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# Security Awareness and Safe Science Learning Environment Among Secondary School Students in Uyo, Akwa Ibom State, Nigeria

Daniel Effiong Uboh[1]*
Rita Uduak Udoette[2]
GloryEdet Jonah[3]
Chukwudi Magnus Duru (Ph.D)[4]

*Department of Science Education, Akwa Ibom State University, Ikot Akpaden, Mkpat Enin, Akwa Ibom State, Nigeria
Corresponding mail id : ubohdaniel@gmail.com

**Abstract**

*A safe and secure learning environment is essential for effective science education because students require a supportive environment in which they can participate in classroom and laboratory activities without unnecessary threats or disruptions. This study examined the relationship between security awareness and safe science learning environment among secondary school students in Uyo, Akwa Ibom State, Nigeria. The study adopted a correlational survey design. The population comprised 14,563 Senior Secondary Two students in the 2023/2024 academic session, from which 389 students were selected through stratified sampling using the Taro Yamane formula. A researcher-developed 40-item Security Awareness and Safe Learning Environment of Science Questionnaire (SASLESQ) was used for data collection. The instrument was validated by experts in Educational Measurement and Evaluation and yielded a Cronbach's alpha reliability coefficient of 0.76. Of the 389 questionnaires administered, 374 were validly completed and used for analysis. Pearson Product-Moment Correlation was used to test the three null hypotheses at the 0.05 significance level. The findings revealed significant positive relationships between security attitude and safe science learning environment ($r = .639$, $p < .05$), security knowledge and safe science learning environment ($r = .665$, $p < .05$), and security automatic behaviour and safe science learning environment ($r = .674$, $p < .05$). The study concludes that students' security awareness is significantly associated with the quality of the science learning environment. The study recommends systematic security education, appropriate school safety management, teacher modelling of responsible behaviour, and continuous sensitisation of students on safety procedures.*

***Keyword:*** *security awareness, security attitude, security knowledge, automatic behaviour, school safety, science learning environment*

## I. INTRODUCTION

A safe learning environment is an important condition for effective teaching and learning in secondary schools. Students require physical, social and psychological conditions that allow them to participate actively in learning without unnecessary exposure to violence, harassment, intimidation, unsafe facilities or other threats. This consideration is particularly important in science education because science learning frequently involves practical activities, laboratories, equipment, chemicals, electrical devices and other materials that require students to follow established safety procedures.

School safety is therefore not limited to protection from external security threats. It also involves the development of a school environment in which students, teachers and other members of the school community understand and practise behaviours that reduce risks and support effective learning. The Federal Ministry of Education's policy and minimum standards for safe schools emphasise prevention, protection, preparedness, response and the creation of safe learning environments in Nigerian schools (Federal Ministry of Education [FME], 2021, 2022). These provisions indicate that school safety requires the participation of school administrators, teachers, students, parents and other stakeholders.

The importance of safety awareness in science education has also been recognised in empirical research in Akwa Ibom State. Udoh (2013), in a study of senior secondary school science students in Akwa Ibom State, reported concerns

regarding the level of students' safety awareness. Such evidence suggests that safety awareness should remain an important consideration in science education, particularly where students participate in practical activities.

Security and safety are also connected with the broader quality of school management. Thomas (2022) reported the importance of strategic planning and administrative competence in securing sustainable education in public secondary schools in Uyo Senatorial District of Akwa Ibom State. Similarly, Thomas and Thomas (2016) examined graduate unemployment among science educators as a threat to global peace and security, highlighting the broader relationship between education and security. Akpan and Uboh (2025) further argued for the relevance of science education to security and national development in Nigeria. A safe school environment is particularly important for science learning because the availability and proper management of learning resources can influence the quality of students' learning experiences. Uboh, Akpan and King (2025) examined the availability and regular maintenance of laboratory equipment in relation to students' performance in Biology and Physics in Akwa Ibom State. Their work draws attention to the importance of appropriate laboratory resources and their maintenance in science education. Similarly, Uboh, Udofia, Abasi and Harrison (2026) examined instructional materials, students' achievement and retention in Physics in Abak Local Government Area of Akwa Ibom State. These studies reinforce the importance of the physical and instructional conditions under which science learning occurs.

The school learning environment is also influenced by students' behaviour and disciplinary practices. Uboh, Thomas, Sunday, Ekanem and Utibe (2026) examined parental attitudes and institutional disciplinary authority in relation to students' behaviour and academic achievement in secondary schools. Their findings provide a basis for considering student conduct and school authority as relevant aspects of the broader school environment. Similarly, Edet, Akpan and Thomas (2023) examined instructional materials and school location in relation to students' academic performance in Biology in Akwa Ibom State, demonstrating the relevance of contextual and instructional conditions to science learning. The present study focuses specifically on security awareness. Security awareness refers to the extent to which students possess appropriate attitudes, knowledge and behavioural dispositions that enable them to recognise, prevent and respond appropriately to situations that may threaten their safety or the safety of others. In the school context, security awareness may involve obeying safety rules, recognising potential hazards, reporting suspicious activities, avoiding dangerous practices, responding appropriately to emergencies and cooperating with school authorities.

Security awareness can be considered through three related dimensions: security attitude, security knowledge and security automatic behaviour. Security attitude concerns students' dispositions towards safety and security practices. A student who values safety is more likely to comply with school rules, respect safety instructions and avoid behaviours that expose others to danger. Security knowledge concerns students' understanding of potential threats, safety procedures and appropriate responses. Security automatic behaviour refers to the extent to which appropriate security responses have become habitual or readily activated when students encounter potentially dangerous situations.

The role of knowledge in educational practice is particularly important. Knowledge acquired through instruction and experience can provide students with the basis for making appropriate decisions in school and laboratory situations. In science education, students are expected to understand not only scientific concepts but also the procedures for handling equipment and conducting practical activities safely. Where students possess adequate knowledge of safety procedures, they may be better prepared to recognise hazards and respond appropriately.

Students' attitudes are equally important. Knowledge of safety rules may not necessarily result in safe conduct if students do not value or accept those rules. A positive security attitude may therefore encourage students to translate knowledge into responsible behaviour. School administrators and teachers have an important role in modelling such attitudes and establishing consistent expectations. Automatic behaviour is also relevant because emergencies and unexpected incidents may require immediate responses. Students who have repeatedly practised appropriate safety procedures may be more prepared to respond without lengthy deliberation. Such behaviour may include immediately following evacuation procedures, reporting a hazard, avoiding unsafe equipment or seeking assistance when a dangerous situation occurs.

The relevance of modelling and observation can be explained through Bandura's Social Learning Theory. Bandura (1977) proposed that people can learn behaviours through observation, imitation and interaction with their social environment. In schools, students observe teachers, peers and other members of the school community. Consequently, when teachers consistently demonstrate safe and responsible behaviour, students may learn and reproduce similar practices.

Maslow's Hierarchy of Needs also provides a useful theoretical basis for the study. Safety is positioned among the fundamental human needs in Maslow's framework. From an educational perspective, students who perceive their environment as unsafe may experience difficulty maintaining attention and participating fully in learning activities. A school environment that addresses students' safety needs can therefore provide a more supportive context for learning. The relationship between school safety and students' learning is consistent with the broader national emphasis on safe schools. The National Policy on Safety, Security and Violence-Free Schools in Nigeria emphasises the responsibility of schools and stakeholders to prevent violence and other threats to learners and educational facilities (FME, 2021). The Minimum Standards for Safe Schools further identify prevention, protection and emergency preparedness as important components of school safety (FME, 2022). Recent safeguarding initiatives also emphasise mechanisms for identifying, reporting and responding to concerns affecting learners' safety (FME, 2025, 2025).

Within this context, security awareness should not be regarded only as a matter for school security personnel or administrators. Students are active members of the school community and their attitudes, knowledge and behaviours may

form part of the everyday safety culture of the school. The present study therefore investigated the relationships between students' security attitude, security knowledge, security automatic behaviour and the safe learning environment of science in secondary schools in Uyo, Akwa Ibom State.

## II. Theoretical Framework

### a) Maslow's Hierarchy of Needs Theory

The study is partly anchored on Maslow's Hierarchy of Needs Theory. Maslow's framework proposes that human beings have different categories of needs, including physiological needs, safety needs, social needs, esteem needs and self-actualisation needs. Safety and security occupy an important position in the framework because individuals require protection and stability before they can fully attend to higher-level needs.

The theory is relevant to the present study because students operate within a social and physical school environment. Where students perceive the school environment as unsafe, their attention may be directed towards protecting themselves rather than participating fully in learning activities. In contrast, a school environment characterised by appropriate safety practices may provide conditions that support students' engagement in science learning.

The theory also provides a basis for understanding why school authorities should not consider academic instruction separately from students' safety. Providing a safe environment is part of creating the conditions within which teaching and learning can occur effectively.

### b) Social Learning Theory

The second theoretical foundation is Bandura's Social Learning Theory (Bandura, 1977). The theory explains learning as a process that can occur through observation, imitation and interaction with the environment. Students do not learn only through formal classroom instruction; they also observe the behaviour of teachers, peers, administrators and other people within the school community. The theory is relevant to security awareness because students may develop security-related attitudes and behaviours through observing how safety rules are treated in the school. If teachers and school administrators consistently demonstrate appropriate safety practices, students may be encouraged to imitate such behaviour. Conversely, inconsistent enforcement of safety rules may weaken students' commitment to safe practices.

The theory therefore provides a basis for examining security attitude, knowledge and automatic behaviour as characteristics that may be associated with a safe science learning environment.

### c) Statement of the Problem

A safe and secure school environment is essential for effective teaching and learning. However, secondary schools may be exposed to different forms of security and safety challenges, including violence, bullying, harassment, cult-related activities, theft, substance abuse, fire incidents, unsafe facilities and other emergencies. These challenges may disrupt students' concentration, participation and confidence in learning activities. The problem may be more critical in science education because science learning often involves practical activities, laboratory equipment, electrical materials, chemicals and other resources that require students to observe appropriate safety practices.

In some secondary schools, students may not possess adequate awareness of the security and safety practices required to protect themselves, their classmates, teachers and school facilities. Some students may have inadequate knowledge of how to recognise potential hazards or respond appropriately to emergencies. Others may know the required safety procedures but may not consistently demonstrate positive attitudes towards them. There may also be situations in which students fail to respond promptly and appropriately when confronted with unexpected security or safety situations. The situation can affect the quality of the science learning environment. When students feel unsafe or behave in ways that expose themselves and others to danger, classroom and laboratory activities may be interrupted. Such conditions may reduce students' participation in practical activities, affect the effective use of science equipment and create an environment that is less conducive to teaching and learning.

Although school safety is a shared responsibility, students are important members of the school community and their attitudes, knowledge and behaviours may influence the extent to which a safe learning environment is maintained. However, the extent to which students' security attitude, security knowledge and security automatic behaviour are related to the safe learning environment of science among secondary school students in Uyo remains unclear.

It is therefore necessary to investigate the relationship between students' security attitude, security knowledge, security automatic behaviour and safe science learning environment among secondary school students in Uyo, Akwa Ibom State. The study is intended to provide empirical evidence that may assist teachers, school administrators and other education stakeholders in strengthening students' security awareness and promoting a safer environment for effective science teaching and learning.

## III. PURPOSE OF THE STUDY

The purpose of the study was to examine the relationship between security awareness and safe science learning environment among secondary school students in Uyo, Akwa Ibom State, Nigeria.

**a) Specifically, the study sought to:**

I. determine the relationship between students' security attitude and safe science learning environment.
II. determine the relationship between students' security knowledge and safe science learning environment.
III. examine the relationship between students' security automatic behaviour and safe science learning environment.

**b) Research Questions**

The following research questions guided the study:

I. What is the relationship between students' security attitude and safe science learning environment?
II. What is the relationship between students' security knowledge and safe science learning environment?
III. What is the relationship between students' security automatic behaviour and safe science learning environment?

**c) Research Hypotheses**

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

**$H_{01}$:** There is no significant relationship between students' security attitude and safe science learning environment.

**$H_{02}$:** There is no significant relationship between students' security knowledge and safe science learning environment.

**$H_{03}$:** There is no significant relationship between students' security automatic behaviour and safe science learning environment.

## IV. METHOD

**a) Research Design**

The study adopted a correlational survey design. The design was considered appropriate because the study sought to determine the degree and direction of relationships between students' security awareness variables and safe science learning environment without manipulating the variables.

**b) Area of the Study**

The study was conducted in Uyo, Akwa Ibom State, Nigeria. Uyo is the capital city of Akwa Ibom State and contains a substantial number of secondary schools serving students from different social and educational backgrounds. The area provides an appropriate setting for examining school safety and science learning because secondary schools operate within a range of institutional, social and environmental conditions.

**c) Population of the Study**

The population of the study comprised 14,563 Senior Secondary Two (SS2) students in secondary schools in Uyo during the 2023/2024 academic session.

**d) Sample and Sampling Technique**

A sample of 389 SS2 students was selected from the population using stratified sampling technique. The sample size was determined using the Taro Yamane formula. The stratification procedure was used to ensure representation of students from the identified strata within the study population.

Of the 389 questionnaires administered, 374 were correctly completed and returned, representing the valid responses used for statistical analysis.

**e) Instrument for Data Collection**

The instrument used for data collection was a researcher-developed questionnaire titled Security Awareness and Safe Learning Environment of Science Questionnaire (SASLESQ).

**f) The questionnaire contained 40 items organised into four sections:**

Items 1–10: Security Attitude
Items 11–20: Security Knowledge
Items 21–30: Security Automatic Behaviour
Items 31–40: Safe Learning Environment of Science

The items were structured on a four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

**g) Validity of the Instrument**

The instrument was subjected to expert validation by specialists in Educational Measurement and Evaluation. Their observations and suggestions were used to improve the clarity, relevance and appropriateness of the items before the final administration.

**h) Reliability of the Instrument**

The internal consistency of the instrument was determined using Cronbach's alpha reliability coefficient. The instrument yielded an overall reliability coefficient of 0.76, indicating acceptable internal consistency for the study.

**i) Data Collection Procedure**

The researchers administered the questionnaire to the sampled SS2 students with appropriate assistance from the schools. The respondents were informed of the purpose of the study and the questionnaire was administered and retrieved after completion. Of the 389 questionnaires administered, 374 were sufficiently completed for analysis.

## V. METHOD OF DATA ANALYSIS

Pearson Product-Moment Correlation was used to determine the relationship between each security awareness variable and safe science learning environment. The three null hypotheses were tested at the 0.05 significance level.

The decision rule was that a null hypothesis would be rejected where the obtained p-value was less than 0.05 and retained where the p-value was greater than 0.05.

## VI. RESULTS

**a) Hypothesis One**

$H_{01}$: There is no significant relationship between students' security attitude and safe science learning environment.

**Table 1:** Pearson Product-Moment Correlation between Security Attitude and Safe Science Learning Environment

| Variables | N | r | p-value | Decision |
|---|---|---|---|---|
| Security attitude and safe science learning environment | 374 | .639 | .000 | Reject $H_{01}$ |

*Significant at p < .05.*

The result in Table 1 shows a positive correlation between security attitude and safe science learning environment (r = .639, p = .000, N = 374). Since the p-value is less than the 0.05 significance level, the null hypothesis was rejected. Thus, there was a statistically significant positive relationship between students' security attitude and safe science learning environment.

**b) Hypothesis Two**

$H_{02}$: There is no significant relationship between students' security knowledge and safe science learning environment.

**Table 2:** Pearson Product-Moment Correlation between Security Knowledge and Safe Science Learning Environment

| Variables | N | r | p-value | Decision |
|---|---|---|---|---|
| Security knowledge and safe science learning environment | 374 | .665 | .000 | Reject $H_{02}$ |

*Significant at p < .05.*

Table 2 shows a positive correlation between students' security knowledge and safe science learning environment (r = .665, p = .000, N = 374). Since the p-value is less than 0.05, the null hypothesis was rejected. Therefore, a statistically significant positive relationship existed between students' security knowledge and safe science learning environment.

**c) Hypothesis Three**

$H_{03}$: There is no significant relationship between students' security automatic behaviour and safe science learning environment.

**Table 3:** Pearson Product-Moment Correlation between Security Automatic Behaviour and Safe Science Learning Environment

| Variables | N | r | p-value | Decision |
|---|---|---|---|---|
| Security automatic behaviour and safe science learning environment | 374 | .674 | .000 | Reject $H_{03}$ |

*Significant at p < .05.*

The result in Table 3 indicates a positive correlation between students' security automatic behaviour and safe science learning environment (r = .674, p = .000, N = 374). Since the p-value is less than 0.05, the null hypothesis was rejected. Hence, there was a statistically significant positive relationship between students' security automatic behaviour and safe science learning environment.

## VII. DISCUSSION OF FINDINGS

### a) Security Attitude and Safe Science Learning Environment

The first finding revealed a statistically significant positive relationship between students' security attitude and safe science learning environment. The correlation coefficient of .639 indicates that students' security attitudes were positively associated with their perceptions of a safe science learning environment. One possible explanation is that students who value safety may be more willing to observe school rules, respect safety instructions, avoid dangerous conduct and cooperate with teachers and other school personnel. A positive attitude towards security can therefore form part of the culture required for maintaining a safe learning environment.

This finding is consistent with the broader emphasis on safety consciousness in Nigerian schools. The Federal Ministry of Education (2021, 2022) identifies school-community participation, prevention and protection as important elements of safe schools. The finding also agrees with the relevance of strategic school management identified by Thomas (2022), who examined strategic plan implementation and administrative competence in relation to securing sustainable education in public secondary schools in Uyo Senatorial District.

The result is also consistent with the work of Akpan and Uboh (2025), who examined the relationship between science education, security and national economic development in Nigeria. Their work reinforces the need to recognise security as an educational concern rather than treating it as a matter entirely separate from science education.

The finding should, however, be interpreted as an association rather than evidence that security attitude causes a safe science learning environment. The correlational design does not establish causal direction.

### b) Security Knowledge and Safe Science Learning Environment

The second finding showed a statistically significant positive relationship between students' security knowledge and safe science learning environment ($r = .665$, $p < .05$). This indicates that higher levels of students' reported security knowledge were associated with higher levels of reported safe science learning environment.

Security knowledge may help students recognise potential hazards and understand appropriate responses. In science education, such knowledge is particularly relevant because students participate in practical activities requiring attention to equipment, materials, laboratory procedures and safety instructions.

The finding is consistent with Udoh (2013), who identified safety awareness as an important issue among senior secondary school science students in Akwa Ibom State. It also relates to research on science learning resources in the state. Uboh, Akpan and King (2025) highlighted the importance of laboratory equipment availability and regular maintenance for science education, while Uboh, Udofia, Abasi and Harrison (2026) demonstrated the importance of instructional materials in Physics learning. These studies collectively reinforce the idea that students' learning does not occur independently of the physical and procedural conditions surrounding science instruction. The result is also compatible with the Federal Ministry of Education's (2022) emphasis on prevention, preparedness and response within safe-school standards. Students cannot be expected to respond appropriately to safety situations without adequate information about the risks and procedures involved.

Again, the finding establishes a relationship and not causation. It cannot be concluded from the correlation alone that increased security knowledge will necessarily produce a safer science learning environment.

### c) Security Automatic Behaviour and Safe Science Learning Environment

The third finding revealed a statistically significant positive relationship between students' security automatic behaviour and safe science learning environment ($r = .674$, $p < .05$). Among the three relationships examined, this was the largest correlation coefficient.

Automatic security behaviour may involve the routine practice of safety procedures, prompt reporting of hazards, compliance with emergency instructions and other behaviours that become familiar through repeated practice and reinforcement. In a school environment, such behaviours may contribute to an atmosphere in which students and teachers are more prepared to respond appropriately to potential threats.

The finding can be explained through Bandura's Social Learning Theory (1977), which emphasises learning through observation and modelling. When teachers and other school personnel consistently demonstrate responsible safety practices, students may observe and reproduce those behaviours. The finding also has implications for school administration. Thomas and Thomas (2016) linked educational conditions with broader peace and security concerns, while Thomas (2022) highlighted strategic planning and administrative competence as important considerations for sustainable education. Effective school safety therefore requires more than written rules; it also requires consistent modelling, practice, supervision and reinforcement.

The finding should nevertheless be interpreted cautiously because the study used a self-report correlational design. The result demonstrates a statistically significant association between security automatic behaviour and safe science learning environment but does not demonstrate that one variable directly causes changes in the other.

## VIII. CONTRIBUTION TO KNOWLEDGE

**The study contributes to knowledge in several ways.**

1 It provides empirical evidence on the relationship between three specific dimensions of security awareness—security attitude, security knowledge and security automatic behaviour—and safe science learning environment among secondary school students in Uyo, Akwa Ibom State.

2 The study extends the discussion of school safety beyond administrative and infrastructural considerations by examining students as active participants in the maintenance of a safe learning environment.

3 The study contributes local evidence to the literature on science education and school safety in Akwa Ibom State. This is relevant because existing research has considered safety awareness, instructional materials, laboratory resources, school management and students' behaviour as separate educational issues.

4 The study provides empirical evidence that can assist science teachers, school administrators and education stakeholders in designing security-awareness activities that address students' attitudes, knowledge and routine safety behaviours.

**Limitations of the Study**

The study has some limitations that should be considered when interpreting the findings.

The study adopted a correlational survey design. Consequently, the findings demonstrate relationships among the variables but do not establish cause-and-effect relationships.

The study relied on students' self-reported responses. Respondents may have provided socially desirable answers, particularly because security and safety behaviours are socially valued.

The study was conducted among SS2 students in Uyo, Akwa Ibom State. Therefore, the findings should not automatically be generalised to all secondary school students throughout Akwa Ibom State or Nigeria without consideration of differences in location, school type, institutional conditions and student characteristics.

The study focused on three dimensions of security awareness and one broad measure of safe science learning environment. Other factors, including school infrastructure, teacher preparedness, administrative practices, parental involvement, school location and community security conditions, may also be associated with school safety.

## IX. CONCLUSIONS

Based on the findings, the study concludes that students' security attitude, security knowledge and security automatic behaviour were each significantly and positively related to safe science learning environment among secondary school students in Uyo, Akwa Ibom State.

The findings suggest that safe science learning should be viewed as a shared responsibility involving school administrators, teachers, students and other stakeholders. Students' attitudes towards safety, their knowledge of appropriate security practices and their routine responses to safety situations are relevant components of the broader school safety culture.

However, because the study employed a correlational design, the findings should be interpreted as evidence of significant relationships rather than evidence that any of the security-awareness variables directly causes a safe science learning environment.

**Recommendations**

**Based on the findings, the following recommendations are made:**

1. Security-awareness education: Secondary schools should organise periodic security-awareness programmes through which students are taught appropriate safety practices, hazard recognition, emergency procedures and responsible reporting.
2. Positive security attitudes: Science teachers and school administrators should encourage students to develop positive attitudes towards safety by consistently reinforcing compliance with school rules and laboratory safety procedures.
3. Practical safety training: Security and laboratory safety education should include practical demonstrations and drills rather than relying exclusively on verbal instruction.
4. Teacher modelling: Teachers and school administrators should consistently demonstrate appropriate security and safety behaviours because students may learn through observation and imitation.
5. Emergency preparedness: Schools should establish and regularly practise clear procedures for responding to emergencies such as fire, accidents, violence and other threats.
6. Laboratory safety: Science departments should ensure that laboratory equipment and materials are properly maintained and that students receive adequate instruction before practical activities.
7. School management: School administrators should incorporate safety and security considerations into strategic planning, supervision and routine school management.
8. Stakeholder collaboration: Government agencies, school authorities, parents and community stakeholders should collaborate in strengthening school safety systems and safeguarding students.

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