



THE INFLUENCE OF KIDNAPPING AND BANDITRY ON MATHEMATICS ACHIEVEMENT IN SELECTED SECONDARY SCHOOLS IN ZAMFARA COMPARE TO GOMBE STATES.

Hassan Muhammad

Department of Mathematics
Federal University of Education Kontagora Niger State
profmaths781@fckg.edu.ng
08080404040
[ORCID iD: 0009-0007-0095-1489](https://orcid.org/0009-0007-0095-1489)

And

Niyi Olonrunsola Oriola (PhD)

Department of Mathematics
Federal University of Education Kontagora Niger State.

And

Angel Otse Ogbu

Department of Mathematics Education.
Federal College of Education (Tech) Bichi, Kano State

And

Sadik Hamagam

School of Genaral Studies Department of Mathematics.
Federal College of Education (Tech) Gombe, Gombe State.

Abstract

Environmental insecurity poses a growing challenge to educational systems in conflict-affected regions, yet its implications for mathematics achievement remain under-examined in comparative contexts. This study examined the influence of environmental insecurity--specifically kidnapping and banditry--on senior secondary school students' mathematics achievement in Nigeria, using a comparative analysis of Zamfara State (high insecurity) and Gombe State (relatively low insecurity). A comparative cross-sectional survey design was employed. Data were collected from 300 students and 36 mathematics teachers drawn from 18 public secondary schools using a Mathematics Achievement Test and an Environmental Insecurity Questionnaire. Descriptive statistics and Chi-square tests were used for analysis. The findings revealed a substantial and statistically significant disparity in mathematics achievement between the two states, with students in Zamfara recording markedly lower achievement than their counterparts in Gombe. Environmental insecurity was significantly associated with mathematics achievement, indicating that academic performance varied systematically by security context. Gender-disaggregated analysis showed that female students in Zamfara were more adversely affected than male students, whereas no meaningful gender differences were observed in Gombe. Further analysis by school location indicated that rural schools experienced more severe learning disruptions than urban schools, although urban students were also affected, primarily through insecurity encountered during travel to school. The study concludes that environmental insecurity undermines mathematics achievement through intersecting mechanisms involving instructional disruption, gender vulnerability, and rural disadvantage. Addressing educational underachievement in high-risk regions therefore requires integrated education and security interventions, with targeted support for rural schools and female learners.



Keywords: environmental insecurity, mathematics achievement, secondary education, gender differences; rural schools.

Introduction

Insecurity especially in its connotation of kidnapping and banditry has become a rising menace to education sector in Nigeria especially in the northern states such as Zamfara. The overall effects of these security issues are the closure of schools, disrupted learning, and teaching, and they have caused both students and teachers to suffer psychological stress. Specifically, some of the subjects like mathematics which are based on sequential and continuous teaching have been at a grave disadvantage. The schooling climate in Zamfara has been marked by intermittent school attendance, time wastage during school and the general drop in performance in school.

Although the consequences of insecurity in war torn areas like Zamfara have been harsh, the situation is still better in more stable countries like Gombe. Schools in such regions are still open, students are very regular and classes are running in a normal way with little interruption. This sharp contrast of Zamfara and Gombe offers a critical background on the importance of different degrees of lack of security and its role in the academic achievement of students especially in mathematics.

It has been demonstrated in earlier research that insecurity can have serious consequences on education, and school attendance and teaching processes result in low academic performance (Burde et al., 2017; Justino, 2016). In addition, the psychological impact of an unstable environment (increased stress and anxiety) also negatively affect the learning potential of students (Vogel et al., 2016).

Nonetheless, the literature still has a gap in the sense of the specific impact of insecurity on the mathematics performance in the regions of different safety levels.

The aim of this study is to fill this gap by considering how insecurity affects the performance of students studying mathematics in Zamfara and Gombe which have very high insecurity rates respectively and have relatively low insecurity levels respectively. This research will inform on the effect of insecurity on mathematics learning by looking at the causes of educational disruptions including school closures, teacher absenteeism, and psychological stress among school-going children and adolescents. Moreover, it will indicate the necessity of the specific intervention to reduce the negative impact of insecurity and enhance the academic performance of students living in the high-risk areas.

Educational insecurity as a structural condition of schooling. The issue of educational insecurity has gradually taken a structural form as a phenomenon that transforms schooling systems instead of a transitional phenomenon. The schools in conflict-prone areas are run with a constant threat that jeopardises the stability of the institution as well as the social credibility. Similar investigations conducted on African settings reveal that a normalized violence around schools leads to a long-term loss in governance, enrolment, and continuity of instruction in education systems (Ansell et al., 2020; Burde et al., 2017). Forms of insecurity in Northern Nigeria include kidnapping, banditry, and armed attacks that are disproportionately affecting the rural and peripheral areas.



Such threats change the household decision-making whereby families put schooling against physical safety, which will mostly entail a delayed or a total abandonment of formal education (Ikpi, 2022; Justino, 2016). These choices are not single but cumulative leading to structurally disproportionate access to learning.

System level studies indicate that insecurity distort the education focus towards the crisis management at the expense of the pedagogical development. Burde et al. (2017) posit that conflict-impacted systems are characterized by the focus on survival instead of instructional coherence, decreased supervision, curriculum supervision, and long-term planning. This distortion of structures limits the capacity to maintain quality learning in a system despite the schools being open.

Even comparative evidence shows that stable regions continue with education during conditions that are opposing. In environments where insecurity is low, schools are better placed to have predictable academic timetables, compulsory attendance and have routines that uphold the teaching schedule (Ikpi, 2022). These comparisons highlight how the environmental conditions influence the learning outcomes and not the ability of individual.

Structurally insecure systems are particularly at risk of mathematics education. The topic is based on progressive development, continuity and abstraction-circumstances that are methodically disturbed in unsteady schooling settings (Ashcraft and Krause, 2007). As a result, a long term disadvantage

to mathematics learners in affected areas is created by insecurity.

Instructional Time Loss and Absence. The student suffers from disruption, and the teacher cannot deliver the lesson effectively (Harrison, 2009). One of the shortest-term effects of insecurity on learning is attendance disruption. Insecure settings prevent frequent school attendance due to the fear of violence, which results in habitual absenteeism and discontinuous learning processes (Ikpi, 2022; Justino, 2016). Such disturbances have been especially harmful in mathematics, where late classes undermine background knowledge.

In addition to individual absenteeism, insecurity often leads to long term school shutdowns. The fact-based evidence demonstrates that when instructional time is lost, it leads to a serious decrease in the coverage of the curriculum and the possibility of reinforcement and remediation (Mora et al., 2024). Such disruptions are particularly sensitive to mathematics learning, which is based on sequential exposure and practice.

The reaction of teachers to the loss of time is often compression of the syllabi or the absence of cognitively challenging topics. Although they are aimed at saving academic schedules, such adaptations negatively affect the depth of concepts and strengthen the pattern of superficial learning, which leads to the ongoing achievement gaps between insecure and stable areas (Mora et al., 2024).

Psychological Stress, Cognitive Load, and Mathematics Anxiety. Psychological implications of insecurity have far-reaching impacts on the cognitive ability of students



in learning. Unremitting exposure to threat and uncertainty results in chronic stress and trauma that dysfunction in attention, working memory, and executive functioning (Betancourt et al., 2014; Mutu, 2023). Mathematical reasoning and problem-solving is based on these cognitive processes.

Studies on learning in stress show that an increased cortisol level has adverse impacts on memory consolidation and cognitive flexibility, which leads to a lower capacity in students to study the difficult academic content (Vogel et al., 2016). This is experienced in mathematics in the form of difficulty with multi-step processes and abstract relationship.

Academic motivation and persistence also reduces as a result of trauma exposure. Violence victims tend to shun intellectually stimulating activities and form negative views of themselves as learners, which perpetuates loops of poor performance (Mutu, 2023).

The relationship between anxiety and insecurity is further mediated by mathematics anxiety and performance. Anxiety leads to the use of working-memory resources which are used in calculation and reasoning, and thus, worsened task performance is found in both competent and incompetent learners (Ashcraft and Krause, 2007; Carey et al., 2016).

As far as longitudinal evidence indicates that mathematics anxiety is bidirectionally related to mathematics achievement, with poor performance supporting anxiety and the other way round (Dowker et al., 2016). Emotional instability and instructional

disruption elevate this feedback loop in insecure settings.

Conversely, the cognitive preparedness, resilience, and long-term involvement in mathematical problem-solving are supported by emotionally secure learning conditions, which demonstrate the indirect but strong influence of psychological safety on mathematics performance (Vogel et al., 2016).

Teachers, Infrastructure, and Instructional Capacity; Teachers are the key mediating factor in the definition of the influence of insecurity on learning. Safety issues in dangerous areas lower the morale of the teachers, raise the absenteeism rates, and drive skilled educators away or out of the jobs (Olujuwon et al., 2024). These limits especially influence mathematics teaching which involves accuracy and consistent instruction.

Inequalities in patterns of deployment enhance the losses in teacher quality. Studies indicate that the less privileged and insecure schools are more prone to the lack of skills teachers and consequent deterioration of the instructional rigor and learning outcomes (Hanushek and Rivkin, 2012).

Professional development and instructional supervision are also limited by insecurity. Pedagogical practices cannot improve without regular support, which restrains the possibility of providing learners with mathematics instruction that is learner-centred and conceptually rich (Burde et al., 2017).

The destruction of physical infrastructure also compromises the ability to instruct. Armed conflict usually destroys learning



classrooms and learning materials, resulting in overcrowded and under-resourced learning conditions that cannot be effectively used to teach and evaluate (Nnaji et al., 2022). Stable regions, on the contrary, hold the material and institutional resources required to ensure long-term high-quality instruction.

Statement of the Problem

Insecurity, especially kidnapping and banditry has stood out as one of the worst impediments to education in Nigeria, especially in such states as Zamfara. These security issues interfere with the schooling process by closing the school, being absent and by causing more psychological pressure on the students, especially on those subjects which need continuity, such as mathematics. Although some measures have been adopted, including the heightened level of security in schools and community based programs, the effect of insecurity on academic performance has not completely been countered. Although literature has been providing information on how insecurity affects education in conflict zones (Burde et al., 2017; Justino, 2016), there is no study that compares the impact of insecurity on mathematics performance of the area with high insecurity with those with low levels of insecurity, especially in northern Nigeria. The proposed study seeks to fill this gap by comparing Zamfara (high insecurity) with Gombe (low insecurity) in terms of the effect of insecurity on math performance. It will identify the effects of insecurity on learning among students, such as the disturbances in learning, rising stress, and the gender effect. The identification of these mechanisms will lead to the suggestion of specific interventions in the study to enhance the outcomes of education in the high-risk areas.

Objectives of the Study

The following objectives guided the study

- 1 To explore the impact of insecurity, especially kidnapping and banditry, on the performance of mathematics among students in secondary schools in Zamfara State.
- 2 To compare students' achievement in mathematics in insecurity prone Zamfara and Gombe State where the insecurity levels are relatively lower.
- 3 To explore psychological, social and educational processes, in which the insecurity can influence mathematics learning and performance among students in secondary school
- 4 To investigate the gender differences in mathematics achievement among students in Zamfara and Gombe, exploring how insecurity influences male and female students differently in the context of high and low insecurity regions.

Research Questions

The following Research questions guided the study:

- 1 What is the effect of insecurity, particularly kidnapping and banditry, on mathematics performance among high school students in Zamfara state?
- 2 What are the differences between the mathematics performance of Zamfara (high insecurity) and Gombe state (low insecurity) students?
- 3 How does insecurity influence mathematics learning and performance among students in psychological, social, and educational processes?



- 4 How do gender differences in mathematics achievement manifest in regions with, to compare academic results within the regions at one time and to find statistically significant differences in accordance with contextual insecurity without causal assertions.

Methodology

The present research followed a comparative cross-sectional survey design to explore the role of environmental insecurity, which is the kidnapping and bandits, on the mathematics performance among students in two states with different security profiles in Nigeria; that is, Zamfara State (high level of insecurity) and Gombe State (relatively low level of insecurity). It was a good design to compare academic results within the regions at one time and to find statistically significant differences in accordance with contextual insecurity without causal assertions.

The research population was the senior secondary school students and the male mathematics teachers in the public secondary schools within Zamfara and Gombe States. The stratified random sampling method was used. The schools were initially stratified into urban and rural to make them representative. Out of the sampling frame, 18 public secondary schools were picked (9 schools in each state).

The study involved 300 students (150 students of Zamfara and 150 students of Gombe). Furthermore, 36 mathematics teachers were also involved to give some contextual information regarding disruption in instruction and conditions of learning. The sample size of students was

regarded as sufficient to conduct comparative statistical analysis but teacher data were applied to the contextual triangulation instead of inferential test.

Data collection was done using two instruments:

The highest level of performance was observed in mathematics Achievement Test (MAT): A test made by a researcher to evaluate the achievement of the students on the core senior secondary mathematics topics in line with national curriculum.

Environmental Insecurity Questionnaire (EIQ): An administered questionnaire of a 4-point Likert scale (Strongly Agree-Strongly Disagree) format to obtain the experience of the students in terms of insecurity, such as fear of being kidnapped, school closures, teacher absenteeism, and their feeling of safety in the school. Administrative coordination and follow-up communication were conducted through standard institutional channels.

Expert evaluation was used to determine the content validity of the instruments by three specialists in mathematics education and educational psychology who evaluated the relevance of the items, clarity, and suitability of the items with the study objectives. Each instrument was individually determined as reliable:

Achievement test of Mathematics was evaluated with the help of the Kuder-Richardson Formula (KR-21), which resulted in a very high coefficient of reliability, 0.87.

Cronbach Alpha was used to test the Environmental Insecurity Questionnaire, and the value of the coefficient was found to be greater than the acceptable level of



0.70, which proved that the questionnaire could be applied to survey research.

The process of data collection was carried out in two weeks. The Mathematics Achievement Test was also conducted on a standardized classroom setting to provide uniformity. The Environmental Insecurity Questionnaire was administered and received on the same day, immediately after a test, as a way of reducing the bias of answering. The purpose of the study was explained to the participants who were assured of confidentiality.

Descriptive statistics (means and standard deviations) were used to analyze the data to summarize the indicators of insecurity and mathematics achievement of students. The chi-square tests were used to test the relationship existing between the environmental insecurity variables and mathematics attainment of students across states, gender, and geographical features (urban/rural) with a 0.05 level of significance. Since the study was cross-

sectional, the results were taken to mean associational and not causal.

Ethical Considerations

The study had ethical standards that were adhered to. All data were used only in academic purposes and all the participants were informed about the study and provided informed consent, all coded identifiers were used to protect anonymity, and all data were used voluntarily.

Results

Research Question 1; What is the effect of insecurity, particularly kidnapping and banditry, on mathematics performance among high school students in Zamfara state?

Descriptive statistics were employed to answer Research Question 1 because the study aimed to compare mathematics achievement scores of high-insecurity (Zamfara State) and low-insecurity (Gombe State) students. Table 1 provides the results.

Table 1: Mathematics Achievement by State

State	N	Mean Score (%)	Standard Deviation
Zamfara	150	54.2	13.6
Gombe	150	86.4	9.8
Total	300	—	—

Table 1 shows a pronounced difference in mean mathematics achievement scores between the two states, with students in Gombe achieving substantially higher scores than students in Zamfara.

To determine whether this difference was statistically significant, a Chi-square test of association between environmental insecurity and mathematics achievement was conducted in (Table 2)

Table 2: Chi-Square Test of Association between Environmental Insecurity and Mathematics Achievement

Test	Value	Df	p-value
Pearson Chi-Square	6.982	1	0.008
Likelihood Ratio	7.214	1	0.007
Continuity Correction	6.103	1	0.014



The Chi-square results indicate a statistically significant association between environmental insecurity and mathematics achievement at the 0.05 level.

Research Question 2; What are the differences between the mathematics performance of Zamfara (high insecurity) and Gombe state (low insecurity) students?

Table 3: Mathematics Achievement by Gender and State

State	Gender	N	Mean Score (%)
Zamfara	Male	75	58.1
Zamfara	Female	75	50.3
Gombe	Male	75	86.7
Gombe	Female	75	86.1

Table 3 indicates a noticeable gender gap in mathematics achievement in Zamfara State, where female students recorded substantially lower mean scores than male students. In contrast, minimal gender differences were observed in Gombe State.

Research Question 4; What environmental insecurity factors are associated with students' mathematics achievement?

To examine the insecurity-related factors affecting mathematics achievement, students' responses to the Environmental Insecurity Questionnaire were analyzed. The results are presented in Table 5.

Table 4: Students' Exposure to Environmental Insecurity Factors by State

Insecurity Indicator	Zamfara (%)	Gombe (%)
Fear of kidnapping	88	24
School closures due to insecurity	82	19
Teacher absenteeism	74	28
Insecurity during travel to school	79	31
Inadequate security within school	81	22
Disrupted learning schedule	85	20

Table 5 shows that students in Zamfara experienced markedly higher exposure to all insecurity indicators. Although students in Gombe also reported insecurity particularly during travel the frequency and intensity were considerably lower.

Discussion

This research shows that there is a wide gap in the performance of mathematics among the students in Zamfara which is a high insecurity area and also Gombe which is a low insecurity area. The performance of students in Zamfara was significantly poor in mathematics, which Burde et al. (2017) and Justino (2016) also confirmed, noting frequent cases of school shutdown and teacher absenteeism in the conflict areas,

which deteriorates academic achievement. The Chi-square test (Table 2) shows that this difference is statistically significant, which confirms the claim that environmental insecurity has a direct implication on the education of students. As Ashcraft and Krause (2007) point out, anxiety created by insecurity adversely affects cognitive abilities including working memory that is very important in mathematical thinking.

Gender-related unbalance also existed in Zamfara, as female learners achieved lower results better than male learners; which is consistent with Burde et al. (2017), who discovered that female learners in conflict areas are more vulnerable to mobility



problems and violence. The difference between the genders was on the other hand minimal in Gombe where there was stability that alleviated gender differences during education. This achievement gap between rural and urban Zamfara was especially high, with low performance being the worst in rural students. This is consistent with other researchers, who found that rural schools in conflict areas encounter more issues with educational disruptions because of poor infrastructure and security issues (Harrison, 2009 and Morales et al., 2024). This difference was less in Gombe, which indicated that the lower level of insecurity provided more fair educational opportunities.

Also, Zamfara students reported more exposure to insecurity factors, including fear of kidnapping and distorted learning schedules, which is consistent with Ikpi (2022) and Justino (2016), who recorded that insecure regions increase the likelihood of students being affected by disruption factors that hamper learning. The role of psychological stress, as the aforementioned sources by Betancourt et al. (2014), Vogel et al. (2016), and Mutu (2023) imply, is also critical, as the intellectual and emotional preparedness to learn is undermined by the influence of trauma and anxiety in subjects of high cognitive load, such as mathematics.

Conclusion

This paper has shown that the environmental insecurity has large negative effects on the performance of the students in mathematics and there are sufficiently higher impacts of the same in the Zamfara State than in a rather secure Gombe State. The long-term exposure to kidnapping, banditry and school disturbances destroy the continuity of instruction and worsen the lack of instruction in mathematics. It is also found that female students together with students in rural schools are

disproportionately impacted upon with the urban students being affected comparatively less, which are mostly during school travel. Though the problem of insecurity is a universal concern in all schools, the extent of its impact differs depending on the place of study, sex, and security situation, which support the assertion that educational performance is directly related to the environmental safety situation.

Recommendations

Based on the findings of this study, targeted interventions are needed to address the negative impact of insecurity on mathematics achievement, particularly in high-risk areas like Zamfara. This section provides key recommendations aimed at improving school security, supporting vulnerable students, and ensuring continuity in mathematics education to enhance academic performance in conflict-affected regions.

- I. To achieve the safe and uninterrupted learning in the schools, the education authorities should intensify security around schools in areas where there is high insecurity especially in rural communities.
- II. Interventions such as safe transportation and community-based protection programs should be done in such a way that the disproportionate effect of insecurity on female students is minimized.
- III. Specific investment in rural schools, including better facilities and teacher development and remedial mathematics courses are necessary to counter the increased vulnerability of village schools.
- IV. Mathematical catch-up and remediation programmes based on structured catch-up should be implemented to make up the instructional time lost as a result of disruptions related to insecurity.



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