching.

2.2. Assessment Practices and Mathematics Learning Outcomes

Assessment strongly influences what teachers teach, how students learn, and how achievement is measured in mathematics. In many secondary school systems, assessment remains dominated by summative examinations. While summative assessment is useful for certification, promotion, and accountability, it provides limited support for improving learning during instruction. Recent literature therefore emphasises formative assessment and assessment for learning as more effective strategies for improving mathematics achievement, motivation, and retention. Formative assessment involves the continuous use of evidence about students' understanding to guide teaching and support learning. Alordiah (2025) found that formative assessment improves academic achievement, critical thinking, and problem-solving in African educational contexts. In mathematics classrooms, formative assessment is especially important because students may arrive at correct answers through memorised procedures without understanding the underlying concepts. Through questioning, diagnostic exercises, peer assessment, self-assessment, exit tickets, classroom discussion, and feedback, teachers can identify misconceptions and adjust instruction. Karaman's (2021) meta-analysis confirmed that formative assessment has a strong positive effect on learning, especially when feedback is interactive and student-initiated. This suggests that students learn better when they are actively involved in identifying errors, explaining reasoning, asking questions, and reflecting on progress. Ikeh et al. (2026) also found that formative assessment, diagnostic assessment, peer assessment, and self-assessment

significantly predicted mathematics achievement, while summative assessment alone explained only a small proportion of achievement. This supports the use of balanced assessment systems that combine diagnostic, formative, peer, self, and summative assessment. Assessment for learning also improves motivation and engagement. Oguguo et al. (2025) found that the "muddiest point" technique improved retention in mathematics by allowing students to identify the most confusing part of a lesson. This helps teachers address specific areas of difficulty and encourages learners to reflect on their understanding. Palmberg et al. (2024) further found that multi-approach formative assessment sustained behavioural engagement and autonomous motivation. When assessment is used only to rank or punish learners, it may create fear and reduce interest. However, when it provides constructive feedback and supports improvement, it can strengthen confidence and persistence.

A major challenge is the misalignment between curriculum expectations and assessment practices. Many mathematics curricula emphasise reasoning, creativity, problem-solving, collaboration, and real-life application. However, classroom tests and public examinations often focus on routine computation and memorisation. Leung et al. (2014) and Zana et al. (2024) reported gaps between curriculum goals and actual assessment practices. Since teachers often teach according to what is assessed, curriculum reform must be accompanied by assessment reform. Without this alignment, innovative curriculum goals may not translate into classroom practice.

2.3. Predictors of Mathematics Achievement

Mathematics achievement is influenced by teacher-related, student-related, school-level, and contextual factors. Among these, teacher quality remains one of the most important determinants. Effective mathematics teachers require strong content knowledge, pedagogical content knowledge, assessment skills, classroom management ability, and the capacity to explain abstract concepts clearly. They must also be able to identify misconceptions, select appropriate tasks, use instructional materials, and create supportive learning environments.

Armah et al. (2025), in a study of secondary schools in Ghana, found that favourable teacher characteristics and positive student attitudes were significantly associated with mathematics achievement. Interestingly, parental education and parental support were not strong predictors in that context. This suggests that in low-resource settings, school-based factors, especially teacher competence and instructional practice, may have stronger influence on achievement than home background alone. Teacher professional development is therefore essential for improving mathematics outcomes. Mbundu et al. (2026) found that students taught by teachers who received short-term professional development performed better in conceptual and symbolic dimensions than those taught by untrained teachers. This shows that even brief but well-designed professional development can improve instructional quality. However, professional development is more effective when it is continuous, practical, subject-specific, collaborative, and linked to classroom realities.

Student-related factors also shape achievement. Engagement, motivation, interest, attitudes, and confidence are important predictors of mathematics performance. Asanre, Ifamuyiwa, et al. (2024) found that cognitive, behavioural, and emotional engagement significantly predicted mathematics achievement among senior secondary students. Cognitive engagement refers to mental effort and learning strategies; behavioural engagement involves participation and completion of tasks; and emotional engagement includes interest, confidence, and enjoyment.

Motivation and interest further support persistence in mathematics. Asanre, Sondlo, et al. (2024a) found that motivated and interested students achieved better mathematics outcomes. This is important because many learners perceive mathematics as difficult or abstract. Teachers therefore need to build students' confidence,

demonstrate the usefulness of mathematics, provide achievable challenges, and create supportive classroom conditions.

Gender equity remains an important issue. Some studies report gender differences in mathematics performance, while others show that these differences vary by school type, family structure, and instructional approach. Kaiser and Zhu (2022) found gender differences in mathematics achievement using PISA data from Shanghai. However, Chengere et al. (2025) found that guided inquiry-based instruction benefited both male and female students equally. This suggests that gender disparities are not inevitable and may be reduced through inclusive, active, and supportive teaching practices.

2.4. Curriculum Reform, Teacher Agency, and Professional Development

Curriculum reform in mathematics education increasingly emphasises competence-based learning, problem-solving, learner-centred instruction, higher-order thinking, creativity, and real-life application. These reforms reflect the view that mathematics education should move beyond memorisation of formulas and procedures to develop reasoning, communication, and practical problem-solving skills. However, the literature shows that a gap often exists between curriculum policy and classroom implementation. Moses and Saine (2025), in their review of Rwanda's competence-based curriculum, identified inadequate teacher preparation, shortage of teaching materials, curriculum overload, misaligned assessment, socio-cultural barriers, and weak instructional leadership as major challenges. Similarly, Nihayah et al. (2023) found that teachers may continue using traditional practices when reforms lack clear guidelines and adequate support. These findings show that curriculum reform requires more than revised documents. It requires teacher preparation, resources, leadership, monitoring, and assessment alignment. Teacher agency is central to successful curriculum implementation. Teachers interpret, adapt, and enact curriculum reforms according to classroom realities. When teachers are treated only as policy implementers, reforms are less likely to succeed. Fekumo and Phoshoko (2026) argued that teachers' experiential knowledge and cultural perspectives are often undervalued, limiting their ability to design contextually meaningful mathematics instruction and assessment. Professional development is therefore necessary for translating curriculum goals into classroom practice. Nkundabakura et al. (2024) found that continuous professional development improved teachers' pedagogical content knowledge, confidence, and self-efficacy in mathematics and science teaching. Gerard et al. (2026) also found that teachers are more likely to participate in professional development when it is subject-specific, practical, collaborative, and aligned with their professional goals. Lesson study is a promising professional development model because it allows teachers to collaboratively plan, teach, observe, reflect, and revise lessons. Dibaba et al. (2024) found that lesson study improved Ethiopian secondary mathematics teachers' lesson planning competence and supported more student-oriented instruction. Such models are valuable because they connect professional learning directly to classroom practice and encourage teachers to focus on how students learn mathematics.

2.5. Low-Resource Contexts, Equity, and Culturally Responsive Mathematics Education

Mathematics education in low-resource contexts is shaped by structural constraints such as inadequate textbooks, overcrowded classrooms, poor infrastructure, limited technology, and insufficient teacher support. These challenges often restrict the implementation of learner-centred pedagogy, formative assessment, inquiry-based learning, and technology-enhanced instruction. However, the literature shows that meaningful innovation is possible when teachers adapt instruction to local realities. Chengere et al. (2025) demonstrated that guided inquiry-based instruction can be implemented in resource-limited schools using low-cost materials and virtual simulations. This challenges the assumption that innovation always requires expensive resources. Teachers can use locally available materials, drawings, charts, group tasks, community data, market

activities, and everyday examples to support mathematical understanding. Formative assessment can also be implemented through low-cost strategies. Alordiah (2025) noted that while digital platforms have potential, low-tech alternatives remain essential in contexts with unreliable infrastructure. Oral questioning, peer feedback, self-assessment, short quizzes, notebook checks, group presentations, and error analysis can provide useful evidence of student learning without advanced technology. Equity and cultural responsiveness are also essential in mathematics education. Students differ in gender, language, socio-economic background, prior achievement, confidence, and access to learning support. Inclusive mathematics teaching requires supportive classrooms, avoidance of gender stereotyping, encouragement of participation, and support for struggling learners. Active learning, guided inquiry, collaborative learning, and formative assessment can promote equity by engaging diverse learners.

Culturally responsive mathematics education connects classroom learning with students' lived experiences, local knowledge, and community practices. Meeran and Niranjan (2026) found that indigenous games can support mathematical engagement, while Age (2025) argued that performance-based assessment informed by Ubuntu philosophy can promote collective learning, cultural relevance, and higher-order thinking. In African contexts, mathematics can be taught through market activities, farming, construction, tailoring, transport, household budgeting, games, and community surveys.

3. Research Methodology

The study adopted a quantitative descriptive correlational survey design to examine the relationships among teaching practices, assessment strategies, and students' mathematics achievement under the New Senior Secondary School Mathematics Curriculum in Kenema District, Eastern Sierra Leone. The target population comprised mathematics teachers, SSS II and SSS III students in urban and rural senior secondary schools. A multistage sampling technique was used. Schools were stratified according to location and selected through simple random sampling. Mathematics teachers were purposively selected, while students were selected using simple random sampling. The sample consisted of approximately 300 students and 30 mathematics teachers. Data were collected using teachers' and students' questionnaires, a classroom observation checklist, and students' mathematics achievement scores. The questionnaires measured teaching practices, learner-centred pedagogy, instructional-material utilisation, classroom assessment, feedback, and students' experiences of mathematics instruction. The observation checklist was used to validate questionnaire responses by assessing teacher student interaction, student participation, problem-solving activities, resource utilisation, and classroom assessment. Students' achievement was measured using school examination results or a researcher-developed Mathematics Achievement Test. The data were represented in Frequencies, percentages, means, and standard deviations were used for descriptive analysis. Pearson Product Moment Correlation was used to test the relationships among the variables, while multiple regression analysis determined the predictive effects of teaching practices and assessment strategies on students' mathematics achievement. All hypotheses were tested at the 0.05 level of significance.

4. Result

Table 4.1 Respondents by Gender and Class Level

Gender	SSS II	SSS III	Total	Percentage (%)
Male	78	76	154	51.3
Female	76	70	146	48.7
Total	**154**	**146**	**300**	**100**

Table 4.1 shows the demographic characteristics of the 300 student respondents by gender and class level. The results indicate a slightly higher proportion of male students (154, 51.3%) compared to females 146. Similarly, SSS II students constituted 154 of the respondents, while SSS III students accounted for 146 (48.7%). The relatively balanced distribution across gender and class level ensured fair representation of students' views in the study.

Table 4.2 Mathematics Teachers by Gender and Academic Qualification

Gender	Diploma/HTC	Bachelor's Degree	Master's Degree	Total
Male	3	15	4	22
Female	1	5	2	8
Total	4	20	6	30
percentage	**13.3%**	**66.7%**	**20.0 %**	**100%**

Table 4.2 shows the distribution of mathematics teachers by gender and highest academic qualification. Male teachers constituted the majority, with 50.0% holding bachelor's degrees, 13.3% master's degrees, and 10.0% Diploma/HTC qualifications out of 22 male teachers. Among the 8 female teachers, 16.7% held bachelor's degrees, 6.7% master's degrees, and 3.3% had a Diploma/HTC qualification. Overall, bachelor's degree holders formed the largest group, indicating that most mathematics teachers possessed the required academic qualifications; however, the findings reveal a gender imbalance, with male teachers outnumbering females across all qualification levels.

Table 4.3 Mathematics Teachers by Teaching Experience

Teaching experience	Frequency	Percentage
1–5 years	9	30.0
6–10 years	11	36.7
Above 10 years	10	33.3
Total	**30**	**100**

Table 4.3 shows that 11 teachers, representing 36.7%, had between 6 and 10 years of teaching experience. Ten teachers, representing 33.3%, had taught for more than 10 years, while 9 teachers, representing 30.0%, had between 1 and 5 years of experience. The results demonstrate that most respondents had substantial teaching experience and were therefore likely to provide informed responses regarding mathematics teaching practices, assessment strategies, and curriculum implementation.

Table 4.4 Students and Mathematics Teachers by School Location

School Location	Students Frequency	Students (%)	Mathematics Teachers Frequency	Teachers (%)
Urban	171	57	17	56.7
Rural	129	43	13	43.3
Total	**300**	**100**	**30**	**100**

Table 4.4 shows the distribution of respondents by school location. Among the 300 students, 171 (57.0%) were from urban schools, while 129 (43.0%) were from rural schools. Similarly, of the 30 mathematics teachers, 17 (56.7%) taught in urban schools and 13 (43.3%) in rural schools. The findings indicate a fairly balanced representation of urban and rural schools, with a slightly higher proportion of urban participants, possibly due to the greater concentration of senior secondary schools, student enrolment, and educational facilities in urban areas.

Table 4.5 Students' Responses on Mathematics Teaching Practices

Teaching practice	Mean	Standard Deviation
Teachers clearly explain lesson objectives	3.78	0.87
Teachers use problem-solving activities	3.65	0.92
Teachers employ learner-centred methods	3.52	0.96
Teachers use classroom questioning	3.84	0.81
Teachers use instructional materials	2.91	1.08
Teachers organise group activities	3.28	1.03
Teachers relate mathematics to real-life situations	3.70	0.89
Teachers address differences in students' abilities	3.15	1.01
Mean	**3.48**	**0.76**

Table 4.5 shows that mathematics teaching practices were employed to a generally high extent, with an overall mean of 3.48 and a standard deviation of 0.76. Classroom questioning recorded the highest mean score of 3.84, followed by clear explanation of lesson objectives with a mean of 3.78. The use of real-life examples and problem-solving activities also recorded high mean scores of 3.70 and 3.65, respectively.

Table 4.6 Students' Responses on Mathematics Assessment Strategies

Assessment strategy	Mean	Standard Deviation
Regular homework assignments	4.02	0.79
Administration of quizzes and class tests	3.71	0.88
Assessment during classroom instruction	3.58	0.91
Provision of timely feedback	3.44	0.97
Use of different types of assessment tasks	3.12	1.04
Use of diagnostic assessment	2.94	1.08
Use of peer and self-assessment	2.76	1.12
Use of end-of-term examinations	4.11	0.73
Mean	**3.46**	**0.79**

Table 4.6 indicates that mathematics teachers used assessment strategies to a high extent, with an overall mean of 3.46 and a standard deviation of 0.79. End-of-term examinations recorded the highest mean score of 4.11, followed by homework assignments with a mean score of 4.02. Quizzes, class tests, classroom assessment, and teacher feedback were also frequently used.

Table 4.7 Observed Mathematics Teaching and Assessment Practices

Classroom practice	Observed	Not Observed	Percentage Observed
Clear explanation of lesson objectives	17	3	85.0
Learner-centred instructional methods	12	8	60.0
Use of instructional materials	8	12	40.0
Student participation in problem-solving	14	6	70.0
Classroom questioning	18	2	90.0
Formative assessment during lessons	15	5	75.0
Provision of feedback	13	7	65.0
Group or collaborative activities	9	11	45.0

The observation results show that classroom questioning was observed in 90.0% of the mathematics lessons, while the explanation of lesson objectives was observed in 85.0%. Formative assessment and student participation in problem-solving were observed in 75.0% and 70.0% of the lessons, respectively.

Table 4.8 Students' Mathematics Achievement Scores

Achievement score	Performance level	Frequency
Below 50%	Low	57
50–59%	Moderate	79
60–69%	Moderate	88
70–79%	High	52
80% and above	Very high	24
Total		**300**

The results show that 57 students, representing 19.0%, scored below 50%. A total of 167 students, representing 55.6%, scored between 50% and 69%, while 76 students, representing 25.3%, scored 70% and above. The students recorded an overall mean achievement score of 62.84, with a standard deviation of 13.25.

4.9 Test of Hypothesis

H_{01}: There is no significant relationship between teaching practices and students' mathematics achievement under the New Senior Secondary School Mathematics Curriculum.

The Pearson correlation analysis revealed a positive and statistically significant relationship between teaching practices and students' mathematics achievement ($r = 0.612$, $p < 0.001$). This indicates that improvements in teaching practices were associated with higher levels of students' achievement in mathematics. Since the significance value was less than the 0.05 level of significance, the null hypothesis (H_{01}) was rejected.

H_{02}: There is no significant relationship between assessment strategies and students' mathematics achievement under the New Senior Secondary School Mathematics Curriculum.

The Pearson correlation analysis showed a positive and statistically significant relationship between assessment strategies and students' mathematics achievement ($r = 0.547$, $p < 0.001$). This finding suggests that effective assessment practices were associated with improved students' performance in mathematics. Since the probability value was below the 0.05 significance level, the null hypothesis (H_{02}) was rejected.

H_{03}: Teaching practices and assessment strategies do not significantly predict students' mathematics achievement.

The multiple regression analysis showed a strong positive relationship between teaching practices, assessment strategies, and students' mathematics achievement ($R = 0.647$). The coefficient of determination ($R^2 = 0.418$) indicated that teaching practices and assessment strategies jointly explained 41.8% of the variation in students' mathematics achievement, while the remaining 58.2% was influenced by other factors such as students' motivation, mathematics anxiety, prior performance, teacher qualifications, instructional resources, class size, parental support, and socioeconomic background.

Table 4.9 Analysis of Variance for the Regression Model

Source	Sum of Squares	df	Mean Square	F
Regression	21,916.34	2	10,958.17	106.64
Residual	30,518.28	297	102.76	
Total	52,434.62	299		

The analysis of variance shows that the regression model was statistically significant, ($F(2,297) = 106.64$, $p < 0.001$). The probability value was below the 0.05 level of significance; therefore, the null hypothesis was rejected. Teaching practices and assessment strategies jointly made a significant contribution to the prediction of students' mathematics achievement.

Table 4.10 Regression Coefficients for Predictors of Mathematics Achievement

Predictor	Unstandardized B	Standard Error	Standardised Beta (β)	t-value
Constant	18.27	m3.21	—	5.69
Teaching practices	7.86	0.88	0.444	8.93
Assessment strategies	5.11	0.91	0.265	5.62

Table 4.10 shows that both teaching practices and assessment strategies significantly predicted students' mathematics achievement. Teaching practices had a stronger predictive effect ($\beta = 0.444$, $t = 8.93$, $p < 0.001$) compared to assessment strategies ($\beta = 0.265$, $t = 5.62$, $p < 0.001$), indicating that instructional practices contributed more to variations in achievement. The unstandardized coefficients revealed that a one-unit increase in teaching practices increased achievement by 7.86 points ($B = 7.86$), while a one-unit increase in assessment strategies increased achievement by 5.11 points ($B = 5.11$). The regression model, $Y = 18.27 + 7.86X_1 + 5.11X_2$, confirms that both factors positively influence mathematics achievement, with teaching practices having the greater impact.

4. 11 Regression Assumption Diagnostics

The regression assumptions were examined to ensure the validity of the model. The multi collinearity diagnostics showed that tolerance values were above 0.10 and variance inflation factor (VIF) values were below 5.00, indicating that multi collinearity was not a serious concern among the predictor variables. Furthermore, the residuals were approximately normally distributed, and diagnostic checks showed no serious violations of linearity or homoscedasticity assumptions. Therefore, the regression model was considered appropriate for predicting students' mathematics achievement.

4.12 Discussion of findings

The findings indicate a slight predominance of male respondents, but the small difference does not create significant gender bias. The balanced representation of SSS II and SSS III students enhances the credibility and generalisability of the study findings. Similarly, the inclusion of both urban and rural schools, with rural representation of 43.0% of students and 43.3% of teachers, provides diverse perspectives on mathematics teaching and learning experiences. Although mathematics teachers generally possess acceptable qualifications, with a high proportion holding bachelors and master's degrees, the low representation of female teachers remains a concern, highlighting the need for gender-inclusive recruitment and retention strategies. The findings further suggest that effective teaching practices, learner-centred approaches, classroom management, clear explanations, and appropriate assessment strategies such as continuous assessment, formative assessment, feedback, and diagnostic assessment significantly influence students' mathematics achievement. Therefore, strengthening teachers' pedagogical skills, improving assessment practices, and providing targeted support to rural schools through resources, training, and digital facilities are essential for enhancing mathematics outcomes under the New Senior Secondary School Mathematics Curriculum.

5. Conclusion

This study concludes that mathematics teaching practices and assessment strategies significantly influence students' achievement under the New Senior Secondary School Mathematics Curriculum. The findings from 300 students and 30 mathematics teachers showed that teachers generally had relevant qualifications and experience and applied effective practices such as questioning, clear lesson objectives, problem-solving, and real-life examples. However, limited use of instructional materials, group activities, and strategies for individual differences were identified. Assessment practices were widely used, though learner-centred methods such as diagnostic, peer, and self-assessment were less common. Students recorded a moderate mean achievement score of 62.84, indicating acceptable understanding but continued learning challenges. The significant relationships and regression results, which showed that teaching practices and assessment strategies explained 41.8% of the variation in achievement, highlight the importance of improving instructional and assessment approaches to enhance mathematics learning outcomes. The findings imply that mathematics teachers require continuous professional development to strengthen learner-centred teaching, use of instructional resources, and differentiated instruction. Schools and education authorities should provide adequate teaching materials and encourage diverse assessment methods beyond traditional examinations. Curriculum developers and policymakers should strengthen support systems and monitoring mechanisms to ensure effective implementation of the New Senior Secondary School Mathematics Curriculum and improved student achievement.

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