

## Application of Defensible Space Theory in a Nigerian Secondary School: Faith Academy, Ota



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### ABSTRACT

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The escalating security challenges confronting Nigerian educational institutions necessitate proactive, evidence-based safety strategies. This study assesses the application of Oscar Newman's Defensible Space Theory (DST) in Faith Academy Secondary School, Ota, Nigeria, employing a convergent parallel mixed-methods case study approach. Data were collected from 126 student surveys and structured physical observations, analysed through DST's four core elements: territoriality, natural surveillance, image, and milieu. Findings reveal a strong implementation of physical territoriality, with 62.7% of students agreeing that spaces are clearly demarcated. However, a critical gap in psychological ownership exists, as only 27.8% of students report feeling a sense of ownership over school spaces. Furthermore, 55.6% of students identified poor external road infrastructure as a significant vulnerability in the school's milieu. The school's design successfully incorporates natural surveillance, contributing to a generally positive perception of safety (64.3% satisfaction with security). The study concludes that while DST provides a relevant framework, its application must be holistic and context-sensitive. This research provides a practical, evidence-based model for assessing and enhancing school safety through environmental design in Nigeria, emphasizing the need to integrate strategies that foster psychological ownership, rigorous maintenance, and external stakeholder engagement.

## 1. INTRODUCTION

The safety and security of educational institutions have become a paramount concern globally, with schools increasingly being targets of violence, crime, and security threats [1, 2]. In Nigeria, this threat has manifested severely through organised attacks, leading to the abduction of hundreds of students, particularly in the northern regions, causing widespread fear, prolonged school closures, and a significant decline in school attendance [3-5]. Study shows that the quality of the physical environment significantly impacts student performance [6], suggesting that unresolved security challenges within school environment may threaten educational outcome. These incidents underscore a critical vulnerability in the physical security infrastructure of many Nigerian schools and demand proactive, evidence-based strategies to create safer learning environments.

In response to such security challenges, architectural and environmental design theories have been advanced to mitigate crime. Among the most influential is Defensible Space Theory (DST), pioneered by Newman [7]. DST posits that the strategic design of the physical environment, through elements such as territoriality, natural surveillance, image, and milieu, can empower residents and users to control their spaces, thereby deterring criminal behaviour [8-10]. While initially developed for public housing [11], the principles of DST are universally applicable. They have been recognised as a core

component of Crime Prevention Through Environmental Design (CPTED) for various building typologies, including educational facilities [12, 13].

While DST forms a foundational pillar of the broader CPTED approach, this study specifically adopts Newman's four-element framework (territoriality, natural surveillance, image, and milieu) to conduct a structured, granular assessment of the physical environment. This focus allows for a targeted evaluation of how each distinct principle is architecturally manifested and experientially perceived within a single school context. Our research uniquely measures and reports on the interplay between these four DST elements, providing a more nuanced understanding than studies employing only general CPTED concepts.

Despite the theoretical promise of DST, its empirical application and assessment within the specific socio-cultural and architectural context of Nigerian schools remain limited. While studies have discussed general safety concerns in Nigerian schools, for example, infrastructure disrepair [14], the perception of landscape elements [15], and general insecurity [3-5], there is a scarcity of research that systematically investigates the presence and effectiveness of all four defensible space elements in existing Nigerian school designs from the users' perspective. This gap is critical, as the successful application of these principles depends on local context and user perception.

Therefore, this study seeks to bridge this gap by conducting

an assessment of the application of DST in Faith Academy Secondary School, Ota, Ogun State, Nigeria. The research is guided by the following objectives:

- 1) To identify and evaluate the presence of defensible space elements, specifically territoriality, natural surveillance, image, and milieu, in the design and construction of the school.
- 2) To investigate the students' level of satisfaction with the security afforded by the school's built environment.
- 3) To provide evidence-based recommendations for enhancing security through environmental design in Nigerian secondary schools.

By linking user perceptions with physical observations, this study offers a nuanced understanding of how defensible space principles function in practice within a Nigerian secondary school. The findings are expected to provide valuable insights for school administrators, architects, and policymakers involved in the design, renovation, and management of secure educational facilities in Nigeria and similar contexts.

## **2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK**

### **2.1 Defensible Space Theory: Origins and core principles**

The concept of defensible space was formally introduced by Newman [7] following his seminal study of housing projects in New York City. Newman observed that crime rates were significantly higher in high-rise, anonymous public housing complexes compared to low-rise developments. He attributed this disparity to the weakened sense of ownership and control residents felt over shared, ill-defined spaces in larger complexes [7]. From these observations, he defined defensible space as a residential environment whose physical characteristics, specifically building layout and site plan, function to allow inhabitants themselves to become the key agents in ensuring their own security [7]. The theory is fundamentally rooted in the premise that the physical design of an environment can influence human behaviour and reduce crime by fostering a sense of ownership and encouraging natural surveillance.

While Newman's work originated in a residential context, the principles of DST have proven to be highly adaptable and have been integrated into the broader field of CPTED. CPTED provides a multi-disciplinary approach for designing safer environments across various building types, including schools [12, 13]. The core argument is that a well-designed environment can reduce the opportunity for crime and mitigate the fear of crime without relying exclusively on formal policing. Recent studies continue to validate this approach, demonstrating its effectiveness in various contexts, including educational settings in both developed and developing countries [13, 16].

### **2.2 The four pillars of defensible space**

This study adopts Newman's original framework, analysing the built environment through four interconnected elements: territoriality, natural surveillance, image, and milieu.

#### **2.2.1 Territoriality**

Research on territoriality in defensible space focuses on the design's ability to create a sphere of influence and sense of ownership among legitimate users, thereby discouraging

intrusion by outsiders [7]. Physical markers such as fences, gates, signage, and landscaping are used to define boundaries between public, semi-public, and private spaces [17, 18]. In a school context, a clear territorial definition helps students and staff identify strangers and reinforces their authority over the environment. Research has shown that when users feel a sense of ownership, they are more likely to challenge intruders and report suspicious activities [19]. The quality of the learning environment also plays a crucial role in shaping student motivation and self-discipline [20], which may indicate that territoriality extend beyond physical feature that foster a sense of ownership among student. The permanent display of student artwork, for instance, has been significantly associated with a greater sense of ownership among students, making spaces feel more defended [19, 21]. A recent study in the Nigerian context affirmed that territorial reinforcement through clear spatial definition and access control is a critical, though often underutilised, strategy for enhancing security in educational facilities [22, 23].

#### **2.2.2 Natural surveillance**

Research on natural surveillance in defensible space examines the capacity of the physical environment to provide opportunities for users to observe their surroundings casually and continuously. This concept is often linked to Jacobs's notion [24] of "eyes on the street," where the natural movement and presence of people provide informal oversight. In architectural terms, this is achieved by maximising visibility through strategic placement of windows, minimising blind spots, using open landscaping, and ensuring adequate lighting [25]. When a school is designed for good natural surveillance, students and staff can easily monitor corridors, courtyards, and playgrounds, which deters potential offenders who fear being observed. However, the effectiveness of this design depends on user awareness, as safety in Nigerian schools can be influenced by how well student and staff understand and engage with existing security measures [26]. Contemporary research emphasises that the effectiveness of natural surveillance is not merely about the number of windows, but about the strategic management of sightlines to ensure continuous oversight of key areas, a principle that holds in the design of modern school buildings [27].

#### **2.2.3 Image**

Research on image in defensible space pertains to a place's overall appearance and the perception it projects to both insiders and outsiders. According to Newman [7], a poorly maintained environment with signs of physical deterioration, such as broken windows, graffiti, and litter, can signal neglect and a lack of care, making it more vulnerable to crime and vandalism. Conversely, a well-maintained and aesthetically pleasing environment projects a sense of order and control, deterring criminal activity. In schools, a positive image fosters pride among students and staff, encouraging them to protect and care for their environment, which in turn reinforces territoriality and natural surveillance. The Broken Windows theory, which aligns with this element, continues to find support in environmental criminology, with recent studies linking the perception of neglect to increased fear of crime and defensive behaviours among students [28, 29].

#### **2.2.4 Milieu**

Research on milieu in defensible space refers to the location of a property within its surrounding context and how the

characteristics of that area influence security [7]. This includes the proximity to other secure or active facilities, such as police stations or bustling commercial areas, as well as the quality of the immediate infrastructure, such as roads and street lighting. A school located in an area with poor road infrastructure or perceived as crime-prone faces additional security challenges, regardless of its internal design [30]. A supportive milieu can enhance security, while a negative one can undermine even the best defensible space design within the school's boundaries. The importance of this external context is increasingly recognised in safe school planning, with recent frameworks advocating for a holistic approach that integrates the school with its surrounding neighbourhood to create a cohesive and secure educational landscape [31].

### 2.3 Application in school design: Current guidelines and research

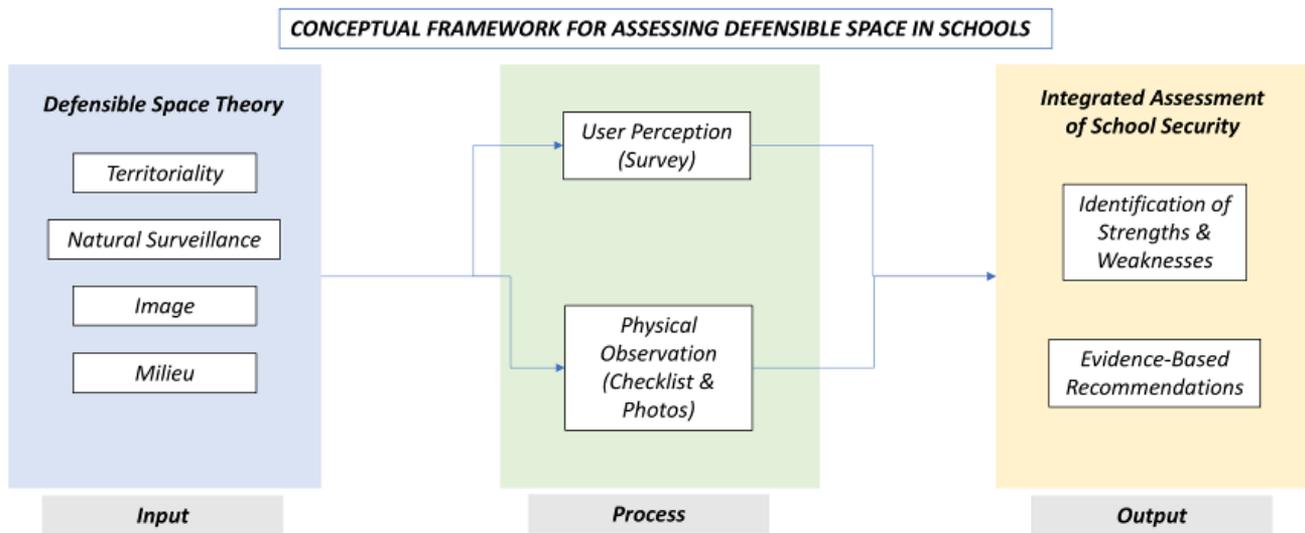
The application of defensible space and CPTED principles in educational settings has gained traction globally. Studies have led to the development of structured design guidelines that translate theory into practical strategies for architects and schools [32, 33]. These guidelines typically advocate for a multi-layered approach encompassing site design, building architecture, interior spaces, and maintenance protocols.

However, empirical research applying the integrated four-element defensible space framework to secondary schools in Nigeria remains sparse. While prior studies have examined

isolated aspects such as infrastructure conditions [14] or perceptions of landscape elements [15], a critical knowledge gap persists. Specifically, there is a lack of holistic, mixed-methods studies that simultaneously: (a) evaluate the physical presence of all four DST pillars (territoriality, natural surveillance, image, milieu), and (b) investigate how these features are perceived by the primary users (students) in the Nigerian secondary school context [34, 35]. This study aims to fill this gap by employing Newman's comprehensive framework in a convergent parallel assessment of Faith Academy, thereby linking architectural audit with user experience.

### 2.4 Conceptual framework

This research is guided by the conceptual framework illustrated in Figure 1. The study posits that the application of the four defensible space elements (Territoriality, Natural Surveillance, Image, and Milieu) in the school's design directly influences the perceived and actual security of the environment. These elements are investigated through two primary data sources: 1) the perceptions of the primary users (students), captured via surveys, and 2) direct physical observation of the school's grounds, exterior, and interior. The integration of these data sources provides an overall evaluation of how defensible space principles are implemented and experienced in a real-world Nigerian secondary school context.



**Figure 1.** Conceptual framework for assessing defensible space in schools

Note: This framework illustrates the integration of theoretical principles and mixed-methods data collection to achieve a comprehensive security assessment.

## 3. MATERIALS AND METHODS

### 3.1 Research design

This study employed a convergent parallel mixed-methods design, grounded in a case study approach, to facilitate a comprehensive evaluation of DST application. This design was selected to concurrently collect both quantitative and qualitative data, providing a holistic understanding that neither approach could achieve in isolation [36]. The quantitative component, a cross-sectional survey, systematically measured students' perceptions of the school's security environment. The qualitative component, comprising structured observations

and photographic documentation, provided contextual depth and physical evidence of the built environment. The integration of these datasets during the analysis phase enabled triangulation, strengthening the validity of the findings by corroborating user perceptions with physical reality. The case study framework was ideal for this investigation as it allowed for an in-depth exploration of the complex interplay between architectural design and user experience within the authentic context of Faith Academy [37].

### 3.2 Study area

The research was conducted at Faith Academy Secondary

School, a private boarding institution located within the campus of Covenant University in Ota, Ogun State, Nigeria. The selection of this school was deliberate, as its relatively recent establishment presented an opportunity to assess the application of modern security-conscious design principles in a Nigerian educational facility. Understanding the spatial

configuration is fundamental to a defensible space analysis. Therefore, the study utilised a site plan (see Figure 2) to illustrate key aspects such as perimeter boundaries, access points, building orientation, and the relationship between different functional zones, which are critical for evaluating territoriality and natural surveillance.



**Figure 2.** Site plan of Faith Academy Secondary School, Ota

Note: Site Plan of Faith Academy Secondary School, Ota. This plan illustrates the spatial organisation and physical boundaries of the case study school (Source: Authors' compilation based on Google Earth data, 2024; Google Earth imagery © 2024 Google) [38].

### 3.3 Population and sampling

The target population comprised 960 senior secondary school students (SSS1 to SSS3) at Faith Academy, as shown in Table 1. A stratified random sampling technique was employed to ensure proportional representation across all three class levels, thereby capturing a diverse range of user experiences within the school environment. This method enhances the representativeness of the sample and reduces sampling bias [39].

**Table 1.** Study population distribution

Class Level	Population
SSS1	320
SSS2	300
SSS3	340
Total	960

Source: School administration records (2024) [40].

The sample size was calculated using a standard formula for finite populations, which is widely applied in educational and social science research to determine a representative sample with a specified margin of error [41]. The formula is given as:

$$n = N/[1 + N(e)^2] \quad (1)$$

where,

$n$  = required sample size

$N$  = population size (960)

$e$  = margin of error (8% or 0.08)

Substituting the values:

$$n = 960/[1 + 960(0.08)^2] = 134$$

Thus, a minimum sample of 134 students was required. A total of 134 questionnaires were distributed, and 126 were completed and returned, yielding a high response rate of 94%.

### 3.4 Data collection instruments and procedures

Data collection was conducted using three complementary instruments designed around the core principles of DST.

Table 2 provides a summary of how each DST pillar was operationalised into measurable variables for both the survey and the observational checklist.

**Table 2.** Operationalisation of Defensible Space Theory (DST) elements in research instruments

DST Pillar	Survey Construct (Example Item)	Observational Checklist Variable
Territoriality	Perceived boundary clarity & ownership ("I feel a sense of ownership over the school spaces.")	Presence of perimeter fencing, gates, signage, and demarcated zones.
Natural Surveillance	Perceived visibility & monitoring ("I can see the external surroundings from inside buildings.")	Window placement, absence of blind spots, open landscaping, sightlines in corridors/courtyards.
Image	Perception of maintenance & order ("The school environment is clean and well-maintained.")	Evidence of litter, graffiti, vandalism, physical deterioration, and overall aesthetic.
Milieu	Perception of surrounding context ("The roads around the school are well constructed and safe.")	Condition of access roads, adjacent land use, street lighting, and proximity to other facilities.

Source: Table developed by authors based on DST [6].

#### 3.4.1 Questionnaire survey

A structured questionnaire was developed to operationalise the four elements of DST, which are Territoriality, Natural Surveillance, Image, and Milieu, into measurable perceptual items. The instrument consisted of two sections: Section A collected demographic data (gender, age, class level), and Section B contained 25 items rated on a five-point Likert scale (Strongly Disagree to Strongly Agree). The questionnaire was subjected to a pilot test with 20 students from a comparable school to assess clarity, reliability, and validity. The internal consistency of the scale was confirmed with a Cronbach's alpha coefficient of 0.79, indicating acceptable reliability [42].

#### 3.4.2 Structured observational checklist

A binary (Yes/No) observational checklist was created to systematically audit the physical environment against the criteria of DST. The checklist was organised into three spatial domains: School Grounds, Building Exterior, and Building Interior, and contained specific variables for each of the four defensible space elements. This systematic approach ensures objective and replicable data collection on environmental features [43].

Observations were conducted by two trained raters (the authors) to ensure reliability. Prior to data collection, both raters underwent a joint training session using the checklist at a different school site to standardize interpretations. Inter-rater reliability was assessed on a subset of observations, yielding high agreement. All observational data were collected on three

weekdays (Tuesday–Thursday) during active school hours (8:00 am–3:00 pm) to capture conditions during peak use, and one Saturday morning to assess weekend surveillance and maintenance status. This schedule was designed to account for temporal variations that could influence judgments of natural surveillance and environmental cleanliness.

#### 3.4.3 Photographic documentation

Photographs were taken to provide visual evidence supporting the observational data. This technique helps to capture the qualitative state of the environment, offering incontrovertible evidence of features such as maintenance conditions, signage clarity, and sightlines, which enriches the data and supports the findings [44, 45]. This use of photographic documentation aligns with established methodological practices in safety and security engineering research. Recent studies have demonstrated how systematic visual documentation supports the assessment of environmental design principles by providing concrete evidence of physical conditions that can be analysed alongside survey data.

### 3.5 Data analysis

The quantitative data from the surveys were analysed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics (frequencies, percentages, means) were computed to summarise the data. The qualitative data from the observational checklist were analysed through content analysis and synthesised into a summary table. The photographic evidence was used as a triangulation source to verify and illustrate the integrated results from the survey and observation, providing a multi-faceted understanding of the research problem.

### 3.6 Ethical considerations

The Covenant University Research Ethics Committee granted ethical approval. Written permission was obtained from the school administration, and informed assent was secured from all student participants. The purposes of the study were clearly explained, and participants were assured of confidentiality and anonymity. Data were stored securely and used solely for this research.

## 4. INTEGRATED RESULTS AND DISCUSSION

This section presents and discusses the findings from both the student surveys and physical observations, organised around the four elements of DST. This integrated approach provides a comprehensive understanding of how the theory's principles are manifested and perceived within Faith Academy.

### 4.1 Territoriality: Defined boundaries and perceived ownership

The assessment of territoriality revealed a complex interplay between well-defined physical boundaries and a moderate sense of psychological ownership among students.

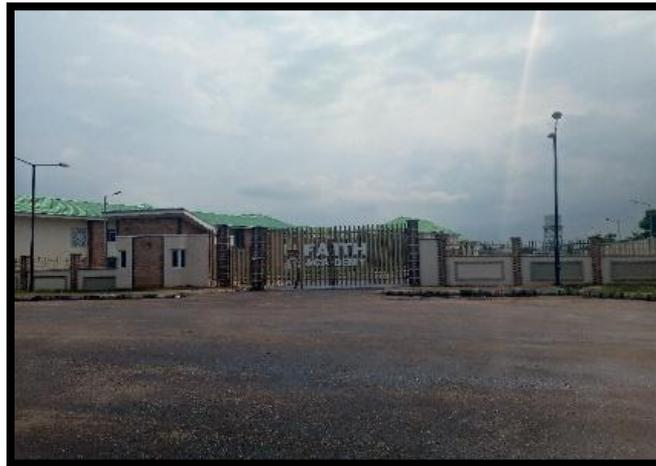
Survey Results: As shown in Table 3, a strong majority of students (62.7%) agreed that private and public spaces were clearly demarcated, and a similar proportion (62.7%)

confirmed that spaces were adequately labelled, facilitating wayfinding. Furthermore, 57.9% of respondents agreed that access to spaces was regulated. However, only 27.8% of

students reported feeling a sense of ownership over school spaces, indicating a significant opportunity to strengthen psychological territoriality.

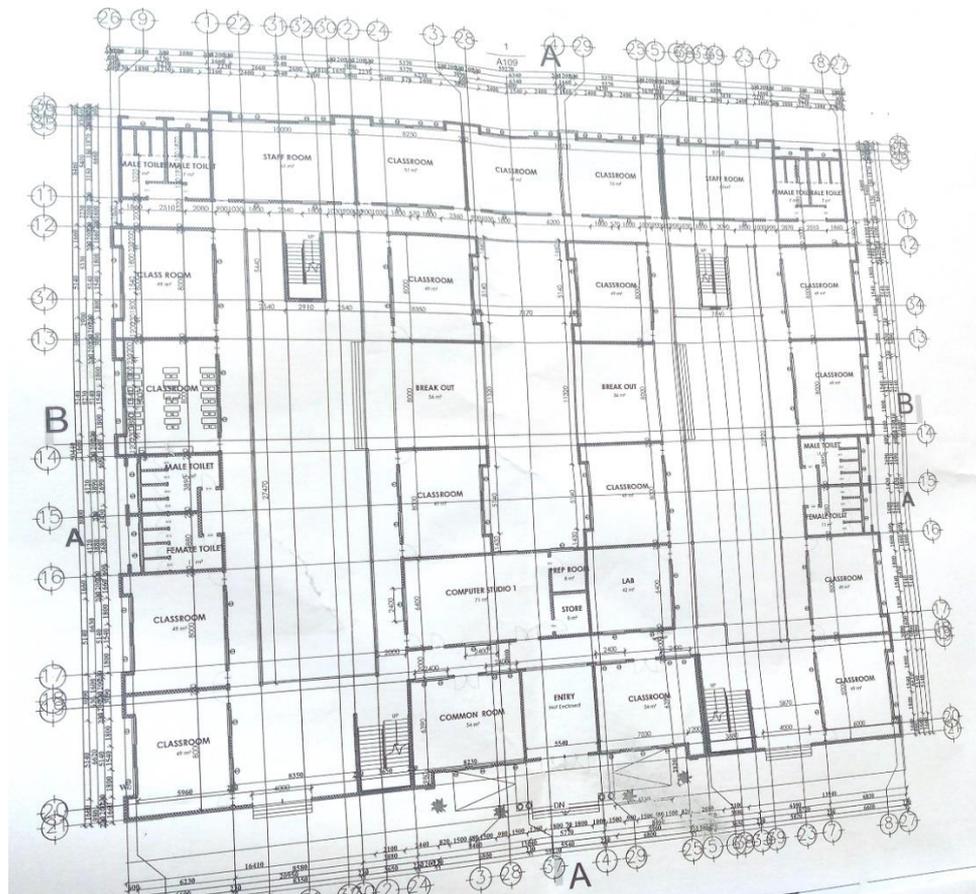
**Table 3.** Student perceptions of territoriality (n = 126)

Variable	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Mean	Std. Deviation
Ability to recognise strangers	8.7%	27.8%	15.1%	38.1%	10.3%	3.13	1.19
Clear demarcation of spaces	7.1%	18.3%	11.9%	51.6%	11.1%	3.41	1.13
Adequate signage	5.6%	22.2%	9.5%	54.8%	7.9%	3.37	1.09
Regulated access	4.8%	20.6%	15.1%	48.4%	9.5%	3.32	1.06
Feeling of ownership	15.9%	34.1%	21.4%	23.0%	4.8%	2.64	1.14



**Figure 3.** Perimeter fence and controlled gatehouse at Faith Academy

Note: Photograph from the authors' fieldwork shows a clear physical boundary and access control point, reinforcing territoriality, 2024.



**Figure 4.** Standardised classroom layout at Faith Academy

Note: The image shows the standardised classroom layouts with minimal to no potential for student personalisation. (Source: School administration records, 2024) [46].

Observational Findings: Physical observations confirmed the presence of strong territorial markers. The school grounds are enclosed by a perimeter fence with controlled entry points (see Figure 3). Pedestrian routes are clearly marked and separated from vehicular traffic, and recreational areas like the football field are well-fenced. The main entrance is architecturally emphasised with signage and landscaping, reinforcing the transition from public to private space.

Integrated Discussion: At Faith Academy, the disconnect between well-defined physical boundaries and a moderate sense of psychological ownership presents a site-specific instance of a broader phenomenon noted in defensible space literature: that physical demarcation alone is insufficient to foster territoriality [22, 23]. In this case, while the school successfully establishes physical territoriality through fences and signage, the lower sense of ownership appears linked to the standardised classroom layouts with minimal opportunities for student personalisation (as illustrated in Figure 4). This case study finding suggests a transferable implication for school design more generally: to achieve true defensibility,

architectural strategies must be coupled with opportunities for user personalisation. Research consistently indicates that interventions like permanent displays of student artwork can significantly enhance the sense of ownership and defensive attitudes [19, 21], a principle applicable beyond this single case.

**4.2 Natural surveillance: Strategic design and behavioral response**

The study found that the school's design effectively facilitates natural surveillance, and students demonstrate awareness of this feature.

Survey Results: Table 4 indicates that 52.4% of students agreed they could see external surroundings from inside buildings, and 52.3% stated they would inspect their surroundings upon hearing suspicious noises. This suggests that the architectural design not only provides the opportunity for surveillance but also encourages vigilant behavior among users.

**Table 4.** Student perceptions of natural surveillance (n = 126)

Variable	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Mean	Std. Deviation
Visibility to the exterior	12.7%	26.2%	7.9%	41.3%	11.1%	3.10	1.28
Behavioral response to noise	9.5%	27.8%	10.3%	46.0%	6.3%	3.12	1.17



**Figure 5.** Strategic window placement for natural surveillance

Note: Photograph from the authors' fieldwork showing classroom windows positioned to provide clear sightlines to outdoor spaces, enabling casual monitoring, 2024.

Observational Findings: The observational data confirmed these perceptions. The fencing around the site allows visual penetration, and key areas like parking lots and pedestrian walkways are within the sightlines of classrooms and administrative offices (see Figure 5). The interior design features two courtyards with classrooms arranged around them, promoting cross-visibility. Corridors and staircases are positioned to be easily monitored, and the staff room is located near the main entrance for oversight.

Integrated Discussion: At Faith Academy, the alignment between the physical environment and user perception reflects the successful application of natural surveillance principles. The strategic placement of windows and open planning minimises blind spots, which is a cornerstone of effective

CPTED [12, 13]. This case study finding suggests a transferable implication for school design more generally: the effectiveness of natural surveillance depends not merely on the number of windows, but on strategic management of sightlines to ensure continuous oversight of key areas [27]. The fact that over half of the students reported a willingness to act on what they see or hear is particularly significant. This aligns with prior studies, which show that when environments facilitate observation, they empower users to become key agents in their own security, fulfilling a core tenet of DST [7]. This principle, demonstrated at Faith Academy, has broad applicability for creating actively defended educational spaces beyond this single context.

### 4.3 Image and Milieu: Maintenance, perception, and contextual challenges

The elements of Image and Milieu presented the most significant challenges, with dissatisfaction centred on maintenance and external infrastructure.

Survey Results: As presented in Table 5, perceptions of the

school's image were mixed. While 53.1% of respondents disagreed that the school had physical deterioration, a notable 48.4% were dissatisfied with the general cleanliness of the environment. Regarding milieu, although 51.6% disagreed that the school was in a crime-prone area, an overwhelming 55.6% indicated that the roads surrounding the school were not well constructed.

**Table 5.** Student perceptions of image and milieu (n = 126)

Variable	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Mean	Std. Deviation
Physical deterioration	19.8%	33.3%	12.7%	23.0%	10.3%	2.68	1.30
Satisfaction with cleanliness	16.7%	31.7%	11.9%	33.3%	4.8%	2.73	1.21
School in a crime-prone area	21.4%	30.2%	18.3%	23.8%	6.3%	2.63	1.24
Roads well-constructed	28.6%	27.0%	10.3%	25.4%	8.7%	2.59	1.36

Observational Findings: Observations largely supported the positive aspects of the school's image, noting well-maintained buildings with little to no vandalism and trimmed vegetation. However, the poor condition of the access roads, specifically Ota Road, was visibly evident and constituted a significant negative aspect of the school's milieu.

Integrated Discussion: At Faith Academy, dissatisfaction with cleanliness despite the overall lack of vandalism presents a site-specific illustration of the nuanced nature of "image." It suggests that for these students, daily maintenance routines are as important as the absence of major damage. This finding underscores a broader principle in environmental criminology: that minor signs of disorder, like litter, can signal a lack of care and potentially lead to more serious issues, as posited by the Broken Windows theory [28, 29]. Similarly, the poor state of the surrounding roads at Faith Academy represents a critical, context-dependent milieu factor that not only affects accessibility but may also subconsciously signal isolation and poor connectivity. This case study finding reinforces a transferable implication for school safety planning: that a school's security is inextricably linked to the quality and safety of its immediate external environment [30, 31]. Therefore, a holistic approach to school safety must extend beyond the school's perimeter, a principle applicable to educational

facilities in similar contexts.

### 4.4 Overall perception of safety

Despite the identified concerns, the overall perception of safety within the school was positive. As shown in Table 6, 49.3% of students felt safe within the school grounds, and a strong majority (64.3%) expressed general satisfaction with the level of security. This indicates that the application of defensible space principles, even with its imperfections, contributes to a generally secure environment.

A preliminary subgroup analysis was conducted to explore variations in overall safety perception. An independent samples t-test comparing safety satisfaction between male (Mean (M) = 3.25, Standard deviation (SD) = 1.05) and female (M = 3.13, SD = 1.11) students revealed no statistically significant difference (t-statistic (124) = 0.63, p-value = 0.53). Similarly, a one-way Analysis of Variance (ANOVA) examining differences across the three class levels (SSS1, SSS2, SSS3) showed no significant variation in feelings of safety within the school (F-statistic (2,123) = 0.05, p-value = 0.95). These results indicate that perceptions of safety and security were consistent across gender and class level subgroups within the sample.

**Table 6.** Overall perception of safety and security (n = 126)

Variable	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Mean	Std. Deviation
Feeling safe in school	7.9%	20.6%	22.2%	43.7%	5.6%	3.19	1.08
Satisfaction with security level	9.5%	14.3%	11.9%	51.6%	12.7%	3.44	1.17

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Key conclusions

This study yields three primary conclusions regarding the application of DST in the Nigerian secondary school context:

1. The territoriality paradox: The school exhibits strong physical territoriality through clear boundaries and access control, yet demonstrates a significantly weaker psychological sense of ownership among students. This disconnect highlights a critical, often overlooked gap between architectural implementation and user internalisation of DST principles.

2. Effective natural surveillance: The architectural design successfully facilitates natural surveillance, a finding corroborated by both physical audit and student perception. Importantly, this surveillance potential translates into reported

vigilant behaviour, affirming the pillar's role in empowering users as active agents in their own security.

3. Contextual vulnerabilities: The study identified significant vulnerabilities in the Image (daily maintenance and cleanliness) and Milieu (poor external road infrastructure) pillars. These context-dependent factors, though external to the core architectural design, substantially influence the overall defensibility and perceived safety of the school environment.

### 5.2 Actionable recommendations

Derived directly from the conclusions above, the following prioritised recommendations are proposed:

1. Address the territoriality paradox: School administrators should implement programs to foster psychological ownership. This can be achieved by creating opportunities for

student personalisation of spaces, such as establishing permanent, curated displays of student artwork in common areas and involving students in the design or stewardship of specific zones.

2. Strengthen image through rigorous maintenance: To project an image of care and control, a transparent and consistently enforced maintenance protocol must be established. This protocol should prioritise the immediate remediation of minor disorders (e.g., litter, minor repairs) to prevent the signalling of neglect, thereby strengthening the perceived defensibility of the space.

3. Mitigate Milieu-related risks: The school administration should proactively engage with local government authorities and community stakeholders. Advocacy should focus on the improvement of surrounding road infrastructure, explicitly framing it not just as a convenience issue, but as a critical component of the school's security infrastructure.

### 5.3 Limitations and future research

This study, while providing in-depth insights, is constrained by its design as a single-case study, which limits the generalizability of findings to other institutional and cultural contexts. Furthermore, the perceptual data were gathered exclusively from students; incorporating the perspectives of teachers, administrators, and security personnel would yield a more holistic, multi-stakeholder understanding. Finally, the cross-sectional nature of the data offers a snapshot in time and cannot capture longitudinal dynamics in perception or environmental conditions.

Future research should seek to apply this integrated DST assessment framework across a larger, more diverse sample of schools (including public institutions) to enable comparative analysis. Longitudinal studies are needed to evaluate the long-term impact of implementing DST-aligned interventions on both perceived and objective security outcomes. Further investigation could also explore the synergistic integration of technological security systems with the principles of natural surveillance and territoriality.

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### REFERENCES

- [1] Laptiev, M., Zakharov, O. (2021). Experience of leading countries of the world regarding the organization of education institutions security. *Economics, Finance and Management Review*, 1(1): 81-90. <https://doi.org/10.36690/2674-5208-2021-1-81>
- [2] Milligan, M., Doss, K.M., Zungu, B. (2024). Violence in South African schools: Trends, psychology and recommendations. *Perspectives in Education*, 42(1): 4-22. <https://doi.org/10.38140/pie.v42i1.7251>
- [3] Umar, Y. (2022). Insecurity in Nigerian education system: Implications for educational managers. *BIJE: Bichi Journal of Education*, 16(1): 87-95.
- [4] Kanu, I.A., Pilani, M.P., Bazza, M.B., Kamai, P.H., Kanyip, P.B., Onukwuba, M. (2024). Educational insecurity in Northwest Nigeria. *International Journal of Religion*, 5(7): 151-164. <https://doi.org/10.61707/9zmetc45>
- [5] Adamu, C.D., Uleanya, C. (2025). Insecurity in secondary school education: A solution to sustainable development in Northern Nigeria. *Journal of Governance Risk Management Compliance and Sustainability*, 5(1): 66-84. <https://doi.org/10.31098/jgrcs.v5i1.2727>
- [6] Owoseni, A., Ibem, E., Opoko, A. (2020). Impact of physical learning environment on students' learning outcomes in secondary schools in Lagos State, Nigeria. *Universal Journal of Educational Research*, 8(8): 3635-3642. <https://doi.org/10.13189/ujer.2020.080841>
- [7] Newman, O. (1973). *Defensible Space: Crime Prevention Through Urban Design*. Collier Books, New York.
- [8] Berg, R.F., Cisneros, H. (2003). *Defensible Space: Deterring Crime and Building Community*. DIANE Publishing, USA.
- [9] Moanis, Y., Hussein, F. (2021). Defensible spaces. *Encyclopedia*, 1(2): 314-323. <https://doi.org/10.3390/encyclopedia1020026>
- [10] Prenzler, T. (2024). Creating defensible spaces and designing out opportunities for crime. In *Preventing Crime and Disorder in Public Places: Blending Opportunity Reduction, Guardianship and Welfare*, pp. 17-35. [https://doi.org/10.1007/978-3-031-63764-3\\_2](https://doi.org/10.1007/978-3-031-63764-3_2)
- [11] Jegede, F.O., Ibem, E.O., Oluwatayo, A.A. (2021). The influence of location, planning and design features on residents' satisfaction with security in public housing estates in Lagos, Nigeria. *Urban Design International*, 26(2): 174-196. <https://doi.org/10.1057/s41289-020-00141-7>
- [12] Cozens, P., Love, T. (2015). A review and current status of crime prevention through environmental design (CPTED). *Journal of Planning Literature*, 30(4): 393-412. <https://doi.org/10.1177/0885412215595440>
- [13] Lamoreaux, D., Sulkowski, M.L. (2020). An alternative to fortified schools: Using crime prevention through environmental design (CPTED) to balance student safety and psychological well-being. *Psychology in the Schools*, 57(1): 152-165. <https://doi.org/10.1002/pits.22301>
- [14] Izobo-Martins, O., Dare-Abel, O., Kunle, A.V. (2014). Infrastructure conditions in public secondary school, Ogun State, Nigeria. *International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development*, 4(5): 17-24.
- [15] Ohunene, A.R., Philip, A.Y.U.B.A. (2019). Users perception of landscape elements as security measures in secondary school, Minna, Nigeria. *Journal of Engineering and Architecture*, 7(1): 62-67. <https://doi.org/10.15640/jea.v7n1a7>
- [16] Vagi, K.J., Stevens, M.R., Simon, T.R., Basile, K.C., Carter, S.P., Carter, S.L. (2018). Crime prevention through environmental design (CPTED) characteristics associated with violence and safety in middle schools. *Journal of School Health*, 88(4): 296-305. <https://doi.org/10.1111/josh.12609>
- [17] Soheil, J., Talebie, T. (2023). Investigation of the relation of secondary territory spatial quality in enhancing the sense of environmental safety among

- students in educational spaces. *Armanshahr Architecture & Urban Development*, 16(42): 63-77. <https://doi.org/10.22034/aaud.2022.269447.2404>
- [18] Gomez-Torres, A. (2025). Public space and safety: Access control a means for territorial reinforcement. In *The Dusk of Design: Exploring Multidisciplinary Approaches and Evolutionary Biology in Architecture*, pp. 133-146. [https://doi.org/10.1007/978-3-031-76867-5\\_11](https://doi.org/10.1007/978-3-031-76867-5_11)
- [19] Killen, J.P., Evans, G.W., Danko, S. (2003). The role of permanent student artwork in students' sense of ownership in an elementary school. *Environment and Behavior*, 35(2): 250-263. <https://doi.org/10.1177/0013916502250133>
- [20] Oluwatayo, A.A., Aderonmu, P.A., Aduwo, E.B., Peter, N.J. (2016). Learning environment, motivation and self-regulated learning among students in technical fields. *Journal of Education Research*, 10(3).
- [21] McElhany, J.S. (2017). Awakening student ownership: Transitioning to a student-centered environment. *Art Education*, 70(1): 29-35. <https://doi.org/10.1080/00043125.2017.1247567>
- [22] Momoh, T. (2023). Evaluation of security measures, in the design of a public boarding school in Funtua, Kastina State. Doctoral dissertation.
- [23] Jegede, F.O., Adewale, B.A., Ayara, E.J., Faleti, M.O. (2022). Users' perception of compliance of security features with defensible space principles in selected secondary schools in Ota, Ogun State, Nigeria. *IOP Conference Series: Earth and Environmental Science*, 1054: 012031. <https://doi.org/10.1088/1755-1315/1054/1/012031>
- [24] Jacobs, J. (1961). *The Death and Life of Great American Cities*. Random House, New York.
- [25] Reynald, D.M. (2015). Environmental design and crime events. *Journal of Contemporary Criminal Justice*, 31(1): 71-89. <https://doi.org/10.1177/1043986214552618>
- [26] Sholanke, A.B., Ekhaese, E.N., Ekundayo, P.A. (2024). Users' knowledge of fire safety measures in educational environment: A case study of a college building in Nigeria. *International Journal of Safety & Security Engineering*, 14(1): 135-143. <https://doi.org/10.18280/ijssse.140113>
- [27] Fujii, T., Fujikawa, Y., Oikawa, K. (2013). A quantitative analysis of natural surveillance at elementary schools-evaluation method based on perspectives from both outside visibility and visibility from inside buildings. *Journal of Asian Architecture and Building Engineering*, 12(1): 17-23. <https://doi.org/10.3130/jaabe.12.17>
- [28] Afreh, B. (2023). Effects of inter-hall student vandalism on the development of the University of Cape Coast. Doctoral dissertation, University of Cape Coast.
- [29] Wang, J., Park, M., Lee, J. (2025). Tracing disorder: Environmental catalysts for misdemeanors and felonies in Chicago. *Applied Spatial Analysis and Policy*, 18(4): 125. <https://doi.org/10.1007/s12061-025-09723-w>
- [30] Idowu, A., Amoo, E., Ajayi, M., Odewale, B., Jegede, A., Adekeye, O. (2015). Neighbourhood disadvantages and attitude to schooling in poor urban settlement in Nigeria: Implications for development. In *8th International Conference of Education, Research and Innovation*, Seville, Spain, pp. 1959-1966. <https://library.riated.org/view/IDOWU2015NEI>
- [31] Erickson, A.T., Highsmith, A.R. (2018). The neighborhood unit: Schools, segregation, and the shaping of the modern metropolitan landscape. *Teachers College Record*, 120(3): 1-36. <https://doi.org/10.1177/016146811812000308>
- [32] Moore, J.A., Powers, D.S. (2003). *Florida Safe School Design Guidelines*. Florida Department of Education, Florida. <https://files.eric.ed.gov/fulltext/ED446412.pdf>
- [33] Saxena, R., Kamal, M.A. (2018). The impact of built environment on crime prevention and safety in schools: An environmental-behavior design guidelines approach. *American Journal of Civil Engineering and Architecture*, 6(6): 260-270. <https://doi.org/10.12691/ajcea-6-6-5>
- [34] Gbesoevi, E.S., Ola, B.A., Oladipo, S.A. (2022). Safety and security planning and effective management of public secondary schools in Lagos State, Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, 7(1): 106-118. <https://ajemates.org/index.php/ajemates/article/view/156>
- [35] Marube, C.B. (2024). Defensible design theory for crime reduction in estates in Nairobi, Kenya a case study of Shauri Moyo Estate. Doctoral dissertation, University of Nairobi.
- [36] Creswell, J.W., Clark, V.L.P. (2017). *Designing and Conducting Mixed Methods Research*. Sage Publications, USA.
- [37] Yin, R.K. (2018). *Case Study Research and Applications Design and Methods*. Sage Publications, USA.
- [38] Google Earth. (2024). Aerial Image of Faith Academy, Ota, Ogun state, Nigeria. Retrieved from Google Earth.
- [39] Lynn, P. (2019). The advantage and disadvantage of implicitly stratified sampling. *Methods, Data, Analyses: A Journal for Quantitative Methods and Survey Methodology*, 13(2): 253-266. <https://doi.org/10.12758/mda.2018.02>
- [40] Faith Academy, Ota. (2024). School administrative records: Student population distribution by class.
- [41] Sholanke, A.B., Opoko, A.P., Akpan, O.S., Adigun, T.F. (2019). Universal design of selected secondary schools in Akwa Ibom state, Nigeria: Students' perception of accessibility provisions in meeting their needs. *Journal of Physics: Conference Series*, 1378: 042087. <https://doi.org/10.1088/1742-6596/1378/4/042087>
- [42] Ahmad, N., Alias, F.A., Hamat, M., Mohamed, S.A. (2024). Reliability analysis: Application of Cronbach's alpha in research instruments. In *Pioneering the Future: Delving into E-Learning's Landscape*, pp. 114-119.
- [43] Dissanayake, M.P. (2025). Observational methods: The importance of observational methods in the study of human behaviour. *Journal of Social Sciences-NISD*, 3(1). <https://doi.org/10.4038/jssnisd.v3i1.25>
- [44] Banks, M. (2018). *Using Visual Data in Qualitative Research*. Sage Publications, USA.
- [45] Rose, G. (2022). *Visual Methodologies: An Introduction to Researching with Visual Materials*. Sage Publications, USA.
- [46] Faith Academy, Ota. (2024). School administration records: Classroom layout documentation.