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Perceive Effect of Integrating ChatGpt in Learning Sciences Among Secondary School Students in Kaduna North, Kaduna State, Nigeria

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Abstract

This study examined students' perception on challenges associated with using artificial intelligence (Chat GPT) in learning science in senior secondary schools in Kaduna North Local Government Area, Nigeria. The research design was a cross-sectional survey research design. The population of the study consisted of eight co-educational schools having a total number of two thousand nine hundred and forty three (2,943) of SS III students across the eight secondary schools in Kaduna North Local Government Area. From the population of the study 352 students were selected to form the sample size for the study. The instrument used for data collection was a structured Students 'Artificial Intelligence Opinion Questionnaire (SAIOQ). The reliability coefficient of the instrument was 0.81. The study was guided by two research questions and two null hypotheses tested at the 0.05 level of significance. Descriptive statistics of frequencies and percentages were used to answer research questions, Chi-square (χ^2) statistics was used to test null hypotheses. The result of the finding showed no significant difference between students' perceptions and the challenges associated with the use of Chat GPT among secondary school students in Kaduna North. Based on these findings, it was therefore recommended that, students should be trained on the responsible use of Chat GPT. Schools should organize orientation programmes, seminars, and workshops to teach students how to use Chat GPT as a supplementary learning tool while avoiding overdependence on AI-generated responses.

Keywords: Perception, Chat GPT, Artificial Intelligence, Challenges, Science, Learning

Introduction

Chat GPT is a generative artificial intelligence (AI) tool developed by Open AI that uses advanced language processing technology to understand users' questions or instructions and generate human-like text responses (Chukwuere, 2024). Chat GPT can explain concepts, answer questions, summarize information, generate examples, assist with problem-solving, and support learning through interactive dialogue. One of the most prominent developments in education, has been the emergence of generative artificial intelligence (Gen AI) applications such as Chat GPT, which can generate human-like responses to questions, explain concepts and engage learners in interactive conversations. The usage of Chat GPT has expanded rapidly across educational settings ever since Chat GPT was released in the year (2022), creating both opportunities and concerns for teachers and



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students. Research such as Chukwuere (2024) and Oduma, Arisabor, Anthony and Michael (2025) indicates that Chat GPT supports learning through immediate feedback, personalized explanations, accessibility to information, and assistance with complex academic tasks. However, the educational use of Chat GPT could presents challenges relating to accuracy, academic integrity, overdependence, privacy, and the development of students' independent and critical thinking skills (UNESCO, 2026; Nwoye & Okafor, 2026). In education, Chat GPT can function as a virtual learning assistant by providing students with immediate explanations, feedback, study materials, and assistance with academic tasks as reported by Adeyemo and Balogun (2024). The potential usefulness of Chat GPT in learning science must therefore be considered alongside the challenges associated with its use. One of the challenges is the reliability of information generated by AI. Chat GPT does not necessarily distinguish between scientifically accurate information and plausible but incorrect information. Consequently, students who accept AI-generated responses without verification may acquire misconceptions, particularly in science subjects where accuracy and evidence are fundamental. Therefore, this study examined students' perception on challenges associated with using artificial intelligence (Chat GPT) in learning science in senior secondary schools in Kaduna North Local Government Area, Nigeria.

Statement of the Problem

The rapid development of Artificial Intelligence (AI) has introduced new possibilities for teaching and learning across educational systems. One of the most prominent generative Artificial Intelligence applications is Chat GPT, which can explain concepts, provide examples and support students in completing learning activities. In science, Chat GPT may provide students with additional opportunities to clarify difficult concepts in subjects such as Biology, Chemistry, and Physics and to obtain immediate explanations outside the conventional classroom setting. However, the increasing use of Chat GPT in education has also generated concerns regarding the reliability of AI-generated information, academic integrity and the possible effects of AI on critical thinking and independent learning as reported by Akinyemi, Adeyemo and Ojo (2023). The use of Chat GPT in science presents particular challenges, because science learning depends solely on accuracy of information, problem-solving, experimentation, and ability of learners to evaluate evidence. Chat GPT may produce information that is inaccurate, incomplete or presented without adequate sources. UNESCO (2026) notes that generative AI can create educational opportunities but also raises concerns about misinformation, age appropriateness and the need for appropriate pedagogical and ethical safeguards. Consequently, students who accept AI-generated responses without critically evaluating them may acquire misconceptions or inaccurate scientific knowledge. It is against this background that the present study seeks to investigate students' perception of the challenges associated with using Artificial Intelligence (Chat GPT) in learning science in senior secondary schools in Kaduna North Local Government Area, Nigeria. The study is expected to provide evidence to Kaduna State Ministry of Education that would contribute to the development of appropriate school-level AI-use guidelines for the responsible integration of Chat GPT into science education.

Objectives of the Study

The objectives of this study are to:

1. identify students' perceptions on the challenges associated with the use of Chat GPT in science among senior secondary students in Kaduna North LGA.
2. examine students' perceptions on ways for the effective integration of AI tools into secondary school education in Kaduna North LGA.



Research Questions

1. What are students' perceptions of the challenges associated with using Chat GPT for learning Science in senior secondary schools in Kaduna North LGA?
2. What are students' perceptions of the measures to enhance the responsible use of AI tools in science in Kaduna North LGA?

Null Hypotheses

1. there is no significant difference between the perceived challenges associated with using Chat GPT for learning Science among senior secondary school students in Kaduna North LGA.
2. there is no significant difference in students' perceptions of the measures for enhancing the responsible use of AI tools in Science in senior secondary schools in Kaduna North LGA.

Research Methodology

This study adopted a cross-sectional survey research design which involves collecting data from a sample of respondents at one point in time to examine the current status of a phenomenon. The design was considered appropriate for this study because it enabled the researcher to gather information on students' perception on the challenges associated with the use of Chat GPT and measures for enhancing the responsible use of AI tools in Science in senior secondary schools in Kaduna North LGA and supported the use of the Students' Artificial Intelligence Opinion Questionnaire (SAIOQ). The study was conducted in Kaduna North Local Government Area, located in the northwestern region of Nigeria and serves as an important urban and administrative center within the state. The Local Government Area is part of Kaduna metropolis and is known for its educational institutions, commercial activities, and diverse population. The population of this study consisted of all SS 3 science students in eight (8) co-educational public secondary schools within Kaduna North LGA, Nigeria. The total number of the SS 3 students from the eight co-educational public schools is two thousand nine hundred and forty three (2,943) students out of which 1,477 were males while 1,466 were females. The sample for this study consisted of three hundred and fifty two (352) SS 3 Science students selected from public senior secondary schools in Kaduna North Local Government Area. The target respondents included students offering science related subjects such as Biology, Chemistry, Physics, and Mathematics at secondary school level. The study adopted a multistage sampling technique, involving purposive sampling and simple random sampling methods. Purposive sampling was first used to select co-educational secondary schools with science students and access to digital learning tools or internet facilities in Kaduna North. Simple random sampling was also used to select the students who participated in the study. This was done by balloting. This was to give every science student an equal chance of being selected, thereby reducing bias and ensuring fairness in the selection process. The sample size for this study was determined using the Taro Yamane (1967) formula for finite population which yielded a sample size of 352. The research instrument developed by the researcher for the purpose of data collection was a structured Students' Artificial Intelligence Opinion Questionnaire (SAIOQ). The SAIOQ contained 30 - items and had two sections; A and B. Section A was on socio-demographic data of the students while section B comprised of questions on students' perception on the challenges associated with the use of Chat GPT and measures for enhancing the responsible use of AI tools in Science in senior secondary schools in Kaduna North.

a) Validation of Students' Artificial Intelligence Opinion Questionnaire (SAIOQ)

The Students' Artificial Intelligence Opinion Questionnaire (SAIOQ) was given to experts from the Department of Science Education, Kaduna State University, with a minimum qualification of Ph.D.



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and also to experts from ICT Department of Kaduna State University. The experts critically checked the content of the instrument to ascertain the appropriateness of the items; whether the test items conform to the subject matter to be tested.

Reliability of Students' Artificial Intelligence Opinion Questionnaire (SAIOQ)

The reliability of the Students' Artificial Intelligence Opinion Questionnaire (SAIOQ) was determined by adopting the Split half reliability method for measurement of the reliability coefficient and internal consistency index of items within the instrument. The reliability coefficient was estimated using the Cronbach Alpha. From the result obtained, the reliability coefficient of the instrument was 0.82.

Ethical Consideration

Ethical approval was sought from the relevant authorities such as; Kaduna State Ministry of Education, science teachers and school administrators to obtain permission from the selected senior secondary schools before data collection begun. Participation in the study was voluntary.

Data Collection and Analysis

The questionnaires were administered to science students in Kaduna North Local Government Area to assess their opinion on the challenges associated with using artificial intelligence (Chat GPT) in learning science in senior secondary schools in Kaduna North. Four possible responses were given by the students which included Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) by ticking the correct option. To answer the Research Questions, frequencies and percentages were used. To test the Null Hypotheses, Chi-square statistics was used.

Presentation of Results

Research Question 1: What are students' perceptions of the challenges associated with using Chat GPT for learning Science in senior secondary schools in Kaduna North?

To answer research question 1, frequencies and percentages were used. The summary is presented in Table 1.

Table 1: Frequencies and Percentages on Students' Perception on the Challenges associated with the use of Chat GPT

Responses	Frequency	Percentage (%)
Distraction and Misuse	151	42.9
Encourages Overdependence on Technology	33	9.4
Promotes Academic Dishonesty	29	8.2
Reduces Critical Thinking Skills	20	5.7
May Provide Incorrect Information	17	4.8
Weakening of Writing and Research Skills	21	6
Digital Divide and Unequal Access	25	7.1
Limited Understanding of Subject Matter	15	4.3
Privacy and Security Concerns	24	6.8
Reduces Interaction with Teachers and Peers	17	4.8
Total	352	100

Table 1 showed the rate of responses on students' perception on the challenges associated with the use of Chat GPT among secondary school students in Kaduna North. Results show that, a total of 151(42.9%) students reported that, the use of Chat GPT among secondary school students



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encourages distraction and misuse, while 33(9.4%) reported that, the use of Chat GPT encourages overdependence on technology, 29 respondents representing 8.2% said the use of Chat GPT promotes academic dishonesty while 20 respondents (5.7%) said the use of Chat GPT reduces critical thinking skills. 17(4.8%) said it may provide incorrect information as against 21(6.0%) said it weakening writing and research skills, 25(7.1%) said it creates digital divide and unequal accesses as against 15 representing 4.3% said it has limited understanding of subject matter while 24 representing 6.8% said it has privacy and security concerns and the rest 17(4.8%) said it reduces interaction with teachers and peers. In summary, the main challenges that are associated with the use of Chat GPT among secondary school students in Kaduna North includes distraction and misuse, as well as promotes academic dishonesty. However, the statistical validity of these responses is left for the test of the related hypothesis of the study.

Null Hypothesis One: There is no significant difference between the perceived challenges associated with using Chat GPT for learning Science among senior secondary school students in Kaduna North. To test Null Hypothesis one, Chi-square statistic (χ^2) was used on responses of respondent to the challenges associated with the use of Chat GPT among secondary school students in Kaduna North. The summary of the analysis is presented in Table 2.

Table 2: Chi-square Statistics (χ^2) on Students' Responses on Perceived Challenges Associated with the use of Chat GPT among Secondary School Students in Kaduna

Variable	Frequency Y	Frequency N	Total responses	Df	X ² comp uted	X ² crit ical	p- value	Remarks
Challenges using Chat GPT	216	136	352	1	12.9	16.9	0.09	NS
	111.0	241.0						

P-value > 0.05. χ^2 computed < χ^2 critical at df 1

The outcome of the chi-square statistics in Table 2 revealed no significant difference between students' perceptions and the challenges associated with the use of Chat GPT among secondary school students in Kaduna North. Reasons being that the calculated p-value of 0.09 is greater than the 0.05 alpha level of significance and its computed chi square (χ^2) value of 12.9 is lower than the 16.9 critical chi-square (χ^2) value at df 1. The maximum frequencies of the observed values were 216 and 136 for total positive and negative responses respectively while their expected values were 111.0 and 241.0 respectively. Therefore, the null hypotheses which state that "There is no significant difference between the perceived challenges associated with using Chat GPT for learning Science among senior secondary school students in Kaduna North." is hereby accepted and retained

Research Question Two: What are students' perceptions of the measures to enhance the responsible use of AI tools in science in Kaduna North?

To answer research question 2, frequencies and percentages were used. The summary is presented in Table 3.

Table 3: Frequencies and Percentages on Students' Perceptions on the Measures to Enhance the Responsible Use of AI tools in Science in Kaduna North?

Responses	Frequency	Percent
Provide Digital Literacy Education	9	2.6
Use Chat GPT as a Supplementary Tool	21	6



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Train Teachers on AI Integration	20	5.7
Encourage Fact-Checking	24	6.8
Develop Clear School Policies	20	5.7
Improve Access to Technology	36	10.2
Monitor and Guide Student Usage	194	55.1
Foster Collaborative Learning	28	8
Total	352	100

Table 3 showed students' perceptions on measures that can enhance the responsible use of AI tools in science in Kaduna North. A total of 9 respondents (2.6%) reported that, the best measure to enhance the responsible use of AI tools in science is to provide digital literacy education, while 21 (6.0%) suggested, Chat GPT should be used as a supplementary tool only, 20 (5.7%) said teachers should be trained on AI integration. 24 (6.8%) respondents suggested fact checking should be encouraged, while 20 (5.7%) said clear school policies should be developed, also, 36 (10.2%) respondents suggested improvement of access to technology. Similarly, 194 (55.1%) suggested monitoring and guiding students' usage and the rest 28(8.0%) suggested that there should be foster collaboration learning. In summary, the main measures that was suggested to enhance the responsible use of AI tools in science in Kaduna North, is to monitor and guide student usage. However, the statistical validity of these responses is left for the test of the related hypothesis of the study.

Null Hypothesis Two: There is no significant difference in students' perceptions of the measures for enhancing the responsible use of AI tools in Science in senior secondary schools in Kaduna North.

To test Null Hypothesis two, Chi-square statistic (χ^2) was used on students' perceptions of the measures for enhancing the responsible use of AI tools in Science in senior secondary schools in Kaduna North. The summary of the analysis is presented in Table 4.

Table 4: Chi square (χ^2) Statistics on Students' Perceptions of the Measures for enhancing the Responsible use of AI Tools in Science in Kaduna North

Variable	Frequency Y	Frequency N	Total responses	Df	χ^2 computed	χ^2 critical	p- value	Remarks
Measures to enhance	217	135	352	1	13.18	14.07	0.44	NS
	112.6	239.3						

P-value < 0.05. χ^2 computed > χ^2 critical at df 1

Table 4 revealed no significant difference between students' perceptions and the measures for enhancing the responsible use of AI tools in science in senior secondary schools in Kaduna North. Reasons being that the p-value of 0.44 is greater than the 0.05 alpha level of significance and its computed chi- square (χ^2) value of 13.18 is lower than the 14.07 critical chi-square (χ^2) value at df 1. The maximum frequencies of the observed values were 217 and 135 for total positive and negative responses respectively while their expected counts were 112.6 and 239.3 respectively. Therefore the null hypotheses which states that, there is no significant difference in students' perceptions of the measures for enhancing the responsible use of AI tools in Science in senior secondary schools in Kaduna North, is hereby accepted and retained

Discussion of Findings

The study examined students' perception on challenges associated with using artificial intelligence (Chat GPT) in learning science in senior secondary schools in Kaduna North Local Government Area, Nigeria. The findings of the study revealed that there was no significant difference between students'



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perceptions and the challenges associated with the use of Chat GPT among secondary school students in Kaduna North. This finding suggests that students' perceptions of Chat GPT are not significantly influenced by the challenges they encounter when using the technology for academic purposes. In other words, although students may recognize certain challenges associated with the use of Chat GPT, such challenges do not appear to substantially alter their overall perceptions of the technology. The absence of a significant difference may indicate that students have developed relatively similar views about both the usefulness and limitations of Chat GPT. Some students may perceive Chat GPT as a valuable educational tool because of its accessibility and ability to provide immediate responses, while also acknowledging challenges such as inaccurate information, overdependence on artificial intelligence, limited critical thinking, and difficulties in determining the reliability of generated responses. These challenges may therefore contribute to shaping students' overall perceptions of Chat GPT. This finding is important because it indicates that the introduction of Chat GPT into secondary school education should be accompanied by appropriate guidance and digital literacy education. Students need to understand that Chat GPT should serve as a supportive learning tool rather than a substitute for independent thinking, teachers, textbooks, and other reliable academic resources. Teachers should also guide students on how to verify information generated by artificial intelligence and use the technology responsibly. The finding further suggests that schools in Kaduna North may need to develop appropriate policies and instructional strategies for the responsible use of generative artificial intelligence. Such measures could help students maximize the educational benefits of Chat GPT while minimizing challenges associated with misuse, dependency, misinformation, and academic dishonesty. Therefore, the absence of a significant difference should not be interpreted as evidence that Chat GPT has no challenges; rather, it suggests that students' perceptions and the challenges they encounter are closely related and do not differ significantly within the context of the study.

Overall, the finding implies that students' experiences with Chat GPT are shaped by both its perceived educational usefulness and the difficulties associated with its use. Consequently, effective supervision, teacher guidance, and digital literacy training are essential for ensuring that Chat GPT contributes positively to teaching and learning among secondary school students in Kaduna North. The finding of the present study is consistent with the findings of Musa, Adamu, and Nuru (2025), who investigated the awareness and utilization of Artificial Intelligence among secondary school Biology students in Lere, Kaduna State and found No significant difference between the awareness and utilization of Artificial Intelligence among secondary school Biology students in Lere, Kaduna State. Similarly, the finding agrees with Egara, Mosimege and Mosia, (2025), who investigated secondary school students' perceptions of their usage of artificial intelligence-based Chat GPT in mathematics learning and reported that students generally perceived Chat GPT positively, particularly because it enhanced their understanding of complex mathematical concepts and supported problem-solving. However, students also expressed concerns about inaccuracies, consistency, overreliance, and limitations in developing independent problem-solving skills. The coexistence of positive perceptions and identified challenges in their study provides support for the present finding that there was no significant difference between students' perceptions and the challenges associated with Chat GPT use. This suggests that students may not necessarily view the challenges associated with Chat GPT as reasons to reject the technology. Rather, they may regard the challenges as limitations that can be managed through appropriate instruction and guidance. The findings of the study also revealed no significant difference between students' perceptions and the measures for enhancing the responsible use of AI tools in science in senior secondary schools in



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Kaduna North. This finding implies that students' perceptions of AI tools are not significantly different from their views regarding the measures that could promote responsible use of such technologies. The result may suggest that students recognize both the educational benefits of AI and the need for appropriate measures, such as teacher guidance, AI literacy, verification of AI-generated information, respect for academic integrity, and responsible use of AI for learning. The finding is consistent with the study of Akintokun and Bolarinwa (2025), which examined the perceived impact of AI as a science education tool for enhancing students' academic experiences. The researchers reported a favourable perception of AI integration in science education, although several obstacles to effective use were identified. They recommended adequate resources, teacher support, and the incorporation of AI technologies into teaching and learning. This finding agrees with the present study because positive perceptions of AI were accompanied by recognition of the need for appropriate support and measures to ensure effective use. Similarly, the present finding agrees with Adeyemo and Balogun (2024) who examined virtual reality as an AI-driven tool for improving science education in Nigerian secondary schools and found no significant difference between students' perceptions and the measures for enhancing the responsible use of AI tools in science education in senior secondary schools

Conclusion

From the findings of this study, the following conclusions were made:

1. No significant difference between students' perceptions and the challenges associated with the use of Chat GPT among secondary school students in Kaduna North.
2. No significant difference between students' perceptions and the measures for enhancing the responsible use of AI tools in science in senior secondary schools in Kaduna North.

Recommendations

On the basis of the findings from this study, the following recommendations are made:

1. Students should be trained for the responsible use of Chat GPT. Schools should organize orientation programmes, seminars, and workshops to teach students how to use Chat GPT as a supplementary learning tool while avoiding overdependence on AI-generated responses.
2. Teachers should provide adequate supervision. Science teachers should monitor and guide students' use of AI tools to ensure that such technologies complement classroom teaching rather than replace teachers, textbooks, practical activities, and students' independent thinking.
3. Students should be encouraged to verify information generated by Chat GPT. Since AI tools can sometimes provide inaccurate, incomplete, or misleading information, students should be taught to cross-check Chat GPT responses with approved textbooks, teachers, scientific journals, and other reliable sources.

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