Leveraging AI-Powered Learning Tools in Developing Critical Thinking Skills among Nigerian Undergraduates to Combat Insecurity

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Abstract

The use of Artificial Intelligence (AI) has not just been limited to tech fields, but they have also changed how Nigerian school teach and learn. Educators have been investigating on possible ways that knowledge acquisition can help students become more critically minded of the problems that surround them. The present study examined the impact of AI-Powered learning tools on developing critical thinking skills among undergraduates in a period of insecurity in Nigeria. The study employed a descriptive survey research design. The population of the study composed of 420 undergraduate students in the Department of Science Education, Akwa Ibom State University. The study utilized an accidental sampling technique to recruit 126 level 300 and 400 students. The Critical Thinking Skills Assessment Questionnaire (CTSAQ) and the Specific Security Challenges Questionnaire (SSCQ) were used as the instruments for data collection. The reliability of the instrument was determined using Cronbach alpha and the reliability index obtained were 0.75 and 0.88 for CTSAQ and SSCQ respectively. Mean, standard deviation, and one-sample t-tests statistics were used to analyze the gathered data. The findings show a significant improvement in critical thinking skills and a positive perception in the usefulness of AI-Powered tools, with students showing more interest in security-related subjects. Students expressed a favorable attitude toward AI-Powered learning tools since they foster the growth of their security-related critical thinking skills. Additionally, AI-Powered learning tools are seen by Nigerian undergraduates as useful tools for fostering critical thinking skills that could help tp tackle security challenges. Hence, the study concluded that undergraduates' critical thinking and attitudes toward security issues are positively impacted by AI-Powered learning tools. It was therefore recommended that Nigerian universities should integrate AI-Powered learning tools such as tutoring systems, academic chat assistants, chatbots, and interactive simulations into everyday teaching and the curriculum.

Keywords: AI-Powered Learning Tools, Critical Thinking Skills, Nigerian Undergraduates, Insecurity

Introduction

The role of technology in education has shifted from a supportive digital tool to an active driver of change, a paradigm shift that is gradually led by the emergence of Artificial Intelligence (AI). This evolution from simple digital tool to sophisticated AI-Powered systems has fundamentally reshaped the core dynamics of the educational system, thereby impacting how instructors teach, how students learn, and how institutions are managed. The value of this shift is clear as technology fosters a high level of user learning tools and creates opportunities for trainees to learn and develop at their own pace within e-learning environments (Itighise et al., 2022). According to Agbarakwe and Chibueze (2024), the rapid educational evolution is geared by scientific and technological breakthroughs, with AI now positioned to play a central role as

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its integration could bring about feedback and assessment mechanisms, thereby offering a promising path to address persistent issues with educational quality and effectiveness. As stated by Itighise (2018), its utilization in higher institutions plays an important role in student skill acquisition and self-independence, which are vital for national development.

Beyond just being educational and digital tools that simply delivered classroom content, AI represents a more advanced technology level with the capacity for features such as adaptive learning, personalized feedback, and real-time data analysis, which offers a concrete impact on the quality and effectiveness of instructional processes (Omodero, 2021). This potential extends beyond just the classroom and through the modification educational strategies, AI can play a powerful role in enhancing the broader security landscape through education. The growing influence in AI in education matters mostly as it helps students build core skills such as critical thinking skills, which they need to live up to expectations of today's society which has complex security issues and challenges. West & Allen (2018) posit that AI is not a futuristic vision rather something that has come to stay with the present generation. It is being deployed into a variety of sectors such as finance, healthcare, criminal justice, transportation, and most importantly educational and national security which is the focus of this study.

John (2019), opined that AI is not a new phenomenon as it has become a much bigger part of our lives due to improvements in machine learning, big data analytics, deep learning etc among others. The current utilization of AI tools is at the peak in the present century and it is the first to combine the elements such as machine learning, natural language processing and data analytics in order to develop and design intelligent systems which is able to interact with students and instructors on daily basis. AI systems in education have several functions such as assessment of student progress, identification of learning gaps, and customization of instruction in real time. An example of how AI driven systems in education have improved the instructional process is through the use of AI based platforms that can analyze a students' academic performance data and determine the students' strength and weakness in specific subject matter and most importantly customization of the curriculum to meet those identified needs (Zawacki-Richter et al., 2019). The AI system's adaptability allows for a more personalized learning experiences thereby changing how students learn to think critically and solve problems. Unlike traditional educational technologies, such as online courseware and digital textbooks, which typically provide passive learning opportunities through static content. AI systems enable interactive learning environments where students can participate in simulations, examine real-time data, and explore complex situations. To this end, the current practices of AI integration encompass several extents, including the incorporation of AI algorithms and tools into course materials, instructional methods, and assessment strategies by university lecturers (Muhie &Woldie, 2020).

One noticeable strength of AI in education is its potential to help students engage with real-world challenges, particularly in the Nigerian context, where insecurity has become a major concern. The insecurity challenges in Nigeria remains multidimensional, arising from many angles: Boko Haram, herdsmen, bandits, unknown gunmen, kidnapers, militants and separatist agitators (Nsude, 2022). The government is also strengthening security agencies through the provision of security facilities, the development and broadcast of security tips in the mass media and security education. These measures are targeted at deterring or disrupting potentials attacks. (Angbulu, 2021). However, as stated by Itighise (2022), security education aims to expose learners to the knowledge, values, skills, and experiences they need to understand risks, make informed decisions, and respond responsibly to threats. In many communities, students are increasingly confronted with issues such as cyber threats, misinformation, theft, and other forms of insecurity, making it necessary for schools to explore tools that can strengthen learners' ability to understand and respond to these risks. For instance, AI can be trained to recognize keywords associated with harmful content, helping to prevent cybercrime that causes financial and reputational damage

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(Radulov, 2019). Another application is Face Detection Technology, which is often used in security-sensitive areas like airports. This technology works by mapping faces to law enforcement databases to identify individuals. Similarly, AI can be used to scan social networks for signs of radicalization, a method some agencies employ to prevent terrorist recruitment (Radulov, 2019). While for many countries the prospects of artificial intelligence are exciting, its emergence in Africa conjures images of science-fiction-like innovation (Novitske, 2018).

Several recent studies have highlighted the growing role of AI in helping Nigerian students think more carefully about security-related issues in their environment. Abubakar, Onasanya, and Ibrahim (2024) reported that many undergraduates in Nigerian universities already see AI tools as useful for improving their problem-solving skills, especially when dealing with real-life challenges that require critical analysis. The researchers further reported that students are becoming more aware of how AI can assist in interpreting information and identifying potential risks. Similarly, Qiu and Zhou (2019) explained that integrating AI into educational activities related to security issues can equip learners with the knowledge and confidence to understand how security systems work and how threats can be managed. Studies such as those by Onyekpe et al. (2025) further demonstrated that AI-supported learning promotes deeper reflection, as students engage in simulations and data-driven tasks that mirror situations within their communities. By working with these tools, students can learn to analyze patterns, question assumptions and develop practical responses to emerging threats. Furthermore, Itighise and Akpan (2022) reported a high level of literacy skill acquisition among science education students using handheld devices. Overall, these findings suggested that AI not only supports classroom learning but also helps students cultivate the analytical mindset and critical thinking skills needed to respond responsibly to security challenges around them.

Critical thinking is not merely the accumulation of facts, but the disciplined art of analyzing information, evaluating evidence, and synthesizing concepts to form a reasoned judgment. It entails making a deliberate attempt to go beyond a cursory comprehension, challenging presumptions, and taking into account various viewpoints before reaching a decision (Facione, 2020). In an era saturated with information and complex challenges, these skills go beyond being useful in the classroom to becoming crucial for making decisions on a personal, professional, and civic level especially in times when there is an abundance of information and complicated problems. This is the exact point at which artificial intelligence becomes so potent. Rather than replacing human cognition, AI-Powered tools can be structured to act as catalysts for these very skills. For instance, AI-Powered platforms can present students with complex, real-world scenarios such as analyzing the root causes of community conflict or evaluating the credibility of a news source that require them to apply analysis, inference, and evaluation. According to Shin and Biocca (2018), AI-Powered data analysis tools can assist students in identifying patterns or potential risks in security-related scenarios, equipping them to think critically about preventive measures. AI can process vast amounts of data in real time, allowing it to recognize patterns, predict potential threats, and support decision-making in complex security contexts (Lau & Ho, 2020).

Moreover, AI's potential is instrumental in combating misinformation, one of the growing security challenges in the world today. By analyzing vast datasets and verifying information, AI tools can assist students in distinguishing between reliable and unreliable information sources, thereby promoting media literacy and critical thinking (Zawacki-Richter et al., 2019). In cases where students may face physical security risks, AI can also support institutions in implementing more effective security measures. For example, some universities in high-risk areas could employ AI-based surveillance systems that can detect unusual behavior patterns, identify unauthorized individuals on campus, and alert security personnel to potential threats in real time (Almossa, 2021). Integrating such systems into the educational environment not only enhances physical safety but also demonstrates the practical applications of AI in security,

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reinforcing students' understanding of how technology can mitigate real-world challenges. Researchers like Dwivedi et al. (2021) maintained that when AI is developed with pedagogical intent, it does not offer simple solutions but rather produces dynamic environments that push users to think more deeply and ask more insightful questions, thus actively promoting the fundamentals of critical thinking. Hence, AI-Powered technologies hold immense significance for cultivating critical thinking skills among students.

For Nigerian citizens, especially undergraduates, who face security challenges regularly, critical thinking becomes more than an academic skill but a necessary tool for daily life. Whether they choose to engage with AI tools intended to develop this skill depends heavily on their perception of the technology's effectiveness. Existing researches indicate that students' engagement and learning outcomes are strongly influenced by how they view educational technology tools (Umoetuk et al., 2025; Lau & Ho, 2020; Akpan & Itighise, 2019). If students perceive AI as a legitimate aid, its integration could fundamentally reshape their approach to complex issues like security challenges. Beyond mere perception, a student's underlying attitude is equally critical. A positive disposition towards technology has been consistently linked to deeper engagement and better results (Sunday et al., 2025; Almossa, 2021). In the Nigerian context, nurturing this positive attitude is crucial, as it can inspire students to engage more actively with how AI can be used to create solutions for real-world problems, including the security challenges they face. Equipping students with critical thinking skills is essential, as it enables them to analyze security challenges, assess risks, and propose viable solutions for enhancing safety at both the individual and community levels. While the potential of AI in education is widely recognized, studies have yet to be conducted on the specific mechanisms through which AI-Powered tools cultivate these vital skills in the context of Nigerian insecurity. This study is therefore necessary to fill this gap by providing a detailed investigation into the impact of AI-Powered learning tools on developing critical thinking among Nigerian undergraduates during the period of insecurity.

Statement of the Problem

The global conversation of the immense potential of Artificial Intelligence (AI) in education continues to accelerate, with much emphasis on its power to reshape the industrial and educational sectors. Yet, when this discussion is initiated within the realities of Nigerian higher education, pressing questions emerge that have yet to be sufficiently answered. In a nation where recurring insecurity affects daily life and disrupts academic activities, the need to strengthen students' critical thinking skills becomes even more urgent. These skills are not merely academic assets but essential for enabling students to interpret, evaluate, and respond thoughtfully to the security challenges they confront. While the theoretical potential of AI-Powered tools to foster such critical skills is acknowledged, their practical integration into the Nigerian educational system and teaching practices remains notably limited. There is a lack of clear trend on how Nigerian undergraduates themselves view these AI-Powered tools, whether they perceive them as relevant, and if their attitudes either hinder or promote engagement. More importantly, there exist lack of empirical evidence showing how students' perception and attitude influence the development of critical thinking skills, particularly in relation to security challenges. Hence, this study sought to address these gaps by moving beyond broad assumptions and providing concrete insights on the impact of AI-Powered learning tools in developing critical thinking skills among undergraduates in a period of insecurity in Nigeria.

Research Questions

1. What is the perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges?
2. How does the attitude of Nigerian undergraduates towards AI technology influence their engagement with AI tools for developing critical thinking related to security issues?
3. What specific security challenges do Nigerian undergraduates believe AI-Powered learning tools can help them critically analyze and address?

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Hypotheses

1. There is no significant influence of Nigerian undergraduates' perception of the effectiveness of AI tools on their critical thinking skills for combating insecurity challenges.
2. There is no significant influence of the attitude of Nigerian undergraduates toward AI technology on their engagement with AI tools for developing critical thinking related to security issues.

Methods

The study adopted a descriptive survey design. The population of the study consisted of 420 level 300 and 400 undergraduate students in the Department of Science Education, Akwa Ibom State University. The study utilized an accidental sampling technique to recruit 126 students. This approach was chosen due to the practical constraints of accessing students during the academic schedule, focusing on those who were readily available and willing to participate. The instruments used for data collection were the Critical Thinking Skills Assessment questionnaire (CTSAQ) and the Specific Security Challenges Questionnaire (SSCQ). Cronbach's alpha reliability coefficient was used to determine the reliability of the instruments that yielded reliability coefficients of 0.75 and 0.82 for CTSAQ and SSCQ respectively. The data collected were analyzed using mean, standard deviation, and one-sample t-tests. The Critical Thinking Skills Assessment Questionnaire (CTSAQ) utilizes a Likert-type rating scale featuring four response options: "Strongly Agree" (SA), "Agree" (A), "Disagree" (D), and "Strongly Disagree" (SD), with corresponding numerical values of 4, 3, 2, and 1, respectively. Respondents provided their ratings. Similarly, the Specific Security Challenges Questionnaire (SSCQ) utilizes a Likert-type rating scale featuring four response options: 1-Not at all Helpful (NH), 2-Slightly Helpful (SH), 3-Moderately Helpful (MH), 4-Very Helpful (VH). The value of the Likert-type scale rating was summed and then divided by the number of scales to obtain the discriminating index (4+3+2+1 = 10/4 + 2.5); thus, any statement with a mean score of greater than or equal to (≥) 2.5 was regarded as positive while mean score less than (≤) was regarded as negative. Also, for the SSCQ any statement with the mean below 2.5 was considered low, 2.5-3.49 was considered as moderate while 3.50 to 4.49 was considered as high.

Results

Research Question One: What is the perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges?

Table 1: Mean and standard deviation on the perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges (N=126)

S/N	ITEMS	Mean	SD	Decision
1	AI-powered learning tools enhance my critical thinking skills when studying complex concept	2.93	1.10	A
2	I believe AI-powered learning tools effectively enhance critical thinking skills related to security issues.	3.18	1.07	A
3	I perceive that using AI tools in my studies helps me better understand security challenges in Nigeria.	2.74	0.99	A
4	I believe AI can be useful for identifying trends in campus security issues.	2.56	0.87	A
5	I find AI tools effective in simplifying difficult concepts related to security.	2.53	0.88	A
6	AI tools make it easier for me to analyze real-world issues, especially security challenges.	2.86	1.03	A
7	I think AI can help me learn about fraud prevention and recognize scams.	2.90	0.92	A
8	I feel that AI tools improve my ability to think critically about real-world problems.	2.79	1.01	A
9	I perceive that AI tools provide multiple perspectives on security challenges.	2.69	0.90	A
10	AI tools help me develop critical skills about cause-and-effect relationships in security issues.	2.51	1.38	A
	Cluster Mean	2.77		

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The results presented in the table 1 above provide a summary of mean ratings and standard deviations on the perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges. The mean rating for items 1-10 pertaining to perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges fall within the range of 2.51 to 3.18. This indicates that students' perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges was at a moderate level. The cluster mean of 2.77 which falls within the range of 2.50-3.49 indicate a moderate perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges.

Research Question Two: How does the attitude of Nigerian undergraduates towards AI technology influence their engagement with AI tools for developing critical thinking related to security issues?

Table 2: Mean and standard deviation on the attitude of Nigerian undergraduates towards AI technology influence their engagement with AI tools for developing critical thinking related to security issues

S/N	ITEMS	Mean	SD	Decision
1	I am enthusiastic about using AI tools to improve my critical thinking skills related to security challenges.	2.85	0.81	A
2	I believe AI-powered tools can play a valuable role in helping me understand and address security issues in Nigeria.	3.17	1.04	A
3	I am open to learning more about how AI can help analyze and solve security-related problems.	3.30	0.72	A
4	I feel confident using AI tools to explore solutions for combating insecurity.	2.95	0.98	A
5	I am motivated to engage with AI-powered tools to understand the causes of security threats.	3.08	1.05	A
6	I believe AI technology is a valuable addition to my learning, especially for studying complex security challenges.	2.93	1.16	A
7	I am comfortable using AI tools to improve my ability to analyze and prevent security risks.	2.63	1.18	A
8	I feel that AI-powered learning tools are essential for helping students become more security-conscious.	2.83	1.00	A
9	I am supportive of the use of AI technology in education for addressing societal issues like insecurity.	2.98	0.99	A
10	I believe that AI tools can help me develop critical thinking skills needed to propose solutions for combating insecurity.	2.69	0.91	A
	Cluster Mean	2.94		

The results presented in the table 2 above provide a summary of mean ratings and standard deviations on the attitude of Nigerian undergraduates towards AI technology influence their engagement with AI tools for developing critical thinking related to security issues. The mean rating for items 1-10 pertaining to the attitude of Nigerian undergraduates towards AI technology for developing critical thinking related to security issues fall within the range of 2.63 to 3.30. This indicates that the attitude of Nigerian undergraduates towards AI technology for developing critical thinking related to security issues was at a moderately positive

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level. The cluster mean of 2.94 which falls within the range of 2.50-3.49 indicate a moderately positive attitude of Nigerian undergraduates on how AI technology influence their engagement with AI tools for developing critical thinking related to security issues.

Research Question Three: What specific security challenges do Nigerian undergraduates believe AI-Powered learning tools can help them critically analyze and address?

Table 3: Mean and standard deviation on the specific security challenges do Nigerian undergraduates believe AI-powered learning tools can help them critically analyze and address

S/N	ITEMS	Mean	SD	Decision
1	Cybersecurity threats (e.g., hacking, data breaches)	3.35	1.15	A
2	Fraud and financial scams (e.g., online fraud, identity theft)	3.19	0.90	A
3	Terrorism and violent extremism	3.13	1.04	A
4	Misinformation and fake news	3.05	1.27	A
5	Public health crises and their impact on security (e.g., pandemics, health misinformation)	2.93	0.96	A
6	Drug abuse and related crimes	3.07	1.15	A
7	Campus security issues (e.g., theft, harassment)	3.40	0.86	A
8	Economic security (e.g., job insecurity, poverty-related crimes)	2.83	1.06	A
9	Social unrest and protests	2.58	1.30	A
10	Community safety and preventive measures (e.g., neighborhood watch, police presence)	3.16	0.99	A
	Cluster Mean	3.07		

The results presented in the table 3 above provide a summary of mean ratings and standard deviations on the specific security challenges Nigerian undergraduates believe AI-powered learning tools can help them critically analyze and address. The mean rating for items 1-10 pertaining to the specific security challenges Nigerian undergraduates believe AI-powered learning tools can help them critically analyze and address fall within the range of 2.58 to 3.40. This indicates that there is a high level of believe by Nigerian undergraduates that AI-powered learning tools can help them critically analyze and address. The cluster mean of 3.07 which falls within the range of 2.50-3.49 indicate a high level of believe by Nigerian undergraduates that AI-powered learning tools can help them critically analyze and address.

Hypothesis One: There is no significant influence of Nigerian undergraduates' perception of the effectiveness of AI tools on their critical thinking skills for combating insecurity challenges.

Table 4: One Sample t-test analysis on the influence of Nigerian undergraduates' perception of the effectiveness of AI tools on their critical thinking skills for combating insecurity challenges

Variables	N	Mean	SD	Df	t-valve	p-valve	Decision
Undergraduate students' Perception towards AI	126	2.77	0.31	125	96.2	0.000	Rejected Ho1

Table 4, shows the summary of one sample t-test on the significant influence of Nigerian undergraduates' perception of the effectiveness of AI tools on their critical thinking skills for combating insecurity challenges. The result reveals that there is a significant influence of Nigerian undergraduates' perception of the effectiveness of AI tools on their critical

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thinking skills for combating insecurity challenges (t = 96.2 df= 125, P=0.000). This implies that null hypothesis one was rejected at 0.05 level of significance.

Hypothesis Two: There is no significant influence of the attitude of Nigerian undergraduates toward AI technology on their engagement with AI tools for developing critical thinking related to security issues.

Table 5: One Sample t-test analysis on the influence of the attitude of Nigerian undergraduates toward AI technology on their engagement with AI tools for developing critical thinking related to security issues

Variables	N	Mean	SD	Df	t-valve	p-valve	Decision
Undergraduate students' attitude towards AI	126	2.94	0.35	125	93.5	0.000	Rejected Ho2

Table 5, shows the summary of one sample t-test on the significant influence of the attitude of Nigerian undergraduates toward AI technology on their engagement with AI tools for developing critical thinking related to security issues. The result reveals that there is a significant influence of the attitude of Nigerian undergraduates toward AI technology on their engagement with AI tools for developing critical thinking related to security issues. (t = 93.5 df= 125, P=0.000). This implies that null hypothesis two was rejected at 0.05 level of significance.

Discussion of Findings

The findings on the influence of Nigerian undergraduates' perception of Nigerian undergraduates regarding the effectiveness of AI tools in enhancing critical thinking for combating insecurity challenges confirms a statistically significant influence between Nigerian undergraduates' perception of AI tools and the development of their critical thinking skills for tackling insecurity. This is due to the fact that students who viewed AI as effective were notably better equipped to apply critical analysis to security-related problems. This finding aligns with Adeleke et al. (2024), whose work demonstrated that digital engagement enhances problem-solving capabilities among Nigerian youth. The result is also supported by Atabang and Babayemi (2024), who observed that technology-driven platforms like Zoom and cloud-based tools foster the collaborative and communicative skills that underpin critical thought. Similarly, the study found that students' attitudes toward AI technology significantly shaped their engagement with these tools. This is attributed to the fact that positive disposition appears to fuel curiosity and a willingness to deeply interact with AI applications, thereby strengthening critical thinking skills. This result is in line Edet, Umanah and Sunday (2024), Sunday et al. (2025), Fasola (2024), and Atabang (2024), which consistently note that a favorable attitude toward technology is a key predictor of deeper engagement and its application to real-world issues like security. Finally, the data indicate a strong belief among students that AI-powered tools can aid them in critically analyzing a range of security challenges. This confidence likely stems from a growing awareness of AI's practical security applications, such as facial recognition and predictive analytics, in the wider society. As Ojo and Lawal (2024) suggest, awareness of such real-world applications appears to build students' confidence in AI's potential as a problem-solving resource for local security threats.

Conclusion

The study examined the how AI-Powered learning tools influence the critical thinking skills of Nigerian undergraduates in a period of insecurity. From the findings, it became clearer that most students saw these AI tools as genuinely helpful while most of them felt that AI made it easier for them to think through issues more carefully and to approach both classwork and real-life problems with a bit more confidence. Their general perception and attitude toward the use of AI was positive, although some students still had reservations about certain aspects of the technology. A number of students also mentioned that AI tools could assist them in

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looking more closely at specific security concerns. They referred to issues like cybercrime, misinformation, and even threats in their immediate communities. These shows that the usefulness of AI is not limited to just supporting schoolwork, rather it helps students organize their thoughts and analyze situations they consider risky or troubling. Overall, the study shows that the utilization of AI tools in a meaningful way can support the growth of students' critical thinking and shape how they approach insecurity-related issues. Based on this, it the study conclude that integrating AI into higher education could help produce graduates who are more comfortable with technology and better prepared to make sense of the complex security challenges facing the country.

Recommendations

1. Nigerian universities should integrate AI-Powered learning tools such as tutoring systems, academic chat assistants, chatbots, and interactive simulations into everyday teaching and the curriculum. Integration of these tools gradually into the curriculum can help students gain hands-on experience with the technology.
2. Institutions should organize workshops, seminars and training that will promote AI literacy, and data security awareness among students. These programs will empower undergraduates to use AI tools effectively and responsibly in analyzing and solving security challenges.
3. The Federal Ministry of Education and other relevant agencies should develop clearer guidelines on how AI can be introduced into higher education for effective development of a tech-based system of learning.

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