Insecurity and Students' Attitudes Toward Mathematics Learning: A Study of Secondary Schools in North East Nigeria Affected by Boko Haram Insurgency

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ABSTRACT

Insecurity as it affects education process caused by Boko Haram insurgency poses serious challenges to effective learning, particularly in mathematics. This study therefore, examined the effect of Boko Haram insurgency on senior secondary school students' attitudes toward mathematics learning in Adamawa State, North East Nigeria. A comparative survey research design was used, with a population of 4828 and sample size of 660 involving students from insurgency-affected and non-affected areas in the state. Data were collected using a validated Mathematics Attitude Questionnaire and analyzed using descriptive statistics and independent samples t-tests. Results revealed a significant difference in attitudes toward mathematics between students in insurgency-affected and non-affected areas ($t = 13.27$, $p < 0.05$). Further analyses showed significant differences based on gender ($t = 4.18$, $p < 0.05$) and school location ($t = 14.02$, $p < 0.05$), with female students and those in rural schools exhibiting more negative attitudes. The findings highlight the need for psychosocial and context-sensitive educational interventions in conflict-affected regions.

Keywords: Students, insecurity, Mathematics, Attitude, insurgency

INTRODUCTION

Among school subjects, mathematics holds a unique and strategic position because it underpins scientific reasoning, technological innovation, and problem-solving across disciplines (National Research Council, 2000). Despite its importance, mathematics learning continues to present persistent challenges for many students, particularly in developing countries. These challenges are often reflected in students' negative attitudes toward the subject, low confidence, and poor academic outcomes (Aiken, 2011; Zan & Di Martino, 2014). Attitude toward mathematics has been identified as a key psychological variable influencing students' engagement, persistence, and achievement. Students who develop positive attitudes toward mathematics are more likely to invest effort, adopt effective learning strategies, and pursue mathematics-related careers, while those with negative attitudes tend to disengage and underperform (Cheung, 2018). In fragile and conflict-affected contexts, the teaching and learning of mathematics face even more severe constraints. Armed conflict disrupts educational systems by destroying infrastructure, displacing learners and teachers, interrupting instructional continuity, and creating pervasive environments of fear and uncertainty (Cook, 2016). In such contexts, students' cognitive and emotional readiness to learn is compromised, often resulting in diminished motivation and negative learning dispositions.

In North East Nigeria, Boko Haram insurgency has emerged as one of the most devastating security challenges affecting education in recent decades. Since 2009, the insurgent group has targeted schools, teachers, and students in pursuit of its ideological opposition to western education. Reports indicate that more than 900 schools have been destroyed, thousands of students and teachers killed or abducted, and millions of learners displaced from their homes and schools (Human Rights Watch, 2014; Umukoro, 2014). Beyond physical destruction, Boko

Haram insurgency has generated a state of educational insecurity, characterized by chronic fear, instability, and psychological trauma within school communities. Educational insecurity refers not only to the absence of physical safety but also to the erosion of emotional well-being, instructional stability, and students' sense of belonging within the learning environment (Madiha, 2018). In Adamawa State, one of the epicenters of insurgency in North East Nigeria, students have experienced prolonged school closures, sudden evacuations, and recurring threats to personal safety. These conditions have profound implications for learning processes. Teaching and learning thrive in environments that are safe, predictable, and emotionally supportive. When students learn under constant threat of violence, their ability to concentrate, reason abstractly, and engage meaningfully with academic content is severely constrained (Ajayi, 2011). Mathematics learning, which requires sustained attention, confidence, and problem-solving persistence, is particularly vulnerable to such disruptions.

Attitude toward mathematics is a multidimensional construct encompassing students' beliefs about the usefulness of mathematics, their confidence in their mathematical ability, and their emotional reactions to learning the subject (Aiken, 2011). Research has consistently shown that attitude toward mathematics is closely linked to achievement and long-term participation in the subject (Mohammed & Waheed, 2019). In conflict-affected regions, students' attitudes toward mathematics may be shaped not only by classroom factors but also by broader psychosocial experiences associated with insecurity. Exposure to violence, fear of attacks, and trauma can lead to anxiety, reduced self-efficacy, and disengagement from cognitively demanding tasks (Guvr, 2001). Consequently, even when schools remain open, students may develop negative attitudes toward learning, perceiving schooling as unsafe or meaningless in the face of persistent insecurity. Despite the growing literature on education in conflict zones, empirical studies examining how insurgency influences students' attitudes toward specific subjects, such as mathematics, remain limited. Most existing studies focus on access, enrolment, or attendance, with less attention given to psychological and attitudinal dimensions of learning (Patrick & Felix, 2014). This represents a critical gap, as attitudes play a mediating role between learning environments and academic outcomes.

Gender and school location are important contextual variables that may shape students' experiences of educational insecurity. Gender disparities in mathematics attitudes and participation have been widely documented, with female students often reporting lower confidence and higher anxiety than male students (Eccles & Wang, 2020). In conflict-affected societies, girls may face additional vulnerabilities, including heightened fear, early withdrawal from school, and socio-cultural restrictions on mobility. Similarly, school location influences access to resources, quality of instruction, and exposure to insecurity. Rural schools in North East Nigeria are often more isolated, less resourced, and more vulnerable to insurgent attacks than urban schools (Ibudeh, 2020; Osalusi, 2020). These disparities may exacerbate negative attitudes toward mathematics among students in rural and insurgency-affected areas.

Against this background, the present study investigates the impact of Boko Haram insurgency on Senior Secondary School students' attitudes toward mathematics learning in Adamawa State, North East Nigeria. The study specifically examines differences in attitudes between students in insurgency-affected and non-affected areas, as well as variations based on gender and school location. By addressing these issues, the study seeks to contribute empirical evidence to debates on education in conflict zones and inform policy and practice aimed at restoring learning quality in fragile contexts.

Statement of the Problem

Despite the central role of mathematics in scientific and technological advancement, negative attitudes toward mathematics persist among secondary school students in many conflict-affected regions. In North East Nigeria, Boko Haram insurgency has severely disrupted the educational environment through school closures, destruction of learning facilities, displacement of students, and persistent insecurity. Although these disruptions are well documented, most existing studies have focused primarily on access-related indicators such as enrolment and attendance, with limited empirical attention to the attitudinal consequences of educational insecurity.

Negative attitudes toward mathematics are associated with low motivation, avoidance behaviours, and poor academic performance. In insecure learning environments characterized by fear, trauma, and instability, students' confidence and interest in mathematics may be significantly undermined. These effects may be further

compounded by gender and school location, as female students and those in rural schools often face greater vulnerability in conflict contexts. The lack of empirical evidence on how Boko Haram insurgency influences students' attitudes toward mathematics limits the development of effective psychosocial and instructional interventions. This study therefore seeks to address this gap by examining the effect of Boko Haram insurgency on senior secondary school students' attitudes toward mathematics learning in Adamawa State, North East Nigeria.

Research Objectives

The main objective of this study is to examine the effect of Boko Haram insurgency on senior secondary school students' attitudes toward mathematics learning in Adamawa State.

The specific objectives are to:

1. determine whether there is a significant difference in attitudes toward mathematics learning between students in Boko Haram insurgency-affected and non-affected areas;

2. examine whether there is a significant difference in attitudes toward mathematics learning between male and female students in insurgency-affected areas;

3. assess whether there is a significant difference in attitudes toward mathematics learning between students in urban and rural secondary schools.

Research Questions

The study is guided by the following research questions:

1. What difference exists in attitudes toward mathematics learning between senior secondary school students in Boko Haram insurgency-affected and non-affected areas?

2. What difference exists in attitudes toward mathematics learning between male and female students in Boko Haram insurgency-affected areas?

3. What difference exists in attitudes toward mathematics learning between students in urban and rural secondary schools?

Research Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H_{01}: There is no significant difference in the attitudes toward mathematics learning of senior secondary school students in Boko Haram insurgency-affected areas and those in non-affected areas of Adamawa State.

H_{02}: There is no significant difference in the attitudes toward mathematics learning of male and female senior secondary school students in Boko Haram insurgency-affected areas of Adamawa State.

H_{03}: There is no significant difference in the attitudes toward mathematics learning of senior secondary school students in urban and rural secondary schools in Adamawa State.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Armed Conflict and Education in Fragile Contexts

Armed conflict has long been identified as one of the most significant threats to educational development globally. Studies across conflict-affected regions consistently show that insecurity disrupts schooling through the destruction of infrastructure, displacement of learners and teachers, interruption of instructional time, and

deterioration of learning quality (UNESCO, 2018; Cook, 2016). In fragile contexts, schools are not only sites of learning but also symbolic targets, making them particularly vulnerable during insurgencies. In sub-Saharan Africa, the impact of conflict on education has been severe, with millions of children denied access to schooling due to violence and instability. Research indicates that even when schools remain operational, exposure to violence generates psychological distress that undermines students' ability to engage meaningfully with learning tasks (Madiha, 2018). Fear, anxiety, and trauma associated with conflict have been linked to reduced concentration, impaired memory, and diminished motivation, all of which negatively affect academic performance (Ajayi, 2011). In Nigeria's North East, Boko Haram insurgency represents a unique form of educational disruption because of its ideological opposition to western education. The group's deliberate targeting of schools has resulted in prolonged closures, loss of trained teachers, and mass displacement of learners (Human Rights Watch, 2014; Umukoro, 2014). These conditions have fundamentally altered the learning environment, creating persistent uncertainty and fear within school communities.

Educational Insecurity and Learning Experiences

The concept of educational insecurity extends beyond physical danger to include emotional, psychological, and instructional instability. Educational insecurity exists when students and teachers are unable to predict the continuity of schooling due to threats of violence, displacement, or infrastructural collapse (Madiha, 2018). In such environments, learning becomes fragmented and often secondary to survival concerns. Empirical studies suggest that educational insecurity weakens students' attachment to schooling and erodes their intrinsic motivation to learn. Shan (2017) argues that repeated exposure to insecurity conditions students to associate schooling with fear and vulnerability rather than safety and personal development. This association may foster avoidance behaviors, absenteeism, and negative attitudes toward academic tasks. Mathematics learning is particularly sensitive to educational insecurity because it requires sustained cognitive engagement, abstract reasoning, and confidence in one's abilities. When students experience fear or emotional distress, their working memory and problem-solving capacity are compromised, leading to frustration and disengagement (National Research Council, 2000). Consequently, prolonged insecurity may gradually shape students' perceptions of mathematics as difficult, threatening, or irrelevant.

Attitude Toward Mathematics Learning

Attitude toward mathematics is a well-established construct in mathematics education research. It is commonly defined as a learned predisposition to respond favorably or unfavorably to mathematics, encompassing cognitive beliefs, affective responses, and behavioral tendencies (Aiken, 2011; Bohner & Wank, 2014). These components interact to influence how students approach mathematical tasks, persist through challenges, and evaluate their own competence.

Several studies have demonstrated that students' attitudes toward mathematics are strong predictors of engagement and achievement. Cheung (2018) found that positive attitudes toward mathematics were associated with higher levels of effort and persistence, while negative attitudes were linked to avoidance and poor performance. Mohammed and Waheed (2019) further identified mathematics anxiety, self-efficacy, and prior learning experiences as key attitudinal factors influencing achievement. Attitudes toward mathematics are shaped by a range of factors, including teaching methods, classroom climate, parental support, and socio-cultural expectations (Furinghetti & Pekhonen, 2016). In contexts where learning environments are unstable or threatening, these attitudinal determinants may be negatively reinforced. Students who repeatedly experience disrupted lessons, teacher absenteeism, or fear of attacks may develop unfavorable dispositions toward mathematics regardless of their cognitive ability.

Gender Differences in Mathematics Attitudes

Gender differences in mathematics attitudes and participation have been widely reported across cultures. Research suggests that female students often exhibit lower confidence and higher anxiety toward mathematics than male students, particularly in societies where mathematics is socially constructed as a male domain (Eccles & Wang, 2020). These differences are not solely biological but are shaped by socialization, expectations, and classroom interactions. In conflict-affected regions, gender disparities may be intensified due to heightened

vulnerability of girls to insecurity. Girls may face additional barriers such as restricted mobility, increased domestic responsibilities, and early withdrawal from school during periods of instability (Kost-Smith et al., 2021). Exposure to violence and fear may therefore disproportionately affect female students' attitudes toward learning, including mathematics. Empirical evidence from Nigeria indicates that female students in insecure environments are more likely to develop negative attitudes toward schooling and academic subjects, particularly those perceived as difficult (Philip, 2015). Understanding gender-based differences in attitudes toward mathematics is therefore essential for designing targeted interventions in conflict-affected settings.

School Location and Learning Disparities

School location remains a critical determinant of educational quality and learning outcomes in developing countries. Urban schools generally benefit from better infrastructure, access to instructional materials, qualified teachers, and supportive learning environments compared to rural schools (Adabu, 2019; Osalusi, 2020). Rural schools, by contrast, often face challenges such as inadequate facilities, large teacher shortages, and limited access to educational resources. In conflict-affected regions, rural schools are often more exposed to insurgent attacks due to their isolation and limited security presence. Studies indicate that students in rural conflict zones experience higher levels of educational disruption and psychological distress than their urban counterparts (Ibudeh, 2020). These conditions may foster negative attitudes toward learning and reduce students' engagement with cognitively demanding subjects such as mathematics. Research by Owoeye (2021) found that students in rural schools consistently recorded lower achievement and less positive attitudes toward mathematics than those in urban schools. These findings suggest that school location interacts with insecurity to shape students' learning experiences and dispositions.

Theoretical Framework

This study is grounded in three complementary theoretical perspectives: the Theory of Violence, the Theory of Fear, and the Theory of Attitude Formation and Change.

Theory of Violence

The Theory of Violence, proposed by Galtung (1972), conceptualizes violence as both direct and structural. Direct violence involves physical harm, while structural violence refers to social conditions that systematically disadvantage individuals or groups. Boko Haram insurgency represents both forms of violence, as it directly targets schools and indirectly undermines educational opportunities through fear, displacement, and institutional breakdown. This theory provides a framework for understanding how insurgency disrupts the educational system and learning environment.

Theory of Fear

The Theory of Fear explains fear as an emotional response to perceived threats that triggers physiological and psychological reactions aimed at self-preservation (Guvr, 2001). While fear may be adaptive in immediate danger, prolonged exposure to fear impairs cognitive functioning and emotional regulation. In educational contexts, chronic fear undermines concentration, problem-solving, and motivation. This theory is relevant to the present study because Boko Haram insurgency creates persistent fear that affects students' readiness to engage in mathematics learning.

Theory of Attitude Formation and Change

The Theory of Attitude Formation and Change, proposed by Freeman, Carlsmith, and Sears (1974), posits that attitudes are learned through experience, reinforcement, and social interaction. Repeated negative experiences, such as disrupted schooling and fear-inducing environments, may lead students to develop unfavorable attitudes toward learning tasks. This theory explains how educational insecurity can shape students' attitudes toward mathematics over time.

Together, these theoretical perspectives explain how Boko Haram insurgency creates violent and fear-laden educational environments that influence students' experiences and shape their attitudes toward mathematics

learning. The framework provides a basis for examining differences in attitudes across insurgency exposure, gender, and school location.

METHODOLOGY

The study adopted a comparative survey research design, suitable for examining differences in students' attitudes toward mathematics across groups. This design enabled comparisons between students in Boko Haram insurgency-affected and non-affected areas, as well as subgroup analyses based on gender and school location.

The population for the study comprised all the 4,828 public Senior Secondary two students in Adamawa State, North East, Nigeria from 42 senior secondary two schools for the 2023/2024 academic session. The 42 senior secondary two schools were made up of 24 senior secondary schools from the urban areas and 18 senior secondary schools from the rural settings. The reason for choosing Adamawa State, North East, Nigeria, was because of the frequent Boko Haram Insurgency attacks on secondary schools in many parts of the State which often leads to the closure of the schools for a period of time. SS II students were selected because they had adequate exposure to secondary school mathematics instruction and had developed relatively stable attitudes toward the subject, while not yet being influenced by terminal external examinations.

A multistage sampling technique was employed. Five local government areas most affected by Boko Haram insurgency namely; Madagali, Michika, Mubi North, Mubi South, and Maiha, were selected using purposive sampling technique. Comparable local government areas not directly affected by insurgency such as; Hong, Song, and Gombi were selected as control locations. Schools were stratified by urban and rural location, after which students were randomly selected. A total sample of 660 students, comprising both male and female students from insurgency-affected and non-affected areas, participated in the study.

Data were collected using a Mathematics Attitude Questionnaire (MAQ) adapted to the Nigerian context. The instrument measured four dimensions of attitude toward mathematics: interest, confidence, perceived usefulness, and emotional response. Items were rated on a four-point scale ranging from Strongly Disagree (1) to Strongly Agree (4), with higher scores indicating more positive attitudes. The instrument was validated through expert review to establish content and face validities. Reliability was determined using Cronbach's alpha, yielding a coefficient of 0.82, indicating high internal consistency (George & Mallery, 2019). Data were analyzed using descriptive statistics (mean and standard deviation) and independent samples t-tests to examine differences based on insurgency attacks, gender, and school location at the 0.05 level of significance.

RESULTS

Table 1

Mean Attitude Scores of Students Toward Mathematics Based on Insurgency Exposure

Group	N	Mean	SD	t-value	p-value
Insurgency Affected Areas	320	2.41	0.58		
Non-Affected Areas	340	3.12	0.64	13.27	<0.05

The results in Table 1 show a statistically significant difference in students' attitudes toward mathematics between insurgency-affected and non-affected areas. Students in non-affected areas recorded significantly higher mean attitude scores than those in affected areas. The first hypothesis (H_{01}) stated that there is no significant difference in attitudes toward mathematics learning between students in Boko Haram insurgency-affected areas and those in non-affected areas of Adamawa State. The independent-samples t-test result ($t = 13.27$, $p < 0.05$) shows that the difference in mean attitude scores between the two groups is statistically significant. This implies that male and female students do not experience or respond to educational insecurity in the same way regarding

mathematics learning. Specifically, female students in insurgency-affected areas tend to show more negative attitudes than male students.

Table 2 Gender Differences in Attitude Toward Mathematics in Insurgency-Affected Areas

Gender	N	Mean	SD	t-value	p-value
Male	165	2.56	0.55		
Female	155	2.27	0.60	4.18	<0.05

Table 2 reveals a statistically significant difference between male and female students' attitudes toward mathematics in insurgency-affected areas. Male students demonstrated more positive attitudes toward mathematics than female students. The second hypothesis (H_{02}) proposed that there is no significant difference in attitudes toward mathematics learning between male and female students in insurgency-affected areas. The test result ($t = 4.18$, $p < 0.05$) indicates a significant gender-based difference. This implies that male and female students do not experience or respond to educational insecurity in the same way regarding mathematics learning. Specifically, female students in insurgency-affected areas tend to show more negative attitudes than male students.

Table 3 Attitude Toward Mathematics by School Location

School Location	N	Mean	SD	t-value	p-value
Urban Schools	310	3.05	0.61		
Rural Schools	350	2.38	0.59	14.02	<0.05

The results in Table 3 indicate a statistically significant difference in students' attitudes toward mathematics based on school location. Students in urban schools recorded significantly higher attitude scores than those in rural schools. The third hypothesis (H_{03}) stated that there is no significant difference in attitudes toward mathematics learning between students in urban and rural secondary schools. The result ($t = 14.02$, $p < 0.05$) shows a statistically significant difference between these groups. This implies that school location is a strong factor associated with students' mathematics attitudes. Students in rural schools tend to demonstrate more negative attitudes than those in urban schools.

FINDINGS

The results of the study reveal that:

1. Boko Haram insurgency significantly affects students' attitudes toward mathematics learning.
2. Gender plays a significant role, with female students exhibiting more negative attitudes in insurgency-affected areas.
3. School location significantly influences attitudes, with rural students showing lower attitude levels than urban students.

DISCUSSION

The findings of this study provide strong empirical evidence that Boko Haram insurgency significantly undermines Senior Secondary School students' attitudes toward mathematics learning in Adamawa State, North

East Nigeria. Students in insurgency-affected areas demonstrated substantially lower levels of interest, confidence, and emotional engagement with mathematics compared to their counterparts in non-affected areas. This result aligns with existing research on education in conflict zones, which emphasizes that insecurity and violence disrupt not only access to schooling but also the psychological conditions necessary for effective learning (Cook, 2016; UNESCO, 2018).

The negative attitudes observed among students exposed to insurgency can be explained through the Theory of Fear. Persistent exposure to threat and uncertainty creates chronic anxiety, which impairs cognitive functioning and emotional regulation (Guvr, 2001). Mathematics learning, which requires sustained attention, problem-solving persistence, and confidence, is particularly vulnerable under such conditions. Students who associate schooling with fear and instability may gradually disengage from cognitively demanding subjects, perceiving them as overwhelming or irrelevant to immediate survival concerns.

The findings also support the Theory of Violence (Galtung, 1972), which conceptualizes insurgency as both direct and structural violence. While Boko Haram's attacks represent direct violence against schools and learners, the resulting school closures, teacher shortages, and instructional disruptions constitute structural violence that systematically undermines educational opportunities. These conditions erode students' learning experiences over time, contributing to the development of negative attitudes toward mathematics.

Gender-based differences in attitudes toward mathematics were also evident, with female students in insurgency-affected areas exhibiting more negative attitudes than their male counterparts. This finding is consistent with studies indicating that girls often experience higher levels of mathematics anxiety and lower self-efficacy, particularly in contexts characterized by instability and socio-cultural constraints (Eccles & Wang, 2020). In conflict-affected regions, girls may face additional vulnerabilities, including restricted mobility, early withdrawal from school, and heightened fear of violence, all of which may intensify negative learning dispositions.

School location further moderated students' attitudes toward mathematics. Students in rural schools recorded significantly lower attitude scores than those in urban schools. This result corroborates previous studies highlighting disparities in educational resources and learning environments between rural and urban schools (Ibudeh, 2020; Owoeye, 2021). In insurgency-affected regions, rural schools are often more exposed to attacks and lack adequate security and psychosocial support services, compounding the negative effects of educational insecurity on students' attitudes.

Overall, the rejection of all three null hypotheses confirms that insurgency exposure, gender, and school location significantly shape students' attitudes toward mathematics learning. The findings suggest that negative attitudes toward mathematics in conflict-affected regions are not solely academic in origin but are deeply embedded in broader psychosocial and structural conditions. Addressing these challenges therefore requires interventions that extend beyond curriculum delivery to include psychosocial support, safe learning environments, gender-sensitive strategies, and targeted support for rural schools.

CONCLUSION

This study examined the impact of Boko Haram insurgency on Senior Secondary School students' attitudes toward mathematics learning in Adamawa State, North East Nigeria.

The findings demonstrate that educational insecurity associated with insurgency significantly undermines students' attitudes toward mathematics. Gender and school location further shape these outcomes, with female students and those in rural schools experiencing greater negative effects.

The study contributes to the literature on education in conflict zones by moving beyond issues of access and enrolment to examine the attitudinal dimensions of learning. The study highlights the long-term educational consequences of insecurity in fragile contexts by focusing on mathematics, a core subject critical for scientific and technological development.

RECOMMENDATONS

The findings of this study have important implications for educational policy and practice in conflict-affected regions.

First, educational recovery efforts must extend beyond rebuilding physical infrastructure to address the psychosocial needs of learners. Counseling services, trauma-informed teaching practices, and school-based mental health interventions should be integrated into post-conflict educational planning.

Second, targeted interventions are needed to support female students, who appear to be more vulnerable to the negative attitudinal effects of insecurity. Gender-sensitive counseling programs and community engagement initiatives can help address fear, anxiety, and low self-confidence among girls.

Third, rural schools require special attention due to their heightened vulnerability to insurgency and limited access to resources. Policymakers should prioritize the provision of qualified mathematics teachers, learning materials, and security measures in rural conflict-affected schools.

Finally, mathematics teachers should be supported through professional development programs that emphasize positive attitude formation, learner-centered pedagogies, and strategies for teaching mathematics in challenging environments.

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