

CONTINUOUS ASSESSMENT PRACTICES AND TEST ANXIETY AS PREDICTORS OF MATHEMATICS ACHIEVEMENT AMONG JUNIOR SECONDARY STUDENTS IN KATSINA STATE, NIGERIA

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Abstract

This study examined the influence of continuous assessment practices (CAP) and mathematics test anxiety (TA) on mathematics achievement (MA) among Junior Secondary School (JSS II) students in Katsina State, Nigeria. Guided by a descriptive survey design, the study drew from a population of 96,366 JSS II students, with a stratified random sample of 382 respondents across educational zones. Three validated instruments Continuous Assessment Practices Questionnaire (CAPQ), Mathematics Test Anxiety Scale (MTAS), and Mathematics Achievement Test (MAT) were used to collect data. Descriptive statistics (mean and standard deviation), Pearson's product-moment correlation, and multiple regression were employed for analysis. Findings revealed that CAP in Katsina State is generally high (overall mean = 3.60), particularly in the frequency of assessments and timeliness of feedback, though the use of CA results for remediation remains limited. TA was moderate (mean = 2.78), with emotional symptoms slightly higher than cognitive worry. A significant, moderate positive correlation was found between CAP and MA ($r = 0.512$, $p < 0.001$). Regression results showed that CAP and TA jointly explained 37.4% of the variance in MA, with CAP contributing positively ($\beta = 0.481$) and TA contributing negatively ($\beta = -0.312$). The study concludes that effective continuous assessment enhances mathematics performance, but high test anxiety undermines this benefit. It recommends integrating anxiety-reduction strategies into mathematics instruction, strengthening the remedial use of CA results, enhancing teacher professional development, and fostering parental support without undue pressure. These measures will improve mathematics outcomes in Katsina State junior secondary schools.

Keywords: Continuous assessment, mathematics test anxiety, mathematics achievement, formative assessment, junior secondary school.

Introduction

Education is universally recognized as the primary vehicle for equipping individuals with the skills, knowledge, and attitudes needed for personal development and socio-economic advancement. Mathematics, in particular, occupies a central role in the curricula of most nations, being the language of science, technology, and innovation (Akinsolu & Fajonyomi, 2023). In Nigeria, the Federal Republic of Nigeria (FRN) has consistently emphasized mathematics as a core subject from primary through senior secondary school, given its utility in cognitive development, problem-solving, and career readiness (FRN, 2014).

However, despite its acknowledged importance, mathematics remains one of the subjects where students in Nigeria, including Katsina State, often underperform. Annual examination reports from the West African Examinations Council (WAEC) and the Universal Basic Education Commission (UBEC, 2024) reveal persistent gaps in achievement, with a significant proportion of students failing to attain mastery levels. This performance gap suggests that beyond curriculum content, assessment practices and psychological factors may play critical roles in shaping learning outcomes.

Continuous assessment (CA) was formally integrated into Nigeria's education policy in the 1980s to replace the dominance of one-off, summative examinations with a more comprehensive evaluation of student learning (FRN, 2014). CA involves the systematic collection of data on student performance throughout the academic year, covering tests, assignments, projects, and class participation. In theory, CA should serve both formative and summative functions helping teachers adjust instruction, while also contributing to final grades (Eneogu et al., 2025).

When implemented with feedback-rich, curriculum-aligned tasks, CA has been shown to improve student achievement by enabling timely remediation and sustained engagement (Ugwuadu & Okoye, 2020). However, in many Nigerian schools, CA is reduced to a bureaucratic exercise of score aggregation, with minimal formative use. This limits its potential to improve learning outcomes (Eneogu et al., 2025; Udom & Atser, 2022).

Test anxiety (TA) is a performance-related anxiety that occurs in evaluative contexts, characterized by worry, tension, physiological arousal, and cognitive interference (Zeidner, 2023). While mild anxiety may enhance alertness, moderate-to-high levels are often detrimental, impairing concentration and working memory during tests (Putwain & Daly, 2021). Nigerian studies have found TA to be negatively associated with mathematics achievement, especially among secondary school students (Gidado & Ugochukwu, 2024; Nwankwo et al., 2025).

TA can be exacerbated by high-stakes testing environments, poor preparation, low self-efficacy, and prior negative experiences with assessments (Zeidner, 2023; Yusuff & Oke, 2022). In contexts where CA is poorly implemented, students may lack continuous feedback and formative experiences, heightening their anxiety during terminal examinations.

While both CA and TA have been studied separately in Nigerian contexts, few recent studies in Katsina State have examined their combined predictive power for mathematics achievement among junior secondary students. Understanding this interplay is critical for designing targeted interventions strengthening CA's formative functions while implementing school-based programs to manage TA.

CAP refers to the structured, ongoing evaluation of student learning through varied tasks tests, assignments, classwork, projects spread across the academic session (FRN, 2014). Quality CAP is characterized by Frequency and regularity of assessment tasks, Alignment with curriculum standards, Feedback timeliness to guide student improvement, and the Use of results for remedial instruction (Eneogu et al., 2025).

Test Anxiety (TA) is a multifaceted construct involving both worry (cognitive concern about performance) and emotionality (physiological arousal) (Putwain & Daly, 2021). In mathematics contexts, TA is linked to avoidance behaviors, decreased problem-solving accuracy, and reduced exam scores (Gidado & Ugochukwu, 2024).

Mathematics Achievement (MA) is the extent to which students attain intended learning outcomes in mathematics, usually measured through tests aligned to curriculum objectives (Akinsolu & Fajonyomi, 2023). It reflects both cognitive mastery and the ability to apply concepts.

Black and Wiliam's (1998) theory posits that formative assessment feedback-oriented, ongoing assessment embedded in instruction enhances learning by making learning goals explicit, providing evidence of progress, and guiding next steps.

Sarason's (1984) theory suggests that anxiety occupies cognitive resources needed for task performance, especially in complex tasks like mathematics. TA thus competes with working memory, impairing problem-solving.

Ugwuadu and Okoye (2020) found that effective CA significantly predicted senior secondary mathematics achievement in Anambra State. Similarly, Udom and Atser (2022) reported that frequent, high-quality CA correlated with improved WAEC scores. However, Eneogu et al. (2025) cautioned

that teacher assessment literacy remains a challenge in Nigerian secondary schools, affecting CA quality.

Gidado and Ugochukwu (2024) reported a significant negative correlation between TA and mathematics scores among 450 senior secondary students in FCT, Abuja. Nwankwo et al. (2025) demonstrated a curvilinear relationship moderate TA sometimes motivates, but high TA depresses achievement. These findings echo Zeidner's (2023) international review.

Internationally, studies (e.g., Putwain & Daly, 2021) have suggested that good assessment practices may buffer against the negative effects of TA by increasing familiarity with testing formats and reducing uncertainty. In Nigerian contexts, however, such integrative studies are rare.

While CAP and TA are individually linked to MA, limited evidence exists for their combined effect among junior secondary students in Katsina State. Moreover, few studies measure CA quality from the student perspective alongside standardized achievement testing.

Objectives of the Study

1. Determine the level of continuous assessment practices among JSS II students in Katsina State.
2. Determine the level of test anxiety among JSS II students.
3. Examine the relationship between continuous assessment practices and mathematics achievement.
4. Determine the joint and relative contributions of continuous assessment practices and test anxiety to mathematics achievement.

Hypotheses

H01: There is no significant relationship between CAP and MA among JSS II students.

H02: There is no significant relationship between TA and MA among JSS II students.

H03: CAP and TA do not jointly predict MA among JSS II students.

H04: CAP and TA do not make significant unique contributions to MA.

Methodology

The study adopted a descriptive survey design, which is suitable for describing current conditions, opinions, and relationships between variables without manipulating the study environment (Creswell & Creswell, 2023). This design was considered appropriate because the study sought to measure continuous assessment practices (CAP), test anxiety (TA), and mathematics achievement (MA) as they occur naturally among Junior Secondary School (JSS II) students in Katsina State. The population comprised all JSS II students enrolled in public junior secondary schools across the 34 local government areas of Katsina State during the 2024/2025 academic session. According to the Katsina State Ministry of Education (2024), there were 96,366 JSS II students in the state at the time of the study. The sample size was determined using the Krejcie and Morgan (1970) table, which recommends 382 respondents for a population of approximately 100,000 at a 95% confidence level and 5% margin of error.

A multistage sampling technique was employed through the following states:

Stage 1: Stratified the state into its three senatorial zones (Katsina, Daura, and Funtua).

Stage 2: Randomly selected four LGAs from each senatorial zone (12 LGAs total).

Stage 3: From each selected LGA, two public junior secondary schools were randomly chosen (24 schools total).

Stage 4: From each school, a proportionate number of JSS II students were selected using simple random sampling until the total of 382 was reached.

A 20-item structured questionnaire developed by the researcher measured students' perceptions of CA implementation in their schools. The items covered: Frequency of assessment (5 items), Feedback timeliness (5 items), Relevance to curriculum (5 items), and Use of CA for remedial purposes (5 items). Responses were rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Higher scores indicated better CAP quality.

Another instrument was Mathematics Test Anxiety Scale (MTAS), it is a 15-item scale adapted from the Revised Test Anxiety Scale (Benson & El-Zahhar, 1994) measured cognitive worry (7 items) and emotionality (8 items) specific to mathematics. Responses used a 4-point scale (1 = Almost Never to 4 = Almost Always). Higher scores indicated greater anxiety.

Similarly, Mathematics Achievement Test (MAT) was an instrument used, it comprised 50-items, it is also a multiple-choice test covering the JSS II mathematics curriculum was developed based on the Nigerian Educational Research and Development Council (NERDC) syllabus. Items were validated by subject experts and piloted for clarity. Each correct answer scored 1 mark, making a total possible score of 50.

Interms of Validity and Reliability of the Instruments, three experts in Educational Measurement and Mathematics Education reviewed all instruments for alignment with study objectives and curriculum requirements, the Face and Content validities were established, Pilot Testing was carried out with 40 JSS II students from a non-sampled school in Katsina. Cronbach's alpha was employed for the reliability coefficient of continuous assessment practices (CAP) which was obtained as 0.88, while for the MTAS it was obtained as 0.86, and for the MAT the KR-20 reliability coefficient was calculated as 0.84. However, these values indicated high internal consistency (Taber, 2018). All analyses were conducted using SPSS version 27, with significance set at $p < 0.05$.

Results

The results are presented according to the four research objectives. Both descriptive and inferential statistics are used, following the data analysis plan.

Table 1: Descriptive Statistics of Continuous Assessment Practices

Continuous Assessment Practices	N	Mean	Std. Deviation	Interpretation
Frequency of assessment	382	3.78	0.69	High
Feedback timeliness	382	3.65	0.72	High
Relevance to curriculum	382	3.52	0.77	Moderate-High
Use for remedial purposes	382	3.46	0.80	Moderate-High
Overall CAP	382	3.60	0.75	High

Table 1 indicates the overall mean CAP score (3.60) indicates that continuous assessment practices in the sampled schools are generally high. However, the slightly lower score in remedial use suggests that teachers may not be fully leveraging CA for targeted student improvement.

Table 2: Descriptive Statistics of Mathematics Test Anxiety

Test Anxiety Dimensions	N	Mean	Std. Deviation	Interpretation
Cognitive worry	382	2.71	0.65	Moderate
Emotionality	382	2.85	0.68	Moderate

Overall TA	382	2.78	0.67	Moderate
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Table 2 shows the results indicate a moderate level of test anxiety among students. Emotional symptoms such as nervousness and physical tension were slightly higher than cognitive worry, which aligns with studies suggesting that mathematics evokes strong physiological responses in students (Ramirez et al., 2022).

Table 3: Correlation between CAP and MA

Variables	N	r	p-value	Decision
CAP & MA	382	0.512	0.000***	Significant

***p < 0.001

Table 3 depicts a moderate positive correlation ($r = 0.512$) exists between CAP and MA, indicating that improved continuous assessment practices are associated with higher mathematics achievement. This supports formative assessment theory, which posits that timely feedback improves learning outcomes (Black & Wiliam, 2018).

Table 4: Multiple Regression Analysis of CAP and TA on MA

Predictor Variables	B	Std. Error	Beta	t	p-value
(Constant)	18.32	2.54	—	7.21	0.000***
CAP	4.25	0.52	0.481	8.17	0.000***
TA	-3.14	0.58	-	-	0.000***
			0.312	5.41	

Model Summary:

$R = 0.612$

$R^2 = 0.374$

$F(2, 379) = 113.31, p < 0.001$

***p < 0.001

Table 4 above CAP and TA jointly explained 37.4% of the variance in mathematics achievement. CAP had a significant positive contribution, while TA had a significant negative contribution. This suggests that while effective CA can enhance achievement, high test anxiety can undermine its benefits.

Discussion of Findings

The discussion of findings is presented in line with the four research objectives, comparing the results with existing literature and explaining their implications in the Katsina State context.

The study revealed that continuous assessment practices (CAP) in Katsina State junior secondary schools are generally high (overall mean = 3.60). The highest rated dimension was frequency of assessment (mean = 3.78), followed by feedback timeliness (mean = 3.65). These findings suggest that teachers in the sampled schools conduct assessments regularly and provide timely feedback to students.

This aligns with Ogguniyi and Adeniran (2023), who found that Nigerian teachers increasingly integrate frequent assessment due to policy emphasis on formative evaluation in the 2013 National Policy on Education. Similarly, Okonkwo et al. (2021) reported that timely feedback motivates learners, enhances metacognitive awareness, and helps students self-correct before summative evaluations.

However, the lower score in use of CA for remedial purposes (mean = 3.46) indicates a gap in using CA results to address individual learning difficulties. This echoes Yakubu and Musa (2022), who

observed that while Nigerian teachers often administer CA, many lack the resources or strategies to provide personalized remediation. In Katsina State, large class sizes and inadequate teacher training on diagnostic feedback may be contributing factors.

The findings showed that students experienced a moderate level of mathematics test anxiety (overall mean = 2.78), with emotional symptoms (mean = 2.85) slightly higher than cognitive worry (mean = 2.71). This is consistent with Ramirez et al. (2022), who demonstrated that mathematics anxiety often triggers stronger physiological and emotional responses than purely cognitive ones.

In the Nigerian context, Adebayo and Salihu (2024) found that test anxiety among JSS students is fueled by societal pressure for high grades, teacher-centered pedagogy, and limited exposure to interactive learning strategies. The moderate anxiety level in this study may reflect the tension between frequent CA (which may help students feel more prepared) and high-stakes end-of-term mathematics examinations, which still dominate the evaluation system in Katsina State.

The study established a significant, moderate positive relationship between CAP and mathematics achievement ($r = 0.512$, $p < 0.001$). This confirms the assertion of Black and Wiliam (2018) that formative assessment improves academic outcomes through feedback, goal clarification, and active learner involvement.

The finding is also supported by Chinelo and Mbah (2023), who found a strong correlation between continuous assessment and students' mastery of mathematics concepts in South-East Nigeria. In Katsina, the relationship could be explained by the regular exposure to formative tasks, which familiarizes students with the style and difficulty of mathematics questions, thereby reducing examination shock.

The regression results indicated that CAP and TA jointly accounted for 37.4% of the variance in mathematics achievement. CAP had a positive and significant contribution ($\beta = 0.481$), whereas TA had a significant negative contribution ($\beta = -0.312$). This suggests that while effective CA boosts achievement, high test anxiety can undermine the benefits of good assessment practices.

This pattern mirrors Fadare et al. (2023), who found that Nigerian students with high anxiety levels tend to underperform in mathematics, even when given adequate formative feedback. Theoretically, this supports the Cognitive Interference Theory (Sarason, 1984), which posits that anxiety diverts working memory resources from task-relevant processing to worry-related thoughts, thereby impairing performance.

In the Katsina State context, the interplay between CAP and TA implies that teachers should pair effective formative assessment strategies with anxiety-reduction interventions such as relaxation training, collaborative problem-solving, and gradual exposure to complex tasks to maximize student outcomes.

Conclusion

This study investigated the influence of continuous assessment practices (CAP) and mathematics test anxiety (TA) on mathematics achievement (MA) among JSS II students in Katsina State, Nigeria, using a descriptive survey design. The findings revealed that CAP in the state's junior secondary schools is generally high, particularly in the frequency of assessments and the timeliness of feedback. However, the use of assessment results for remediation remains limited.

Mathematics test anxiety was found to be at a moderate level, with emotional symptoms slightly more prevalent than cognitive worry. A moderate positive correlation between CAP and MA was established, indicating that regular and constructive formative assessment contributes to better mathematics performance. Multiple regression analysis showed that while CAP significantly and

positively predicts MA, TA significantly and negatively affects it, with both variables jointly explaining 37.4% of the variance in achievement.

In essence, the study concludes that effective continuous assessment can enhance mathematics achievement, but its benefits are diminished when students experience high test anxiety. Therefore, improving formative assessment strategies must go hand-in-hand with targeted interventions to reduce mathematics anxiety among junior secondary school students.

Recommendations

Based on the findings, the following recommendations are made:

Enhance Remedial Use of Continuous Assessment in such a way that teachers should be trained to use CA results diagnostically to identify specific learning gaps and design individualized or small-group remedial lessons and school administrators should allocate time within the timetable for targeted remedial sessions.

Integrate Anxiety-Reduction Strategies into Mathematics Instruction, Mathematics teachers should adopt anxiety-reducing approaches such as collaborative learning, guided practice, relaxation techniques, and gradual exposure to challenging tasks, schools should incorporate short pre-test relaxation exercises and confidence-building discussions into lesson routines.

Strengthen Teacher Professional Development, the Katsina State Ministry of Education should organize workshops focusing on formative assessment techniques, interpretation of assessment data, and psychological strategies for managing test anxiety.

Promote Student Self-Assessment Skills, students should be encouraged to assess their own work and track their progress using teacher-provided checklists and rubrics. This can increase ownership of learning and reduce performance-related stress.

Parental Involvement, parents should be sensitized on the importance of supporting their children's mathematics learning without imposing excessive pressure, which can heighten test anxiety.

References

- Adebayo, F. A., & Salihu, M. (2024). Formative assessment practices and learning outcomes in Nigerian secondary schools. *Journal of Educational Research in Africa*, 15(2), 45–60.
- Black, P., & Wiliam, D. (2018). Classroom assessment and pedagogy. *Assessment in Education*, 25(6), 551–575.
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). Sage.
- Eneogu, P. D., Okeke, A. M., & Ugwuanyi, C. S. (2025). Teacher assessment literacy and quality of continuous assessment in Nigerian schools. *Assessment in Education*, 12(3), 112–130
- Federal Republic of Nigeria. (2014). *National Policy on Education* (6th ed.). NERDC Press.
- Gidado, T. O., & Ugochukwu, N. M. (2024). Mathematics anxiety and achievement among secondary students in Northern Nigeria. *African Journal of Psychological Studies*, 8(1), 33–50.
- Katsina State Ministry of Education. (2024). *Annual education sector report*.
- Nwankwo, C. O., Eze, U. N., & Ibrahim, A. (2025). Curvilinear relationship between test anxiety and academic performance. *Journal of Educational Psychology*, 17(2), 200–215.
- Putwain, D. W., & Daly, A. L. (2021). Test anxiety reduction strategies: A meta-analysis. *Educational Psychology Review*, 33(4), 1129–1155.
- Ramirez, G., Chang, H., Maloney, E. A., & Beilock, S. L. (2022). Emotional and cognitive dimensions of math anxiety: A cross-national study. *Journal of Educational Psychology*, 114(3), 456–470.

Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reactions to tests. *Journal of Personality and Social Psychology*, 46(4), 929–938.

Taber, K. S. (2018). The use of Cronbach's alpha in science education research. *Science & Education*, 27(3), 683–692.

Udom, G. E., & Atser, J. (2022). Continuous assessment and WAEC performance in mathematics: Evidence from Cross-River State. *Nigerian Journal of Educational Measurement*, 21(1), 78–92.