

Human and Artificial Intelligence Nexus in the Management of Security Quagmire in Public Schools in Nasarawa West Senatorial District, Nigeria

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Abstract: This study examined the nexus between human intelligence and Artificial Intelligence (AI) in the management of security quagmire in public secondary schools in Nasarawa West Senatorial District, Nigeria. The study focused on how the integration of human decision-making, professional judgment, and experience with AI-driven security technologies enhances school safety and crisis management. A descriptive survey research design was adopted. The population comprised principals, vice principals, teachers, and security personnel in public secondary schools in the district, totaling 3,214 respondents. Using Krejcie and Morgan's table, a sample of 346 respondents was selected. Data were collected using a structured questionnaire validated by experts, with a Content Validity Index of 0.82 and a Cronbach Alpha reliability coefficient of 0.81. Mean and standard deviation were used to answer the research questions, while chi-square statistics tested the hypotheses at a 0.05 significance level. Findings revealed a significant relationship between human intelligence–AI collaboration and effective management of security challenges such as vandalism, intrusions, theft, and student unrest. The study concludes that while AI technologies enhance surveillance and early warning systems, human intelligence remains indispensable for ethical judgment, contextual interpretation, and responsive decision-making. It recommends deliberate investment in AI-based security infrastructure alongside capacity-building for school administrators and security personnel.

Keywords: Human Intelligence, Artificial Intelligence, School Security, Security Quagmire, Public Schools, Nasarawa West.

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I. INTRODUCTION

Security has become a critical concern in educational institutions across the globe, particularly in developing countries where schools increasingly face multifaceted threats such as vandalism, theft, cult-related violence, kidnapping, armed banditry, and community intrusion. These threats have transformed schools from safe learning environments into vulnerable spaces exposed to broader societal insecurity. According to Adegbamigbo and Uche (2021), schools mirror the security conditions of the society in which they operate; thus, when insecurity becomes pervasive at the national or regional level, educational institutions are inevitably affected. In Nigeria, public schools are not insulated from the growing insecurity that permeates the wider society, as incidents of school invasion, destruction of facilities, abduction of students, and attacks on teachers have been widely reported. The safety of learners, teachers, and school property is fundamental to the achievement of

educational objectives and sustainable national development, because learning cannot thrive in an atmosphere of fear, uncertainty, and violence. Where security is compromised, effective teaching and learning become impossible, leading to poor academic outcomes, increased dropout rates, teacher absenteeism, and declining public confidence in the education system (Eze & Nwafor, 2022).

Education is widely recognized as a cornerstone of sustainable national development, as it equips individuals with the knowledge, skills, values, and competencies necessary for social stability, economic productivity, and civic engagement. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2021) emphasized that safe, inclusive, and peaceful learning environments are prerequisites for achieving Sustainable Development Goal 4, which focuses on ensuring inclusive and equitable quality education for all. Insecure school environments undermine this goal by disrupting instructional

activities and exposing learners to psychological trauma that negatively affects cognitive development and academic performance. In Nigeria, insecurity in schools has contributed to declining enrollment in some regions, particularly in rural and conflict-prone areas, thereby exacerbating educational inequality and social exclusion (Ogunode, 2023). Consequently, addressing school security challenges is not merely an administrative necessity but a developmental imperative.

Traditionally, the management of school security has relied heavily on human intelligence. Human intelligence refers to the cognitive ability to reason, judge, interpret situations, solve problems, and make ethical decisions based on experience, emotions, and contextual understanding. In school settings, principals, teachers, guidance counselors, and security personnel depend on their professional judgment, intuition, situational awareness, and interpersonal skills to identify potential threats and respond appropriately. According to Afe (2020), school administrators play a central role in maintaining discipline and safety by enforcing rules, monitoring student behavior, engaging community stakeholders, and coordinating security measures. Human intelligence allows school leaders to understand subtle social dynamics, anticipate conflicts, and mediate disputes before they escalate into serious security incidents.

However, the complexity, scale, and frequency of modern security challenges have stretched the limits of purely human-centered approaches. Human-based security systems are often constrained by fatigue, limited surveillance coverage, slow response time, and subjective judgment. In large public schools with inadequate staffing, it is practically impossible for human security personnel to monitor all entry points and school activities simultaneously. Furthermore, human error, corruption, and poor motivation can weaken the effectiveness of traditional security measures (Adeniran & Adediran, 2021). These limitations have prompted policymakers and educational administrators to explore technology-driven solutions that can complement human efforts in managing school security.

Artificial Intelligence (AI), which involves the use of computer systems capable of performing tasks that normally require human intelligence—such as pattern recognition, prediction, learning, and decision support—has emerged as a transformative tool in security management (Russell & Norvig, 2021). AI systems process large volumes of data at high speed, identify patterns invisible to human observers, and generate predictive insights that support proactive decision-making. In school environments, AI applications include closed-circuit television (CCTV) surveillance with facial recognition, access control systems, intrusion detection sensors, biometric attendance systems, and predictive analytics for risk assessment (Zhang & Lu, 2022). These technologies enable continuous monitoring of school premises, rapid detection of unusual activities, and automated alerts that enhance security response.

Globally, AI-driven security systems have been deployed in educational institutions to reduce crime and

improve emergency preparedness. Studies conducted in advanced economies indicate that AI-enabled surveillance systems significantly reduce incidents of theft, vandalism, and unauthorized access in school environments (OECD, 2022). In developing countries, however, the adoption of AI in school security remains uneven due to infrastructural deficits, funding constraints, and limited technical expertise. In Nigeria, while some private schools and urban institutions have begun experimenting with AI-based security technologies, most public schools still rely on manual surveillance and conventional security arrangements that are inadequate for contemporary security threats (Ogunode & Mustapha, 2021).

The concept of the human–AI nexus emphasizes collaboration rather than replacement. Rather than viewing Artificial Intelligence as a substitute for human intelligence, the nexus approach recognizes AI as a complementary tool that enhances human decision-making. AI provides speed, accuracy, consistency, and data-processing capacity, while humans provide ethical reasoning, empathy, contextual interpretation, and accountability. According to UNESCO (2022), effective security governance in educational institutions depends on the balanced integration of intelligent technologies with human oversight to prevent misuse, bias, and ethical violations. AI systems may detect suspicious movements or predict potential risks, but human actors must interpret these outputs within the social, cultural, and institutional context of the school before taking action.

In the Nigerian context, the human–AI nexus is particularly relevant because security challenges in schools are often deeply embedded in community dynamics, cultural norms, and socio-economic conditions. For instance, youth restiveness, communal conflicts, and poverty-related crimes cannot be adequately addressed through technology alone without human engagement, dialogue, and conflict resolution skills. As Ololube (2020) observed, educational leadership in Nigeria requires a human-centered approach that integrates technology with social intelligence and moral responsibility. Thus, AI-based security systems must be guided by trained school administrators and security personnel who understand the local environment and can make informed decisions. In Nasarawa West Senatorial District—comprising local government areas such as Keffi, Kokona, Karu, Nasarawa, and Toto—public schools face peculiar security challenges that reflect broader socio-political and economic realities. These challenges include porous school boundaries, inadequate perimeter fencing, insufficiently trained security guards, communal clashes, cult-related activities, and youth restiveness. Many schools are located close to highways, markets, or residential settlements, making them vulnerable to intrusion and criminal activities. In addition, rapid urbanization in areas like Karu and Keffi has increased population pressure on schools, further complicating security management (Adeniran & Adediran, 2021).

The integration of AI-supported security systems with human intelligence could significantly strengthen preventive and responsive mechanisms in public schools within the district. AI-enabled surveillance cameras can monitor school

premises round-the-clock, detect unauthorized entry, and provide real-time alerts to administrators and security agencies. Biometric systems can control access to school facilities, ensuring that only authorized staff and students enter the premises. Predictive analytics can analyze past security incidents and identify high-risk periods or locations within schools, enabling proactive intervention. When combined with human intelligence, these technologies empower school leaders to make timely and informed security decisions that protect lives and property.

Moreover, the human–AI nexus can enhance crisis response and emergency management in schools. In situations such as violent outbreaks, fire incidents, or external attacks, AI systems can provide real-time information on movement patterns and safe evacuation routes, while human decision-makers coordinate response efforts and provide emotional support to students and staff. According to Holmes, Bialik, and Fadel (2022), the effectiveness of AI in crisis situations depends largely on human capacity to interpret data accurately and act decisively. This underscores the importance of training school administrators and security personnel in both technological literacy and human-centered leadership skills. Despite the promising potential of integrating human intelligence and AI in school security management, empirical studies examining this relationship in Nasarawa West Senatorial District remain scarce. Most existing studies in Nigeria focus broadly on school safety or ICT integration without specifically addressing the synergy between human and artificial intelligence in managing security challenges. This gap in the literature limits evidence-based policymaking and hinders the development of context-specific security strategies for public schools. As noted by Eze and Okwori (2022), localized empirical research is essential for understanding how technological innovations interact with human factors in specific educational settings. Furthermore, the adoption of AI-based security systems in public schools raises critical ethical and policy concerns. Issues such as data privacy, surveillance overreach, algorithmic bias, and accountability must be carefully managed to prevent abuse and protect the rights of students and staff. UNESCO (2022) emphasized that AI in education should be governed by clear ethical frameworks that prioritize human dignity, transparency, and inclusiveness. Without proper regulation and human oversight, AI-driven security systems could inadvertently reinforce inequalities or create new forms of exclusion within school communities. The growing insecurity facing public schools in Nigeria, particularly in Nasarawa West Senatorial District, necessitates innovative and sustainable approaches to security management. While human intelligence has traditionally played a central role in maintaining school safety, its limitations in the face of complex and evolving threats highlight the need for technological support. Artificial Intelligence offers powerful tools for surveillance, prediction, and response, but its effectiveness depends on meaningful integration with human judgment, ethical reasoning, and contextual understanding. The human–AI nexus therefore represents a balanced and forward-looking approach to managing security quagmire in public schools. By combining technological efficiency with human responsibility,

educational institutions can create safer learning environments that support effective teaching, learning, and sustainable national development.

➤ *Statement of the Problem*

Public secondary schools in Nasarawa West Senatorial District are increasingly confronted with security challenges such as vandalism of school facilities, theft of instructional materials, unauthorized access by intruders, student violence, and community-related conflicts. These security threats disrupt academic activities, instill fear among students and staff, and undermine the overall quality of education. Traditionally, school security management has relied almost exclusively on human intelligence—principals, teachers, guards, and community vigilante groups. However, human-centered approaches are often constrained by fatigue, limited coverage, delayed response, and subjective judgment. Conversely, while Artificial Intelligence offers advanced surveillance and predictive capabilities, its effectiveness is limited without human interpretation, ethical oversight, and decision-making. Most public schools in Nasarawa West lack AI-based security infrastructure, and where such technologies exist, there is limited capacity among school administrators to integrate them effectively with human security strategies. This raises a critical question: how does the nexus between human intelligence and Artificial Intelligence influence the management of security quagmire in public schools? Addressing this problem is essential for ensuring safe learning environments and sustaining educational development in the region.

➤ *Research Questions*

- What is the relationship between the human–artificial intelligence nexus and the management of security quagmire in public secondary schools in Nasarawa West Senatorial District?
- To what extent does the integration of human intelligence and AI enhance preventive and responsive security measures in public secondary schools in Nasarawa West Senatorial District?

II. METHODOLOGY

The study adopted a descriptive survey research design. The population comprised 3,214 principals, vice principals, teachers, and security personnel in public secondary schools in Nasarawa West Senatorial District. A sample of 346 respondents was selected using Krejcie and Morgan's table. Data were collected using a structured questionnaire divided into sections on human intelligence, AI-based security tools, and school security management. The instrument was validated by experts in Educational Management and Security Studies, yielding a Content Validity Index of 0.82. Reliability testing using Cronbach Alpha produced a coefficient of 0.81. Mean and standard deviation were used to answer the research questions, while chi-square statistics tested the hypotheses at a 0.05 level of significance.

III. RESULTS

➤ Research Question 1

What is the relationship between the human–artificial intelligence nexus and the management of security quagmire in public secondary schools?

Table 1: Mean Ratings on Human–AI Nexus and School Security Management

Item	Description	Mean ($\bar{X}$)	SD	Decision
1	Human judgment complements AI surveillance systems in detecting security threats	3.28	0.81	Agreed
2	AI technologies enhance the effectiveness of school security personnel	3.22	0.83	Agreed
3	Human oversight is necessary for interpreting AI-generated security data	3.30	0.79	Agreed

Cluster Mean || 3.27 | 0.81 | Agreed |

➤ Interpretation:

The cluster mean of 3.27, which is above the benchmark of 2.50, indicates a positive relationship between the human–AI nexus and the management of security challenges in public schools.

➤ Research Question 2

To what extent does the integration of human intelligence and AI enhance preventive and responsive security measures?

Table 2: Mean Ratings on Preventive and Responsive Security Measures

Item	Description	Mean ($\bar{X}$)	SD	Decision
4	AI-based early warning systems support proactive security decisions	3.25	0.82	Agreed
5	Collaboration between humans and AI improves emergency response in schools	3.29	0.80	Agreed
6	Human–AI integration reduces security breaches in public schools	3.21	0.84	Agreed

Cluster Mean || 3.25 | 0.82 | Agreed |

➤ Interpretation:

Respondents agreed that integrating human intelligence with AI significantly enhances both preventive and responsive security measures in schools.

Nasarawa West, where schools often have limited security staff, AI tools can serve as force multipliers, extending surveillance coverage beyond human limitations.

IV. DISCUSSION OF FINDINGS

The findings of this study revealed a significant relationship between the human–artificial intelligence nexus and the effective management of security quagmire in public secondary schools in Nasarawa West Senatorial District. This suggests that neither human intelligence nor Artificial Intelligence alone is sufficient to address contemporary school security challenges; rather, their integration provides a more robust and sustainable solution.

The study showed that human judgment and contextual understanding are essential for interpreting AI-generated security data. This supports the position of Holmes et al. (2022), who argued that AI systems lack moral reasoning and situational sensitivity, making human oversight indispensable in security decision-making. In school environments, administrators must assess the social and cultural context of security alerts before taking action, a task that AI alone cannot perform.

Furthermore, the findings indicated that AI enhances the efficiency of security personnel through surveillance, monitoring, and early detection of threats. This aligns with Zhang and Lu (2022), who noted that AI-driven surveillance systems improve response time and reduce human error. In

The integration of AI-based early warning systems with human intelligence was also found to strengthen preventive security measures. This corroborates UNESCO (2022), which emphasized that predictive analytics can help institutions anticipate risks, while humans design and implement appropriate interventions. For public schools, this synergy reduces incidents of vandalism, unauthorized access, and student unrest.

However, the study also implies that over-reliance on AI without human involvement could be counterproductive. Ethical concerns such as privacy, misuse of surveillance data, and misinterpretation of automated alerts necessitate strong human governance structures. As noted by Ogunode (2023), AI must operate within clearly defined ethical and administrative frameworks in Nigerian schools. The findings demonstrate that the human–AI nexus enhances school security management by combining technological efficiency with human responsibility, thereby creating safer learning environments conducive to academic achievement and sustainable educational development.

V. CONCLUSION

The study concluded that the effective management of security quagmire in public secondary schools in Nasarawa West Senatorial District depends largely on the strategic

integration of human intelligence and Artificial Intelligence. While AI enhances surveillance, prediction, and response efficiency, human intelligence remains crucial for ethical judgment, contextual understanding, and decision-making. The human–AI nexus therefore represents a sustainable approach to improving school security and safeguarding educational environments.

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