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Examining the Predictive Capacity of School-based Assessment on Students' Mathematics Performance in Large-scale Examinations

Stacy Hughey Surman [a*], Ifesinachi Jude Ezugwu [a], Justice Dadzie [b] and Evans Addison [b]

[a] The University of Alabama, US.
[b] University of Cape Coast, Ghana.

Authors' contributions

This work was carried out in collaboration among all authors. Authors SHS and EA designed the study. Author JD performed the statistical analysis. Authors JD and EA wrote the first draft of the manuscript. Authors SHS, JD and EA managed the analysis of the study. Authors EA and IJE wrote the literature part. All authors read and approved the final manuscript.

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ABSTRACT

This study underscores the importance of school-based assessment (SBA) in predicting students' mathematics performance in the Basic Education Certificate Examination (BECE) in Ghana. The study was conducted using 150 mathematics teachers from public junior high schools in Ghana's Central Region, the research employed a quantitative approach, using surveys to gather data on internal examination scores, SBA practices, teaching experience, and gender. Regression analysis revealed a strong predictive relationship between internal exam scores and BECE performance (R^2

**Corresponding author: Email: justicedadzie19@gmail.com;*

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= 0.663, B = 0.374, SE = 0.006, t = 67.24, p < .000), while ANOVA showed significant variations in SBA practices based on teaching experience (F (3, 146) = 6.99, p < 0.05). However, t-tests indicated no significant gender differences in SBA practices among teachers (t (148) = 1.100, p = 0.273). These findings highlight the critical role of internal assessments and teaching experience in enhancing educational outcomes and suggest that educational policies should support effective SBA practices and professional development for teachers. Based on these findings, it is recommended to enhance formative assessment practices by focusing on continuous and comprehensive internal assessments, provide ongoing professional development for teachers to improve their skills in implementing SBA, and allocate adequate resources for mathematics education to support effective teaching and learning environments.

Keywords: School based assessment; teacher's years of experience; gender; basic education certificate examination (BECE); academic performance; mathematics; large-scale examinations.

1. INTRODUCTION

In the realm of education, the fundamental purpose of schools is to facilitate teaching and learning, with the ultimate aim of fostering the acquisition and manifestation of specific skills, knowledge, values, beliefs, and attitudes among students [1,2,3]. Teaching, as defined by Riccomini et al. [4], involves the systematic guidance of students towards the attainment of predetermined educational objectives. Conversely, learning is characterized by a conscious effort on the part of students to acquire and internalize knowledge, skills, beliefs, and attitudes [5,2,6,7]. While the process of learning may not be directly observable, its outcomes are evidenced through observable behavioral changes in students [2,8]. Given the central role of teaching and learning in the educational process, the assessment of learning becomes imperative.

Large-scale assessment refers to the systematic evaluation of a significant number of individuals, typically students, on a wide range of educational outcomes or competencies. In education, large-scale assessments are conducted at the national, regional, or international levels to gather data on students' academic performance, knowledge, skills, and abilities across various subjects or domains. According to Hernández-Torrano, and Courtney, [9] these assessments often take the form of standardized tests, surveys, or examinations administered to a representative sample of students within a particular educational jurisdiction. The primary goal of large-scale assessments in education is to provide policymakers, educators, and stakeholders with valuable information about the effectiveness of educational systems, identify areas for improvement, monitor trends in student achievement over time, and make data-driven decisions to enhance teaching and learning practices [10]. Examples of large-scale assessments in education include national standardized tests like the National Assessment of Educational Progress (NAEP) in the United States or international assessments like the Programme for International Student Assessment (PISA) conducted by the Organisation for Economic Co-operation and Development (OECD).

In Ghana, large-scale assessments play a crucial role in evaluating student learning outcomes and informing educational policy and decision-making [11]. One notable example is the Basic Education Certificate Examination (BECE), which is administered by the West African Examinations Council (WAEC) to students completing junior high school. The BECE assesses students' proficiency in core subjects such as English, Mathematics, Science, and Social Studies. Results from the BECE are used to determine students' eligibility for admission into senior high school and influence educational policies aimed at improving teaching and learning practices at both the national and local levels. Additionally, the National Education Assessment (NEA) conducted by the Ghana Education Service (GES) periodically evaluates students' performance in various subjects to monitor educational progress and identify areas for intervention and improvement. These large-scale assessments in Ghana contribute to the ongoing efforts to enhance educational quality, equity, and access across the country.

In Ghana, school-based assessment (SBA) plays a crucial role in evaluating students' learning progress and academic performance. SBA encompasses a variety of assessment activities conducted by teachers within the school

environment, including quizzes, tests, projects, and class presentations. These assessments are designed to measure students' understanding of subject matter, critical thinking skills, and ability to apply knowledge to real-world situations [12]. One primary use of SBA in Ghana is to complement external examinations, such as the Basic Education Certificate Examination (BECE) and the West African Senior School Certificate Examination (WASSCE) [13]. While external examinations provide standardized assessments at the national level, SBA allows teachers to assess students' day-to-day learning and provide timely feedback to support their academic growth.

This approach aligns with the broader educational goals of promoting holistic student development and fostering a deeper understanding of subject matter [14]. Furthermore, SBA in Ghana is often integrated into the curriculum and teaching practices to promote active learning and student engagement. Teachers use a variety of assessment strategies, including formative assessments conducted during instruction and summative assessments at the end of units or terms. By incorporating SBA into teaching practices, educators can identify students' strengths and weaknesses, tailor instruction to meet individual learning needs, and monitor progress over time. Additionally, SBA serves as a tool for promoting accountability and quality assurance within the education system. Teachers are responsible for designing and implementing assessments that align with curriculum standards and learning objectives. School administrators may also use SBA data to evaluate teacher performance and guide professional development efforts. Overall, SBA plays a multifaceted role in the Ghanaian education system, serving as both a means of assessing student learning and informing instructional practices.

School-Based Assessment (SBA) in Ghana represents an integral part of the educational process, involving both teachers and students in assessment activities guided by Ministry of Education (MoE) directives. Implemented since 2008 in basic education and later extended to Senior High Schools (SHS) in 2011, SBA aims to enhance the comprehensiveness of assessment, alleviate teachers' workload, and facilitate the attainment of syllabus objectives while elevating the overall standard of education. SBA encompasses various assessment methods such as tests, quizzes, projects, assignments, self-assessments, peer assessments, and end-of-year examinations, ensuring a holistic approach to evaluating students' cognitive, affective, and psychomotor development in alignment with Ghana's National Philosophy of Education. The system is designed to provide a structured approach to assessment, facilitating periodic data collection, diversification of assessment modes, and standardization of assessment practices across schools, and guidance in constructing and grading assessment items. Additionally, SBA emphasizes student-centered learning, promotes the development of critical thinking, problem-solving, numeracy skills, moral and spiritual development, and formal presentation skills, thus fostering a comprehensive educational experience. Through SBA, schools are equipped with internal assessment systems to enhance teaching and learning processes, promote accuracy and reliability in assessment, and ultimately support students' academic growth and achievement.

In Ghana, the School-Based Assessment (SBA) system comprises 12 assessments conducted throughout the academic year. Each term includes three assessments along with a project, totaling 12 assessments annually. These assessments consist of class tests, group exercises, and project work, with a specific order for each term. The assessments are categorized as Class Assessment Tasks (CAT), with CAT 1, 5, and 9 comprising test items, CAT 2, 6, and 10 involving group exercises, and CAT 3, 7, and 11 consisting of class tests. The project work for each term is assigned CAT 4, 8, and 12, respectively. Preparation for project work begins in the second week of each term, including topic selection and data collection, with projects due by the end of the term or by Week 12, whichever comes earlier. SBA administration is expected to conclude by the end of the eleventh week, allowing schools time to prepare and administer the End-of-Term Test in the twelfth or final week of the term (Ministry of Education, 2011). This structured approach ensures the systematic implementation of SBA across schools and facilitates effective assessment practices in the mathematics. Table 2 presents the summary of the SBA modes and its administration in the mathematics.

Table 1. SBA modes and administration

Term 1		
	First Class Assessment Task (CAT 1)	End of Week 4 of Term 1
	Second Class Assessment Task (CAT 2)	End of Week 8 of Term 1
	Third Class Assessment Task (CAT 3)	End of Week 11 of Term 1
	Fourth Class Assessment Task (CAT 4)	To be collected by the end of Week 12
Term 2		
	First Class Assessment Task (CAT 5)	End of Week 4 of Term 2
	Second Class Assessment Task (CAT 6)	End of Week 8 of Term 2
	Third Class Assessment Task (CAT 7)	End of Week 11 of Term 2
	Fourth Class Assessment Task (CAT 8)	To be collected by the end of Week 12
Term 3		
	First Class Assessment Task (CAT 9)	End of Week 4 of Term 3
	Second Class Assessment Task (CAT 10)	End of Week 8 of Term 3
	Third Class Assessment Task (CAT 11)	End of Week 11 of Term 3
	Fourth Class Assessment Task (CAT 12)	To be collected by the end of Week 12

Source: Ministry of Education (2011)

Table 1 outlines the structured schedule for the administration of School-Based Assessment (SBA) tasks across three terms in an academic year. Each term encompasses four Class Assessment Tasks (CAT), with specific deadlines assigned to each task. In the first term, CATs 1 to 3 are designated for various assessment activities, such as tests and group exercises, to be completed by the end of Weeks 4, 8, and 11, respectively. Additionally, CAT 4 involves project work, which is required to be submitted by the conclusion of Week 12. The second and third terms follow a similar pattern, with CATs 5 to 8 and CATs 9 to 12, respectively, each comprising assessments and project submissions spread across designated weeks within the respective terms. This structured timeline ensures a systematic and organized approach to conducting assessments throughout the academic year, facilitating efficient planning and implementation of SBA tasks within educational institutions.

Since its introduction in 2008, School-Based Assessment (SBA) scores in Ghana initially accounted for 30% of students' total scores, with the Basic Education Certificate Examination (BECE) making up the remaining 70%. Over time, there has been a gradual increase in the weighting of SBA scores, reaching 40% in the 2018/2019 academic year and eventually equalizing with the BECE at 50% each in the current system. Despite this equal weighting, an analysis of student performance in mathematics from 2019 to 2022 reveals a discrepancy, as students have consistently achieved high scores in SBA without corresponding success in the BECE mathematics exam. This raises questions about the effectiveness of SBA in influencing BECE performance, particularly in mathematics. The Ministry of Education's decision in 2020 to raise the SBA weighting to 50% alongside the BECE reflects an effort to improve overall student achievement, especially in core subjects like mathematics. However, the disconnect between SBA performance and subsequent BECE outcomes suggests that further investigation and potential adjustments may be necessary to ensure the SBA fulfills its intended role in enhancing student success.

Assessment of learning, an integral component of the educational process, involves the gathering and interpretation of information pertaining to students' learning [15,16]. This assessment serves various purposes within the formal school system, including monitoring students' progress, diagnosing learning difficulties, assigning grades, and informing decisions related to curriculum, educational programs, and policies [17]. Assessment can either optimize or inhibit student learning, depending on its application [17,18]. Two primary forms of assessment, formative and summative, are employed in the educational context to evaluate student learning outcomes [19,20,21].

Formative assessment, also known as assessment for learning, encompasses various evaluation methods employed by teachers to gauge students' acquisition of specific skills, knowledge, values, beliefs, or attitudes during instructional sessions [19,22]. These assessments aid teachers in monitoring student learning progress and informing instructional adjustments [20]. Examples of formative

assessment strategies include class exercises, tests, and homework assignments. Conversely, summative assessment, referred to as assessment of learning, entails evaluating students' learning outcomes at the culmination of an instructional unit, such as a semester or academic year [20,22,23]. Summative assessments are used to assign grades or evaluate students' achievements concerning course completion [19]. End-of-term or year examinations are common examples of summative assessments.

Several factors influence student performance in both formative and summative assessments. Teacher knowledge and commitment, the teaching and learning environment, student engagement, availability of resources, parental involvement, and socio-economic conditions have been identified as key determinants of assessment outcomes [24,25,26]. These factors collectively contribute to shaping students' learning experiences and ultimately influence their performance during assessments. This comprehensive understanding of assessment in education underscores its critical importance in facilitating student learning and informing instructional practices. However, the predictive validity of internal assessments, particularly in high-stakes examinations such as the Basic Education Certificate Examination (BECE), remains a subject of debate among educators and policymakers in Ghana. Nyarko et al. [27] investigated the predictive validity of internal examination scores on BECE mathematics performance in Ghana. However, this study will be limited to one district in the country and therefore may not be generalizable to other regions. This discrepancy in findings highlights the need for further investigation into the predictive validity of internal examinations on mathematics performance in the BECE. The performance of students in mathematics from 2019-2022 at municipality has been poor. The trend in performance is indicated in Table 2.

Table 2 present data on the pass and fail percentages for mathematics in the years 2019 through 2022. The percentages indicate the proportion of students who either passed or failed mathematics during each respective year. In 2019, 54.1% of students passed mathematics, while 45.9% failed. This suggests that a majority of students successfully met the requirements for passing mathematics during that year. In 2020, the pass percentage decreased slightly to 49.3%, indicating a decrease in the proportion of students who passed mathematics compared to the previous year. Conversely, the fail percentage increased to 50.9%, signifying a higher proportion of students who did not meet the passing criteria for mathematics in 2020. The trend continued in 2021, with the pass percentage declining further to 45.1%, indicating a continued decrease in the proportion of students passing mathematics. The fail percentage increased to 54.9%, indicating that more than half of the students did not meet the passing criteria for mathematics in 2021. In 2022, the pass percentage decreased slightly to 44.7%, representing a continued decline in the proportion of students passing mathematics. The fail percentage also increased to 55.3%, indicating that the majority of students did not pass mathematics in 2022. Overall, the table illustrates a declining trend in the pass percentage for mathematics over the four-year period, accompanied by a corresponding increase in the fail percentage. This suggests a potential challenge in mathematics education that may require further investigation and intervention to improve student outcomes in the subject.

This study seeks to examine the predictive power of school-based assessment on students' academic performance in mathematics in the BECE. The specific research objectives sought to:

1. investigate the effect of internal mathematics exams (SBA) on students' performance in basic education certificate exams in mathematics.
2. determine whether difference exists in the SBA Implementation based on teaching experience in mathematics.
3. determine whether the gender of teachers influences SBA practices.

Research questions:

1. What is the impact of internal mathematics exams (SBA) on students' performance in basic education certificate exams in mathematics?
2. Is there a difference in the SBA Implementation based on teaching experience in mathematics?
3. Does the gender of teachers influence SBA practices?

Table 2. Performance of students in the municipality in mathematics from 2019 to 2022

Mathematics	2019	2020	2021	2022
mathematics pass percentage	54.1	49.3	45.1	44.7
mathematics fail percentage	45.9	50.9	54.9	55.3

Source: Municipality, (2023)

Examining differences in school-based assessment (SBA) practices by teaching experience and gender is crucial for understanding how educators' backgrounds and characteristics may influence assessment approaches and outcomes. According to Mahmud et al., [28] teachers with varying levels of experience may exhibit differences in assessment practices, with more experienced teacher's potentially demonstrating greater expertise in designing and implementing effective assessments. On the other hand, Uvie, [29] gender differences in SBA practices could shed light on potential disparities in assessment strategies, feedback provision, and student engagement based on the gender of the teacher. Understanding these differences is important for ensuring fair and equitable assessment practices that cater to the diverse needs of students.

2. LITERATURE REVIEW

2.1 Theoretical Background

Classical Test Theory (CTT) is a fundamental framework in psychometrics that underpins conventional psychometric testing. It focuses on ensuring the reliability, precision, and accuracy of psychometric test scores by minimizing error. CTT posits that an individual's observed score is a combination of their true score and error, with the true score representing the individual's actual level of ability or knowledge. The theory uses reliability coefficients, such as Cronbach's Alpha, to estimate error and assess the consistency of test scores.

In the context of the study on the predictive validity of internal examination on mathematics performance in the Basic Education Certificate Examination, CTT can play a crucial role. By understanding the principles of CTT, researchers can assess the reliability of internal examination scores as predictors of performance in the external examination. The theory allows for the evaluation of the relationship between observed scores in internal assessments and the true underlying ability of students in mathematics. CTT provides a framework to analyze the consistency and accuracy of internal examination scores in predicting students' performance in the external examination. By considering the reliability of internal assessments using CTT metrics, researchers can determine the extent to which these scores reflect students' true mathematical abilities. This analysis can help in understanding the validity of using internal examination results as a predictor of success in the Basic Education Certificate Examination.

In summary, Classical Test Theory (CTT) is essential in linking the study on the predictive validity of internal examination on mathematics performance in the Basic Education Certificate Examination. By applying CTT principles, researchers can assess the reliability and accuracy of internal examination scores as predictors of students' performance in the external examination, providing valuable insights into the effectiveness of internal assessments in predicting academic outcomes.

2.2 School Based Assessment Predicts Performance in BECE Mathematics

Three studies shed light on the relationship between internal assessments and academic performance in mathematics. Firstly, Moyo et al. [30] explored the impact of formative assessment on students' high-order thinking skills (HOTS) in mathematics. Their study, conducted in Botswana, showed a significant improvement in students' HOTS achievement following the intervention. Teachers also integrated formative assessment strategies into their teaching practices, enhancing mathematics instruction. Secondly, Oko and Okoye [31] investigated the correlation between school-based assessment scores and Senior Secondary Certificate Examination (SSCE) results in Nigeria. While school-based assessment scores in English predicted SSCE English grades for SSIII students, there was no significant predictive relationship for scores across different school years. Lastly, Machisi [32] conducted a comparative analysis of mathematics education systems in South Africa and Zimbabwe. Recommendations included adjustments to exam formats, increased resources for mathematics education, and support for teachers. These studies collectively offer insights into the potential of internal assessments to predict academic

performance in mathematics, with implications for educational policies and practices.

2.3 Examining Variations in School-Based Assessment Practices across Mathematics Teachers' Teaching Experience

Firstly, Azid et al. [33] investigated the effect of incorporating higher-order thinking skills (HOTS) into SBA on mathematics achievement among students. Their mixed-method case study revealed that the incorporation of HOTS questions contributed positively to students' mathematics scores. However, challenges such as students' maturity and misconceptions about math were identified, highlighting the complexities of implementing HOTS in SBA. Despite these challenges, the study found that teachers were able to adapt their pedagogical approaches to meet the needs of students, suggesting a potential benefit of incorporating HOTS into SBA. Secondly, Bosu et al. [34] explored the concerns of Business Studies teachers about the quality of SBA implementation in Senior High Schools in Ghana. Their descriptive survey found that teachers had intense concerns about SBA implementation, particularly regarding self-concerns such as awareness and informational concerns.

However, concerns about the impact of SBA were relatively lower. The study also revealed that teachers' concerns were influenced by factors such as workload and SBA training, emphasizing the importance of ongoing support and training for teachers to effectively implement SBA. Lastly, Kudjordji et al. [13] examined the impact of socio-demographic variables on teachers' SBA practices at the Basic Level in Ghana. Their quantitative study found no significant differences in SBA practices, roles, and challenges among teachers based on socio-demographic variables such as gender, age, educational qualification, years of teaching experience, and class level. However, the study recommended that the Ghana Education Service provide necessary logistics and support to teachers to enhance the implementation of SBA.

2.4 Gender Disparities in School-Based Assessment (SBA) Practices

In the first study by Nurfadilla et al. [35], the research aimed to assess the attitudes, knowledge, and practices of teachers in implementing the STEM approach in learning. Conducted in Aceh Province, Indonesia, the study utilized a quantitative descriptive survey method involving science teachers from various disciplines. Results indicated that both male and female teachers exhibited a high level of attitude, knowledge, and practice towards the STEM approach, suggesting gender parity in their implementation of STEM-based learning. Contrastingly, the study by Ukor and Mezieobi [36] investigated the challenges encountered by teachers in the practice and implementation of school-based assessment (SBA) in the Nigerian school system. The research involved 900 Senior Secondary One (SS1) teachers from Imo and Delta States, with findings revealing disparities based on gender. Male teachers were observed to be better equipped in the practice and implementation of SBA compared to their female counterparts. This discrepancy underscores potential gender-based differences in the adoption and execution of SBA practices.

Similarly, the study by Binaoui et al. [37] explored the impact and effectiveness of the syllable-based reading approach (SBA) on Moroccan pupils' Arabic reading competency, as well as teachers' approaches to its implementation. While the results indicated overall support for the SBA among Moroccan teachers, differences emerged in SBA teaching practices and perceptions based on gender. Notably, female teachers tended to assign more reading homework compared to their male counterparts, suggesting a gender-influenced variation in instructional practices related to the SBA. In contrast to the aforementioned studies, Safir [38] focused on the broader issue of school violence prevention strategies, proposing the Scenario-Based Approach (SBA) as a complementary method. While not directly examining gender differences in SBA practices, this study highlights the multifaceted nature of violence prevention in academic settings, emphasizing the need for comprehensive, stakeholder-inclusive strategies. Overall, the empirical review suggests that while gender-based disparities may exist in the implementation of certain educational practices such as school-based assessment, the extent and nature of these differences can vary across different contexts and methodologies.

2.5 Literature Gap

The current literature provides insights into the potential of internal assessments, such as school-based assessments (SBA), to predict academic performance in mathematics.

However, the existing studies have primarily focused on the relationship between SBA and performance in other external examinations, such as the Senior Secondary Certificate Examination (SSCE) in Nigeria or the general academic achievement of students. There is a lack of research that specifically examines the predictive validity of SBA on students' performance in the Basic Education Certificate Examination (BECE) in mathematics. The BECE is a crucial examination that determines students' transition to secondary education, and understanding the relationship between SBA and BECE mathematics performance could have significant implications for educational policies and practices.

The current study aims to address this gap by investigating the predictive validity of internal examination scores (SBA) on students' mathematics performance in the BECE. This investigation can provide valuable insights into the effectiveness of SBA as a tool for predicting and improving students' mathematics achievement in the BECE, which is a critical milestone in their educational journey. Furthermore, the existing literature has primarily focused on the general relationship between SBA and academic performance, without delving into the potential variations in SBA practices across different levels of teachers' teaching experience. Exploring these variations could offer a more nuanced understanding of the factors that influence the implementation and effectiveness of SBA in the context of mathematics education. By addressing these gaps, the current study can contribute to the existing body of knowledge and provide a more comprehensive understanding of the role of SBA in predicting and supporting students' mathematics performance in the BECE, as well as the factors that shape SBA practices among teachers with varying levels of experience.

3. MATERIALS AND METHODS

To investigate the impact of internal mathematics exams (SBA) on students' performance in basic education certificate exams in mathematics, a non-experimental (survey) research design is aptly employed. This design allows researchers to gather data from a diverse sample of teachers, providing insights into their perceptions, experiences, and practices regarding SBA and its influence on academic performance. Studies like that of Iwanaga et al. [39] and Hayes, [40] have utilized similar survey designs to explore the relationship between classroom assessments and students' achievement outcomes. This method offers a thorough and systematic exploration of the connection between internal assessment scores and outcomes in external examinations, offering valuable insights for educational policies and practices. The target population for the study encompassed 609 teachers, of which 331 were females and 278 were males, primarily hailing from rural and peri-urban areas within the municipality.

This diverse representation ensures that the findings encapsulate the broader educational landscape in the municipality, capturing the perspectives of teachers from various backgrounds and educational settings. It is noteworthy that although there were a total of 158 mathematics teachers in the municipality, only 150 opted to participate in the study. To ensure a comprehensive and inclusive investigation, researchers employed a census approach, encompassing all 150 mathematics teachers from the 87 public junior high schools in the municipality who willingly joined the research. The decision to use a census approach rather than sampling techniques bolsters the study's credibility and dependability by including the entire population of interested participants.

This exhaustive data collection method facilitates a more precise and representative examination of the relationship between SBA and BECE mathematics performance, reducing the risk of sampling biases and augmenting the applicability of the findings. Data were collected through a questionnaire adapted from Numan and Hasan (2017), specifically, the Criterion-Referenced Competency Inventory (CRCI), to assess teachers' SBA practices and challenges. The questionnaire consisted of sections focusing on background information (Section A), teachers' knowledge (Section B), attitudes (Section C), impact on instructional methods (Section D), methods of SBA practices (Section E), and challenges faced (Section F). Participants used a Likert-type scale to respond, ranging from Strongly Agree (SA) to Strongly Disagree (SD). The reliability coefficients of the original instrument are displayed in Table 3.

Table 3. Summary of the reliability coefficient of the original instrument items

Scale		Reliability
	No of items	Original
Knowledge in SBA	9	.72
Attitude towards the Application of SBA Guidelines	6	.76
Impact of SBA on Pre-Service Teachers' Instructional Methods	14	.86
Methods and Process of Implementing SBA	7	.71
Challenges of SBA	10	.73
Total	46	N/A

Source: (Numan & Hasan 2017)

Table 3 provides a summary of the reliability coefficients for each scale comprising the original instrument items used in the study. The reliability coefficients, often represented by Cronbach's alpha (α), indicate the internal consistency or reliability of the scales in measuring the intended constructs. The first scale, "Knowledge in SBA," consists of 9 items and demonstrates a reliability coefficient of .72, suggesting acceptable internal consistency among the items assessing participants' knowledge related to School-Based Assessment (SBA). Similarly, the second scale, "Attitude towards the Application of SBA Guidelines," comprising 6 items, exhibits a reliability coefficient of .76, indicating good internal consistency in measuring participants' attitudes toward applying SBA guidelines. The third scale, "Impact of SBA on Pre-Service Teachers' Instructional Methods," includes 14 items and demonstrates a higher reliability coefficient of .86, suggesting strong internal consistency in assessing the impact of SBA on pre-service teachers' instructional methods. The fourth scale, "Methods and Process of Implementing SBA," comprises 7 items with a reliability coefficient of .71, indicating acceptable internal consistency in measuring participants' methods and processes for implementing SBA. Lastly, the fifth scale, "Challenges of SBA," consists of 10 items and exhibits a reliability coefficient of .73, indicating satisfactory internal consistency in assessing the challenges associated with SBA implementation. Overall, the total instrument comprising 46 items demonstrates a reliability coefficient that is not applicable (N/A), as it represents the combined reliability of multiple scales rather than a single construct.

3.1 Pilot Testing

The questionnaire was structured into three sections: Section A, which addressed the demographic profile of the respondents, including gender, age, teaching experience, and years of teaching in the Municipality. Section B focused on gathering data regarding the current state of SBA, utilizing a Likert scale rating from "strongly disagree" to "strongly agree." This section encompassed two dimensions: teachers' Understanding and Knowledge of SBA, comprising 6 items, and Implementation and Practices, comprising 21 items, totaling 27 items. Some items underwent rephrasing to align better with the study's context. For example, an original item stating, "SBA standardizes the practice of assessment across the nation's schools," was revised to "I understand SBA and its guidelines for assessment."

Section C concentrated on the challenges encountered during SBA implementation, using the same Likert scale rating. It addressed challenges in two sub-sections: Implementation Challenges and Operational and Environmental Challenges. Implementation Challenges encompassed 10 items, with revisions such as changing an original item "It is quite tough for me to effectively execute SBA due to the large number of students" to "I lacked the basic skills of recording and documenting students' SBA achievement." Operational and Environmental Challenges consisted of 8 items, where an item like "The implementation is difficult due to a lack of logistical and physical support from the school administration" was adjusted to". The final instrument comprised 45 items: 27 items to assess the current state of SBA and 18 items to assess challenges during its implementation. The pre-test and subsequent refinements ensured that the research instruments effectively captured the required data for the study, allowing for a comprehensive and accurate exploration of the subject matter.

The research instrument encompassed three distinct sections. Section A captured teachers' biodata. In Section B, the focus was on assessing "The Current State of School-Based Assessment." This section specifically evaluated "Test Construction Skills of Teachers," consisting of 27 items. The reliability of Section B, as

indicated by the Cronbach alpha coefficient, was .845. Moving on to Section C, it delved into the "Challenges of SBA" and comprised 18 items. The Cronbach alpha coefficient for Section C was .791, indicating a satisfactory level of internal consistency. In its entirety, the data collection instrument comprised a total of 45 items. The calculated Cronbach alpha coefficient for the overall instrument was .848, underscoring a high degree of internal consistency and reliability. The municipality Education Directorate provided the students' scores for mathematics SBA and BECE from 2019 to 2022 as secondary data.

3.2 Data Analysis

The study aimed to address three key research questions: the impact of internal mathematics exams (SBA) on students' performance in the Basic Education Certificate Examination (BECE) in mathematics, the differences in SBA implementation based on teaching experience, and whether the gender of teachers influences SBA practices. To analyze the first research question, the Pearson product-moment correlation was employed, revealing a strong predictive relationship between internal exam scores and BECE mathematics performance. The second research question was examined using a one-way analysis of variance (ANOVA), which indicated significant variations in SBA practices based on teaching experience. For the third research question, an independent t-test was conducted, showing no significant gender differences in SBA practices among teachers. These analyses collectively highlight the critical roles of internal assessments and teaching experience in educational outcomes while suggesting that gender does not significantly influence SBA practices.

4. RESULTS AND DISCUSSION

4.1 Demographic Characteristics of Respondents

This section provides an overview of the respondents' demographic distribution. The demographic information encompasses gender, age, teaching experience, and the number of years spent teaching in mathematics are presented in Table 4.

Table 4 presents the distribution of teachers in the Municipality based on gender, age, teaching experience, and years of teaching. In terms of gender, the data indicates that 48.7% of the participants were male, while 51.3% were female. This suggests a slightly higher representation of female teachers involved in teaching mathematics and potentially engaging in school-based assessment activities compared to their male counterparts. Regarding age distribution, a small percentage (3.3%) of teachers fall within the age range of 21-25 years, indicating a cohort relatively young and early in their teaching careers. The age group of 26-30 years represents 4.7% of the sample, with slightly more experienced teachers. Teachers aged 31-35 years constitute 22% of the sample, indicating a significant number with considerable experience in school-based assessment. The age group of 36-40 years, representing 28% of the sample, suggests teachers at their mid-career stage with substantial experience in assessment practices. Additionally, 22.7% of teachers aged 41-45 years and 19.3% above 45 years indicate a significant portion with extensive teaching experience. Moving to teaching experience, the largest group (33.3%) has 0–3 years of experience, followed closely by 8–11 years (25.3%). This distribution suggests a mix of relatively new teachers and those with moderate experience in implementing assessment practices. Furthermore, the majority (44.0%) have over 8 years of teaching experience, while 32.0% have 6–8 years, indicating a substantial portion with significant teaching experience in the Municipality. Categories with below 3 years and 3–5 years contribute 9.3% and 14.7%, respectively, reflecting fewer years of teaching experience. Overall, the data provides insights into the demographic and professional characteristics of teachers in the Municipality, highlighting variations in experience levels and potential implications for school-based assessment practices.

Research Question One: What is the impact of internal mathematics exams (SBA) on students' performance in basic education certificate exams in mathematics?

Research Question 1 aimed to assess the impact of internal mathematics exam scores (SBA) on the performance of junior high school students in the Basic Education Certificate Examination (BECE). A regression analysis was conducted to establish the predictive relationship between internal mathematics SBA scores and BECE results. Before analysing the main data assumption of normality, linearity, homoscedasticity and independents of residuals were examined. The initial assessment of

assumptions, including multicollinearity, normality, linearity, and homoscedasticity, revealed no identified violations, and all conditions were deemed satisfactory. Multicollinearity, which occurs when independent variables are highly correlated (typically with r ≥0.9), was assessed based on recommendations from Pallant (2016). Pallant suggests that, for any regression analysis, there should be at least some relationship with the dependent variable (r ≥ 0.3 and above). The results of the multicollinearity assumption test are presented in Table 5.

As seen in Table 5, SBA scores correlates with pupils' academic performance in BECE with r = .814 which indicates that the assumption of multicollinearity was not violated. To test for the normality, linearity and homoscedasticity, the normality Q-Q plots and residual scatterplot were generated and the results are presented in Figs. 1 - 4.

The normality of residuals was assessed through a detailed examination of the histogram. The histogram displayed a roughly bell-shaped curve, indicating an approximately normal distribution of residuals. This visual inspection, coupled with a normal probability plot, provided substantial evidence to conclude that the assumption of normality in the regression residuals was satisfied. The symmetric and unimodal nature of the histogram affirmed that the residuals followed a normal distribution (Figs. 1-4) supporting the reliability of the regression analysis results. Furthermore, collinearity diagnostics were examined to assess the assumptions of multicollinearity. The variance inflation factor (VIF) for internal scores was well within an acceptable range (1.00), indicating no issues of multicollinearity. The condition index, at 27.574, was below the common threshold of 30, further supporting the absence of multicollinearity (Pallant, 2016). The main result from the regression analysis is presented in Table 6.

Table 4. Demographic data of teachers

	Frequency	Percent
Gender		
Male	73	48.7
Female	77	51.3
Age of teachers		
21-25	5	3.3
26-30	7	4.7
31-35	33	22.0
36-40	42	28.0
41-45	34	22.7
Above 45	29	19.3
Teaching Experience		
0-3	50	33.3
4-7	28	18.7
8-11	38	25.3
12-16	21	14.0
17 and above	13	8.7
Years of teaching in the municipality		
Below 3	14	9.3
3-5	22	14.7
6-8	48	32.0
Above 8	66	44.0

Source: Field Survey (2024)

Table 5. Correlation of BECE And SBA scores

		BECE	SBA Scores
BECE	Pearson Correlation	1	.814
	Sig. (2-tailed)		.184
	N	150	150
SBA Scores	Pearson Correlation	.814	1
	Sig. (2-tailed)	.184	
	N	150	

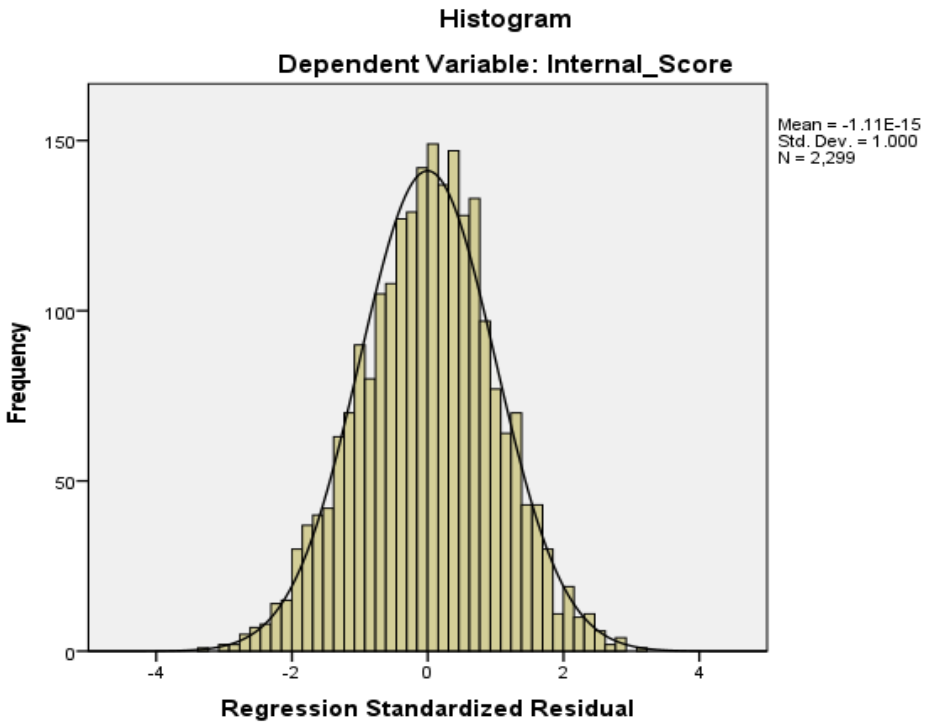

Fig. 1. Normality curve

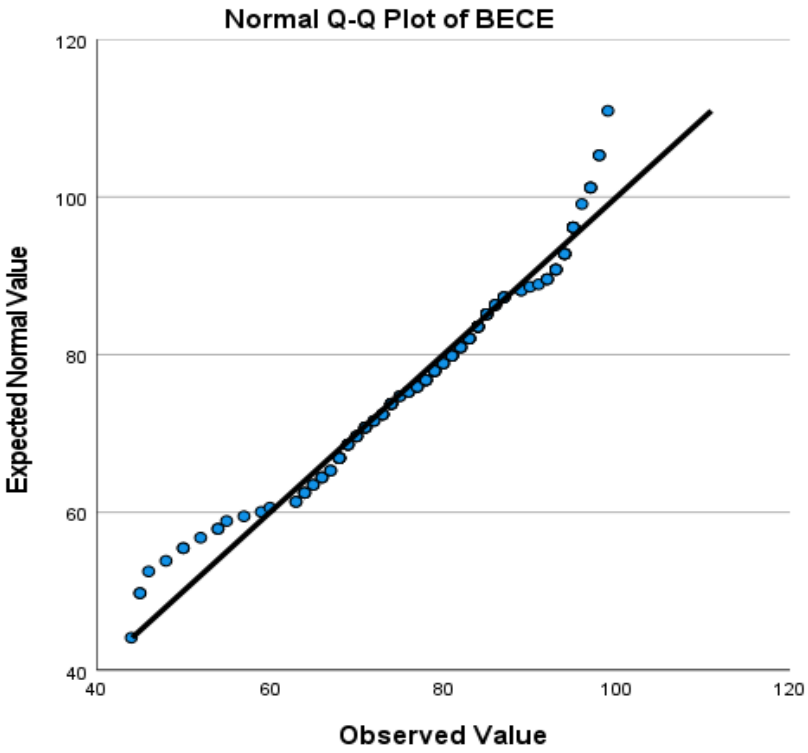

Fig. 2. Q-Q plot for BECE scores

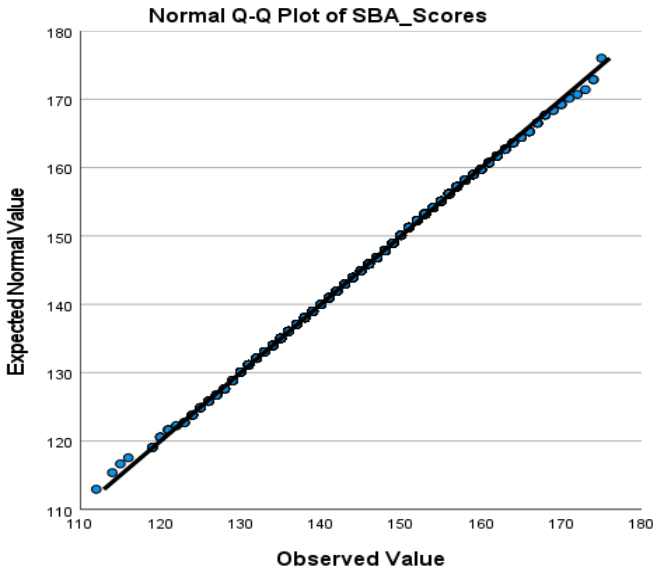

Fig. 3. Q-Q plot for SBA scores

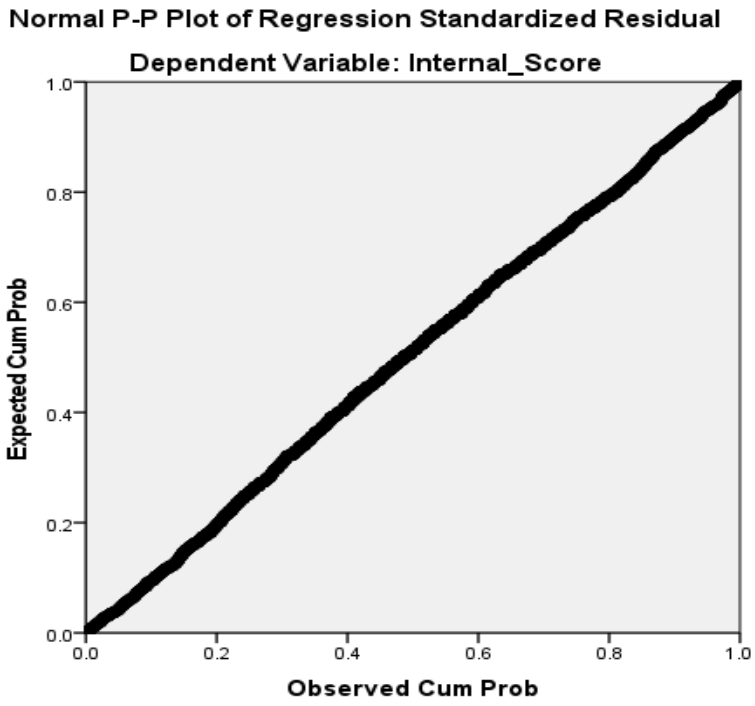

Fig. 4. Independents of residuals

Table 6. Internal scores as a predictor of students' performance in BECE

Model		Sum of squares	Df	Mean square	F	R	R^2	P
1	Regression	126974.40	1	126974.4	4521.40	.814	.663	.000***
	Residual	64506.62	2297	28.08				
	Total	191481.02	2298					

The regression analysis was conducted to investigate the predictive relationship between internal scores (SBA) and students' performance in the Basic Education Certificate Examination (BECE). The overall model was highly significant ($F(1, 2297) = 4521.40$, $p < .000$), indicating substantial explanatory power. The regression equation, with an R^2 of .663, accounted for approximately 66.3% of the variance in BECE performance. The coefficient for Internal Score was statistically significant ($B = 0.374$, $SE = 0.006$, $t = 67.24$, $p < .000$), suggesting that as internal scores increase, there is a corresponding positive effect on BECE performance. The constant term ($B = 49.020$, $SE = 1.43$, $t = 34.41$, $p < .000$) represents the estimated BECE score when the internal score is zero. These findings indicate a strong predictive relationship between internal scores and BECE performance, supporting the hypothesis that internal scores are a significant predictor of academic achievement in mathematics.

Research Question Two: Is there a difference in the SBA Implementation based on teaching experience in mathematics?

Research question two aimed at examining the differences in SBA implementation based on teaching experience in Mathematics. ANOVA analysis was conducted to compare mean difference between teachers practice of SBA with respect to their teaching experience in mathematics in the Mfantseman Municipality. Before analysing the main data, assumption of normality, and homogeneity of variance was conducted. The initial assessment of assumptions, including normality, and homogeneity of variance, revealed no identified violations, and all conditions were deemed satisfactory. Table 7 represents the Levene test of homogeneity of equal variance. To test for the normality, the normality Q-Q plot was generated and the result is presented in Fig. 5.

Table 7. Test of homogeneity of variance

		Levene Statistic	Sig.
Nature	Based on Mean	.771	.546
	Based on Median	.681	.606
	Based on Median and with adjusted df	.681	.606
	Based on trimmed mean	.748	.561

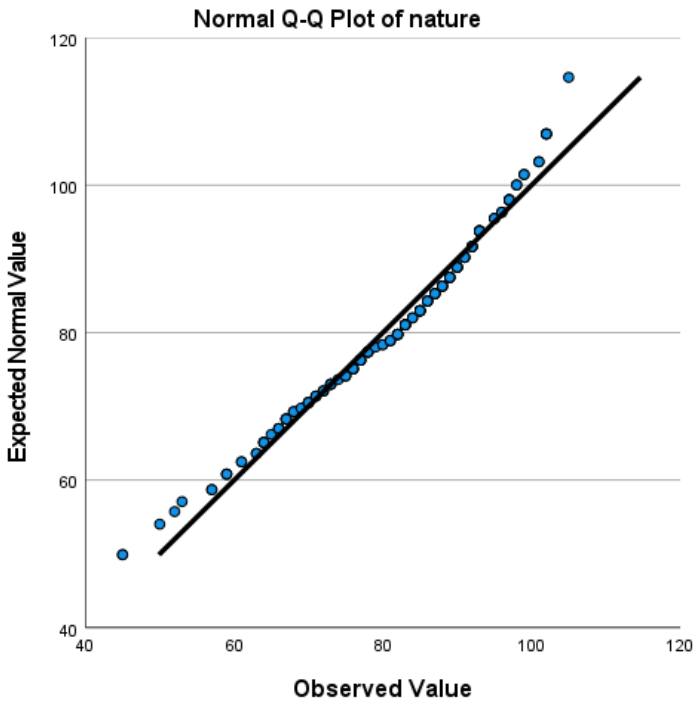

Fig. 5. Normality using Q-Q plot

Table 8. Teachers' teaching experience in municipality

	N	Mean	Std. Deviation
Below 3 Years	14	75.14	10.70
3-5 Years	22	82.54	13.56
6-8 Years	48	75.85	13.76
Above 8 Years	66	85.34	10.35

Table 9. SBA implementation based on teaching experience

SBA Implementation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3051.44	3	1017.14	6.99	0.001***
Within Groups	21232.13	146	145.42		
Total	24283.57	149			

Table 10. Multiple comparisons between years of teaching in municipality

Dependent Variable: SBA Implementation			
	(I) Years of Teaching	(J) Years of Teaching	Sig.
Tukey HSD	Below 3 years	3-5 years	.280
		6-8 years	.997
		Above 8 years	.024***
	3-5 years	Below 3 years	.280
		6-8 years	.141
		Above 8 years	.781
	6-8 years	Below 3 years	.997
		3-5 years	.141
		Above 8 years	.000***
	Above 8 years	Below 3 years	.024
		3-5 years	.781
		6-8 years	.000

**Significant, p < 0.05*

Table 11. Tests of normality

	Gender of Teachers	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
SBA Implementation	Male	.081	73	.200*	.983	73	.408
	Female	.066	77	.200*	.985	77	.518

Table 12. Gender-based differences in SBA practices among teachers

Variable	Group	N	M	SD	t	P-value
SBA Implementation	Male	73	82.12	12.56	1.100	0.273*
	Female	77	79.83	12.94		

**Not significant, p>0.05, df = 148*

The assessment of the normality assumption was conducted through a thorough examination of the Q-Q plot (Fig. 5). The Q-Q plot revealed that all the points closely aligned with the linear curve, suggesting an approximately normal distribution. Table 6 further supported the findings, indicating that the homogeneity of variance was equal, as evidenced by all the sig-values being greater than 0.05. Table 8 presents the descriptive analysis of teachers with teaching experience in the municipality. Table 9 presents the main test of the ANOVA, which aims to determine whether there is a significant mean difference among more than two different groups.

The analysis of variance (ANOVA) was conducted to examine the influence of the independent variable, "Years of Teaching in the

municipality," on the dependent variable, "SBA Implementation" (School-Based Assessment). The results indicate significant differences among the groups based on the years of teaching. The between-groups variation, represented by a sum of squares of 3051.44 with 3 degrees of freedom, yields a mean square of 1017.14. The F-statistic is 6.99, and the associated p-value is less than 0.05, indicating statistical significance. This suggests that the nature of School-Based Assessment significantly varies across different levels of teaching experience in the municipality. Conversely, the within-groups sum of squares is 21232.13 with 146 degrees of freedom, resulting in a mean square of 145.42. The total sum of squares is 24283.57 with 149 degrees of freedom. The substantial F-statistic and the low p-value emphasize that the observed differences like SBA are unlikely to have occurred by chance.

Post-hoc analysis was conducted to examine the specific characteristics contributing to the significant variability in the "SBA Implementation" across different teaching experience levels. To further understand the practical significance of this finding, we examined the effect size using eta-squared (η^2), which measures the proportion of variance in the dependent variable (SBA Implementation) explained by the independent variable (teaching experience). The effect size (η^2) was calculated to be approximately 0.1258. This indicates a large effect size according to conventions for interpreting eta-squared values. Therefore, teaching experience appears to have a substantial impact on the SBA Implementation scores among participants in the study. The results of the post-hoc analysis is presented in Table 10.

The Tukey Honestly Significant Difference (HSD) test revealed several statistically significant differences among different groups based on "Years of Teaching" and their impact on the dependent variable "SBA Implementation" (School-Based Assessment). Significant differences were observed between teachers with below 3 years of teaching experience and those with above 8 years of teaching experience (p = .024). Similarly, a significant difference was found between participants with 6-8 years of teaching experience and those with above 8 years of teaching experience (p = .000). These findings indicate that the SBA implementation among participants varied significantly based on their years of teaching experience. Specifically, participants with fewer than 3 years of teaching experience and those with 6-8 years of teaching experience reported different perceptions of SBA compared to participants with over 8 years of teaching experience. These results highlight the importance of considering teachers' years of experience when examining their perceptions of SBA practices.

Research Question Three: Does the gender of teachers influence SBA implementation?

The analysis involves the use of an independent sample t-test to explore Gender-based differences in School-Based Assessment (SBA) practices among teachers. The analysis involved the application of an independent t-test to explore potential statistically significant distinctions in the implementation of SBA practices between male and female teachers. This approach allowed for a rigorous examination of the data to ascertain whether gender plays a significant role in shaping the nature and extent of SBA practices within the teaching community. The use of an independent sample t-test was motivated by its effectiveness in comparing means between two independent groups, making it a suitable statistical tool for our investigation into potential gender-related variations in SBA practices among educators. Prior to conducting the t-test, I rigorously assessed the key assumptions for conducting an independent t-test.

Firstly, we evaluated the homogeneity of variances using Levene's Test for Equality of Variances and normality test. The results indicated a non-significant outcome (F = 0.064, p = 0.801), signifying that the assumption of homogeneity of variances was met. This ensured a robust basis for interpreting the results from the subsequent t-test. The Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted to assess the normality of distribution for SBA scores among male and female teachers and the result is presented in Table 11.

The normality assumption test result indicates that for both genders, the Kolmogorov-Smirnov statistic was 0.081 for males and 0.066 for females, with corresponding p-values of 0.200*. Similarly, the Shapiro-Wilk statistic was 0.983 for males and 0.985 for females, with corresponding p-values of 0.408 for males and 0.518 for females. These findings suggest that the SBA scores for both male and female teachers follow a normal distribution, as indicated by non-significant p-values (> 0.05) for both tests.

Therefore, the assumption of normality is met, allowing for appropriate statistical analyses to be conducted on the SBA scores. A comparison of SBA practices between male and female participants was conducted using an independent samples t-test and the results is presented in Table 12.

The analysis included 73 male participants with a mean SBA score of 82.12 (SD = 12.56) and 77 female participants with a mean SBA score of 79.83 (SD = 12.94). The results indicated no statistically significant difference in SBA implementation between the two gender groups ($t(148) = 1.100$, $p = 0.273$). These findings suggest that, based on the sample data, male and female participants did not significantly differ in their engagement with SBA practices.

5. DISCUSSION

5.1 School Based Assessment Predicts Performance in BECE Mathematics

The findings of the current study on the predictive validity of internal examination scores on mathematics performance in the Basic Education Certificate Examination (BECE) are largely in line with the empirical evidence presented in the three studies discussed. The strong predictive relationship between internal scores and BECE performance supports the notion that formative assessment, as reflected in internal examination scores, can have a positive impact on students' higher-order thinking skills (HOTS) in mathematics, as observed in the Moyo et al. [30] study. While the Oko and Okoye [31] study found no significant predictive relationship between school-based assessment scores and Senior Secondary Certificate Examination (SSCE) results across different school years, the current study demonstrates a strong predictive validity of internal examination scores on the BECE. This difference may be attributed to the specific context and assessment systems in the respective countries, highlighting the importance of considering the local educational landscape when interpreting the predictive power of internal assessments.

The recommendations from the Machisi [32] study, which include adjustments to exam formats, increased resources for mathematics education, and support for teachers, are aligned with the implications of the current study's findings. The strong predictive relationship between internal scores and BECE performance underscores the need for educational policies and practices that foster effective internal assessment practices and support teachers in their efforts to enhance student learning in mathematics. The current study's findings provide a robust and compelling argument for the predictive validity of internal examination scores on mathematics performance in the BECE. The regression analysis, which accounted for approximately 66.3% of the variance in BECE performance, demonstrates a substantial explanatory power of internal scores. The statistical significance of the regression coefficient further strengthens the argument that internal scores are a significant predictor of academic achievement in mathematics.

The findings of the current study on the predictive validity of internal examination scores on mathematics performance in the Basic Education Certificate Examination (BECE) align well with the principles of Classical Test Theory (CTT). Classical Test Theory focuses on assessing the reliability and validity of test scores, emphasizing the relationship between observed scores, true scores, and measurement error. In the context of the current study, the strong predictive relationship between internal scores and BECE performance supports the core tenets of CTT. The substantial explanatory power of internal scores in predicting BECE performance, as demonstrated by the regression analysis accounting for approximately 66.3% of the variance in BECE scores, is in line with CTT's emphasis on understanding the relationship between observed scores and true scores. The statistical significance of the regression coefficient further reinforces the argument that internal scores are a significant predictor of academic achievement in mathematics, aligning with CTT's focus on the reliability and validity of test scores.

In conclusion, the findings of the current study, supported by the empirical evidence from the three studies discussed, provide strong support for the application of Classical Test Theory (CTT) in the context of internal assessment practices and their predictive validity on mathematics performance in the BECE. The alignment of the study's results with the core principles of CTT underscores the importance of reliable and valid assessment practices in predicting academic achievement, highlighting the value of CTT in educational assessment research and practice.

5.2 Examining Variations in School-Based Assessment Practices across Mathematics Teachers' Teaching Experience

The findings of the current study on the influence of teachers' years of teaching experience on the nature of School-Based Assessment (SBA) are largely in line with the empirical evidence presented in the three studies discussed. The current study's finding that the SBA Implementation varies significantly across different levels of teaching experience aligns with the insights from the Azid et al. [33] study, which found that teachers were able to adapt their pedagogical approaches to meet the needs of students when incorporating higher-order thinking skills (HOTS) into SBA. This suggests that experienced teachers may be better equipped to navigate the complexities of implementing SBA effectively. The Bosu et al. [34] study highlighted the importance of ongoing support and training for teachers to effectively implement SBA. The current study's finding that the SBA Implementation varies across different levels of teaching experience suggests that more experienced teachers may have a better understanding of SBA implementation, potentially due to their exposure to training and support over the years. This provides a nuanced perspective compared to the Kudjordji et al. [13] study, which found no significant differences in SBA practices, roles, and challenges among teachers based on socio-demographic variables.

The current study's finding on the significant influence of teaching experience on the SBA Implementation provides a robust and compelling argument that is largely supported by the empirical evidence from the three studies discussed. The substantial F-statistic and the low p-value reported in the current study's ANOVA analysis underscore the statistical significance of the observed differences in the SBA Implementation across different levels of teaching experience, further strengthening the argument. The alignment of the current study's findings with the insights from the Azid et al. [33] and Bosu et al. [34] studies adds credibility and reinforces the argument. The collective evidence suggests that experienced teachers may be better equipped to navigate the complexities of SBA implementation, potentially due to their exposure to training, support, and the ability to adapt their pedagogical approaches. This evidence can inform educational policies, teacher training programs, and assessment practices to ensure that all teachers, regardless of their experience level, are equipped with the necessary knowledge, skills, and support to effectively implement SBA and enhance student learning outcomes.

5.3 Gender Disparities in School-Based Assessment (SBA) Practices

The current study's findings on the lack of significant gender differences in School-Based Assessment (SBA) practices diverge from the gender-based disparities observed in the empirical studies discussed. While studies by Nurfadilla et al. [35] and Ukor and Mezieobi [36] highlighted male teachers' superiority in implementing STEM approaches and SBA practices, respectively, compared to their female counterparts, the current study found no statistically significant difference in SBA practices between male and female participants. This contrast challenges the notion of gender playing a decisive role in SBA implementation. In alignment with the broader perspective offered by Safir [38], which emphasized the multifaceted nature of educational practices, the current study suggests that factors beyond gender, such as training, support, and resources, may have a more substantial impact on SBA implementation. The robust statistical analysis and the nuanced understanding of context-specific influences underscore the complexity of gender dynamics in educational practices, emphasizing the need for tailored approaches to address disparities in SBA implementation.

6. CONCLUSION

The regression analysis unveiled a robust predictive relationship between internal scores and students' performance in the Basic Education Certificate Examination (BECE), signifying that internal scores serve as a significant predictor of academic achievement in mathematics. This finding reinforces the notion that internal assessments can be reliable indicators of future performance on standardized examinations. The unexpectedly high explanatory power of the regression model (R^2 = .663) underscores the importance of considering internal factors, such as continuous assessment scores, in evaluating students' academic trajectories.

Furthermore, the analysis of variance (ANOVA) shed light on the influence of teaching experience on the nature of School-Based

Assessment (SBA), revealing significant variations across different levels of teaching experience in the municipality. This suggests that the pedagogical approaches and assessment practices employed by educators may evolve or diverge based on their tenure, potentially impacting the quality and consistency of SBA implementation. The post-hoc analysis could provide valuable insights into the specific characteristics contributing to these variations, offering opportunities for targeted interventions or professional development initiatives aimed at enhancing assessment practices. Interestingly, the study found no statistically significant difference in SBA practices between male and female participants, despite some prior research suggesting potential gender-based disparities in academic engagement or performance. This unexpected finding challenges conventional assumptions and underscores the need for continued exploration of gender dynamics within educational contexts.

Overall, this study contributes valuable insights into the predictive validity of internal assessments, the impact of teaching experience on assessment practices, and the absence of gender disparities in SBA engagement. By highlighting the multifaceted nature of academic achievement and assessment, this research enhances our understanding of the complex interplay between internal factors, teaching practices, and student outcomes. Moving forward, further research could explore additional factors influencing academic performance and assessment practices, fostering a more nuanced understanding of educational processes and outcomes.

7. IMPLICATION OF THE STUDY

The research findings have several implications for educational practice and policy. Firstly, the study highlights the importance of internal assessment practices in predicting students' performance in standardized examinations like the BECE. This emphasizes the need for educational policies and practices that support effective internal assessment methods to enhance student learning outcomes. Secondly, the study underscores the significance of teaching experience in shaping School-Based Assessment (SBA) practices. The variations in SBA practices based on teachers' years of experience suggest the importance of providing continuous professional development opportunities for educators to improve assessment practices and ultimately student achievement.

Additionally, the study challenges conventional assumptions about gender-based disparities in academic engagement or performance by finding no significant difference in SBA practices between male and female participants. This calls for a deeper exploration of gender dynamics within educational contexts to ensure equitable opportunities for all students. Overall, the research findings suggest that a multifaceted approach to understanding academic achievement and assessment practices is essential. By considering factors such as teaching experience, gender dynamics, and local educational landscapes, targeted interventions and professional development initiatives can be implemented to enhance assessment practices and ultimately improve student outcomes.

8. RECOMMENDATIONS

Based on the findings of the current study, several recommendations can be made to improve educational practices and policies related to school-based assessment (SBA) and mathematics performance in the Basic Education Certificate Examination (BECE):

1. Enhance Formative Assessment Practices: Given the strong predictive validity of internal examination scores on BECE performance, it is crucial to emphasize formative assessment in the curriculum. Schools should focus on continuous and comprehensive internal assessments to develop students' higher-order thinking skills (HOTS) in mathematics. This approach will better prepare students for the BECE and improve overall academic performance.
2. Provide Professional Development for Teachers: The significant influence of teaching experience on the effective implementation of SBA suggests the need for ongoing professional development. Teachers, regardless of their years of experience, should have access to regular training sessions that focus on best practices in SBA, integrating HOTS, and effective pedagogical strategies. This will help less experienced teachers gain the necessary skills and confidence to implement SBA effectively.
3. Allocate Resources for Mathematics Education: Aligning with the

recommendations from the Machisi (2023) study, schools should invest in resources that support mathematics education. This includes providing up-to-date teaching materials, technology, and support systems that facilitate effective learning environments. Ensuring that teachers have the tools they need will help them better implement formative assessments and support student learning.

CONSENT AND ETHICAL APPROVAL

Ethical guidelines for research were followed throughout; in particular, participants gave written informed consent and were made aware that they are free to withdraw anytime during data collection.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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