

Influence of utilization of AI-based Learning Tools on Students' study habits and academic achievement of science education students in Rivers States

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ABSTRACT

The study examined the Influence of utilization of AI-based Learning Tools on Students' study habits and academic achievement of science education students in Rivers State. Descriptive Survey Research design was used. Four research objectives guided the study. The population for the study was 237 students of Department of science Education in River State university, While the sample comprises of 90 students 300 level purposely selected from the Department. 12-item, self-developed instrument titled: questionnaire on Influence of utilization of AI-based Learning Tools on Students' study habits and achievement' was used for data collection. The instrument was validated by experts and Cronbach alpha was used to determine its reliability which gave a coefficient of 0.77. Mean and standard deviation were used to analyze the data. The results from the study showed students agreed using AI-based Tools, also students agreed that the use of these AI-based resource improved their study habit finally students agreed that their academic achievement changed positively since the use of this resource. Based on these findings, conclusions and recommendations were made.

KEY WORDS: influence, AI-based, learning resource, study habits and academic achievement.

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Introduction

The rapid technological advancement witnessed in the 21st century has significantly transformed various sectors of human Endeavor, with education being no exception. In particular, the integration of Artificial Intelligence (AI) into teaching and learning processes has sparked a revolution in educational delivery, resource development, and student engagement across different levels of education. As global education systems continue to embrace digital innovation, the use of AI-based learning resources is becoming increasingly prominent in improving students' study habits and academic achievements. This trend is especially important in science education, where complex concepts often require interactive, personalized, and adaptive instructional strategies to promote deeper understanding, retention, and critical thinking. Within the context of Rivers States in Nigeria, Imoniri (2025), focusing on science education across Nigeria, further underscores AI's promise in nurturing critical thinking, digital literacy, and STEM readiness—key components of sustainable skills development and economic transformation. In emphasizing curriculum integration, teacher training, and equitable access, this work frames AI not merely as a tool, but as a strategic lever for national educational reform. The increasing availability and adoption of AI tools by schools and students alike call for a critical examination of their impact on science education outcomes.

Artificial Intelligence (AI) refers to the ability of machines or computer systems to perform tasks that typically require human intelligence. AI systems are designed to analyze data, learn from it, and make decisions or take actions with minimal human intervention. With roots in computer science and cognitive psychology, AI has grown into a multidisciplinary field with applications in medicine, transportation, agriculture, business, and most notably, education. In the educational sector, AI is transforming traditional pedagogical methods by providing smart systems capable of delivering personalized learning experiences tailored to individual students' needs and learning styles. Agbarakwe and Chibueze (2024) examined AI's role in streamlining assessments and feedback in Nigerian higher education. They noted that artificial, intelligent tutoring, and adaptive assessments not only enhance grading consistency but also cultivate personalized learning trajectories and interventions. Importantly, this sheds light on how structured AI applications can elevate study habits by reinforcing understanding through timely, tailored responses.

AI-powered educational platforms can provide personalized learning experiences that adjust in real time to each student's pace and performance. Adaptive learning systems use student

response data to deliver targeted practice and scaffold difficult science concepts, promoting mastery in areas where learners struggle. Studies have found that such systems frequently yield significantly higher engagement, better retention, and improved achievement compared to static, one-size-fits-all instruction (Mustapha et al., 2024; Boateng, 2024). For science education specifically, these AI tools help transform abstract, theoretical topics—such as virtual laboratories for biology, chemical reactions or physics simulations—into interactive, experiential learning that better supports students’ conceptual understanding and motivation

AI-based learning resources encompass a wide array of digital tools and platforms that utilize AI technologies to enhance teaching and learning. These resources include intelligent tutoring systems (ITS), adaptive learning platforms, virtual teaching assistants, AI-powered assessment tools, and educational chatbots. Intelligent tutoring systems are computer programs that provide personalized instruction by mimicking the behavior of a human tutor. They analyze student responses, provide immediate feedback, and adapt instructional content to suit the learner’s level of understanding. AI platforms can play a critical role in inclusive education by supporting students with diverse learning needs. Tools such as speech-to-text, text-to-speech, and content translation facilitate accessibility for students with disabilities or those in linguistically diverse contexts. Adaptive learning platforms such as DreamBox and Squirrel AI, use AI algorithms to analyze student data and deliver personalized learning paths. These platforms track learner progress, identify strengths and weaknesses, and modify content delivery to ensure mastery of concepts. In science education, where foundational knowledge is critical, adaptive learning helps bridge learning gaps and reinforces understanding through repeated exposure to challenging topics. Virtual teaching assistants like IBM’s Watson Tutor and AI-powered chatbots such as ChatGPT, DeepSeek, Khanmigo, Grammarly, Scribe AI, etc. They are for learning and serve as 24/7 learning companion providing students with instant responses to queries, assist with assignments, and facilitate group collaboration, thereby promoting self-directed learning, while Quizlet, Formative, Kahoot, Quizizz. etc are for assessment. This inclusion of these AI learning and assessment tools may enhance study habits by reducing frustration and increasing confidence, particularly among students who previously struggled with conventional learning methods.

The use of AI-based tools has significant influence on students’ study habits and success in any learning environment, as they reflect the attitudes, strategies, and routines learners adopt in the pursuit of academic achievement. Effective study habits such as regular revision, proper time management, note-taking, and active engagement with learning materials often distinguish

high-performing students from their peers. However, in recent years, these habits have been influenced by the increasing availability of digital technologies, especially artificial intelligence (AI)-based learning resources. With intelligent tutoring systems, adaptive learning platforms, and AI-driven study tools, students are not only gaining access to wider knowledge but also reshaping how they plan, organize, and approach their studies.

AI-based learning tools encourage self-directed learning by providing instant feedback, customized practice exercises, and adaptive study plans that align with the learner's pace and abilities. This personalization helps students develop consistency, discipline, and reflective practices in their study routines, thereby strengthening long-term retention and academic outcomes. For Nigerian students, who often face challenges such as large class sizes, limited teacher attention, and inadequate access to textbooks, AI tools can offer much-needed support to improve study practices. For instance, a student struggling with science concepts can rely on AI-based applications to review lessons repeatedly, practice with quizzes, and receive guided explanations until mastery is achieved. Also virtual labs and simulations allow science students to experiment with concepts in a risk-free digital environment, fostering inquiry-based learning and deeper conceptual understanding. Similarly, gamified AI platforms incorporate rewards and feedback mechanisms that motivate students to stay engaged and persist through challenges.

Recent evidence from Nigeria indicates that exposure to digital learning technologies positively influences students' study habits, improving their ability to focus, plan, and sustain motivation for academic tasks (Olatunji & Ogunleye, 2022). Such findings underscore the need to explore how AI-based resources, beyond serving as supplementary teaching aids, shape the daily academic behaviors of students.

Despite these benefits, the integration of AI-based learning resources in Nigeria faces several challenges. These include inadequate digital infrastructure, limited internet access, low digital literacy among teachers and students, and resistance to change in pedagogical practices. Additionally, ethical concerns around data privacy, algorithmic bias, and over-reliance on technology must be addressed to ensure equitable and responsible use of AI in education. To maximize the impact of AI in science education, it is imperative for policymakers, educators, and technology developers to collaborate in designing inclusive, context-appropriate solutions that reflect the unique needs and realities of the Nigerian educational landscape (Uche & Ayodele, 2023).

Artificial Intelligence represents a transformative force in modern education, offering a range of tools and strategies to enhance learning experiences, personalizing instruction, and improving student outcomes. The utilization of AI-based learning resources holds promise for science education, where complex concepts and skills demand innovative and interactive pedagogical approaches. By influencing study habits and academic achievement, AI has the potential to reshape how students in Rivers States engage with scientific knowledge and prepare for future careers in science and technology. However, realizing this potential requires deliberate investments in infrastructure, teacher training, and inclusive policies that ensure all students benefit from the AI revolution in education.

Statement of the Problem

Despite the growing availability of AI-based learning resources, their effective utilization by science education students in Rivers State remains uncertain. Many students still rely on traditional study methods, possibly due to limited access, low digital literacy, or lack of awareness. The impact of these AI tools on students' study habits and academic achievement has not been clearly established, especially considering possible gender and contextual differences. This gap in knowledge makes it difficult for educators and policymakers to implement strategies that support effective AI integration in science education. Therefore, this study seeks to investigate how AI-based learning resources influence students' study habits and academic performance in the region.

Purpose of the study

1. To examine the extent to which AI-based learning Tools are utilized by science education students in Rivers and State.
2. To determine the influence of AI-based learning Tools on the study habits of science education students in River state.
3. To examine the influence of AI-based learning Tools on the academic achievement of science education students.
4. To determine challenges associated with the utilization of AI-based learning Tools among science education students in Rivers States.

Research Questions

The following research questions guided the study.

1. To what extent are AI-based learning Tools utilized by science education students in Rivers State?
2. How does the use of AI-based learning Tools influence the study habits of science education students in Rivers state?
3. What is the effect of AI-based learning Tools on the academic achievement of science education students?
4. What challenges do science education students face in utilizing AI-based learning Tools in Rivers State?

Methodology

The study uses descriptive survey method of research design; this is a research design mainly used for scientific investigation to describe the state of events or phenomena. because it is investigating the influence of utilization of AI-based Learning Tools on Students' study habits and achievement of science education students in Rivers State. The research was carried out in the Department of Science Education, Faculty of Education River State University Port Harcourt. 237 students from the Department of Science Education made up the population. While the sample comprises 90 students in 300 levels purposely selected 12-item, self-developed instrument titled: questionnaire on Influence of utilization of AI-based Learning Tools on Students' study habits and achievement' was used for data collection The instrument was validated by experts and Cronbach alpha coefficient was used to determine its reliability which gave a coefficient of 0.77. Google form questionnaire was used to elicit responses from students. The questionnaire was sent to the WhatsApp platform of the two classes through the class rep. After two weeks the response was 74, which is 82 percent response rate The collected data were analyzed using mean and standard deviation and decision taken using grand mean. Based on the modified 5-point Likert-rating scale adopted for the study, 2.50 mean score was used as a benchmark for the study. Therefore, items with mean scores of 2.5 and above were regarded as agreed or positive responses while items with mean scores less than 2.50 were regarded as disagreed or negative responses.

Result

Results of the data collected are presented in the tables below based on research questions

Research Question1.

To what extent are AI-based learning Tools utilized by science education students in Rivers State?

S/N	Utilization of AI-Based Learning Tools	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	Std.	Decision
1	I regularly use AI-based learning resources (e.g., ChatGPT, Grammarly, QuillBot, Elicit) for academic purposes.	48 54.3%	27 30%	9 10%	3 2.9%	3 2.9%	4.30	0.95	Agree
2	AI-based tools are part of my daily or weekly study routine.	53 59.1%	30 33.3%	4 4.2%	1 1.4%	2 2.0%	4.46	0.81	Agree
3	I prefer AI-based Tools to traditional learning resources such as textbooks or lecture notes.	27 30.1%	9 10.3%	9 10%	14 15.3%	31 34.3%	2.87	1.68	Agree
Grand mean							3.88		

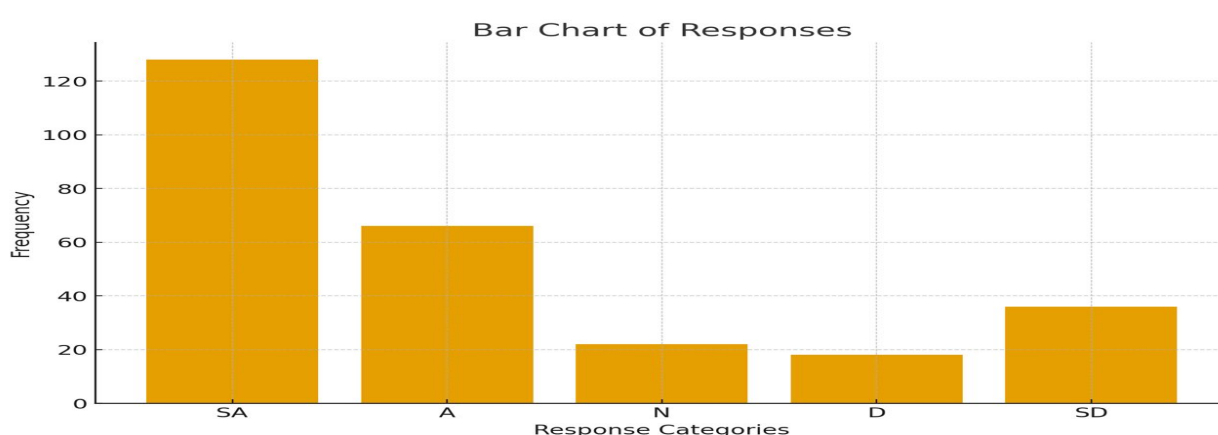


Table 1 shows Mean, and standard deviation on the extent to which AI-based learning resources are utilized by science education students in Rivers State. The findings showed a grand mean of 3.88, indicating a moderate extent of utilization. Among the assessed items, the use of AI tools for regular academic purposes (mean = 4.30), suggesting that many students are familiar

with and occasionally use platforms such as ChatGPT, another is the use of traditional textbook (mean = 2.87) were rated moderately, implying that students are yet to fully integrate AI into their everyday learning practices.

Research Question 2

How does the use of AI-based learning Tools influence the study habits of science education students in the river states?

S/N	Influence on Study Habits	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	Std	Decision
1	AI-based tools help me to plan and manage my study time effectively.	30 33.3%	29 31.9%	23 25%	7 8.3%	1 1.4%	3.84	1.02	Agree
2	AI-based tools make me more consistent in completing my assignments and study tasks.	47 52.4%	20 22.6%	16 17.7%	7 7.3%	0 0%	4.20	0.98	Agree
3	I depend too much on AI-based tools instead of developing independent study skills. (<i>reverse-coded</i>)	32 35.1%	11 12.4%	3 3.5%	14 15.7%	30 33.3%	3.00	1.74	Agree
4	I rely more on AI-based Tools than traditional textbooks or lecture notes.	13 13.9%	16 18.1%	33 36.1%	21 23.6%	7 8.3%	3.06	1.14	Agree
Grand mean		3.52							

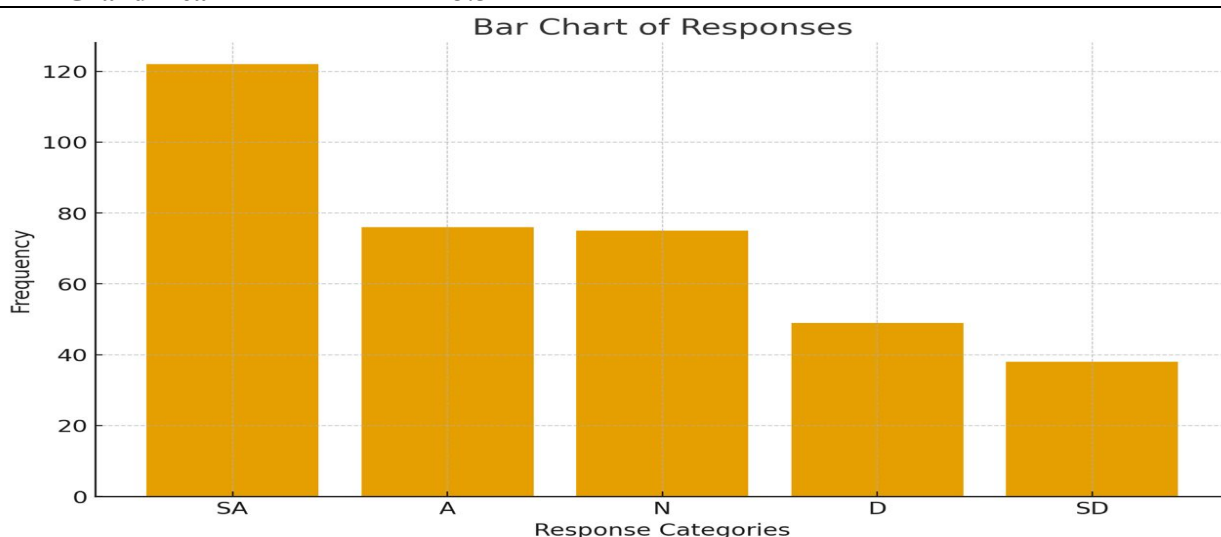


Table 2 shows Mean, and standard deviation on the Influence AI-Based Learning tools on Study Habits in River State. The result revealed a grand mean of 3.52, indicating that respondents generally agree that AI tools have a positive influence on their study habits. The mean scores

for the individual items range between 4.20 and 3.06, suggesting that students perceive AI-based learning tools as beneficial in improving study efficiency, comprehension, and independence.

Research Question 3

What is the effect of AI-based learning Tools on the academic achievement of science education students?

S/N	Influence on Academic Achievement	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	Std.	Decision
1	Since using AI tools, my academic performance has improved	56 61.1%	20 22.5%	9 9.9%	2 2.3%	3 4.2%	4.3	1.03	Agree
2	AI tools have improved the quality of my assignments and presentations.	45 50%	30 32.4%	11 13.8%	1 1.4%	2 2.3%	4.26	0.92	Agree
3	I feel more confident during assessments when I study with the help of AI tools.	47 52.1%	23 25.4%	18 19.7%	1 1.4%	1 1.4%	4.25	0.91	Agree
Grand mean							4.27		

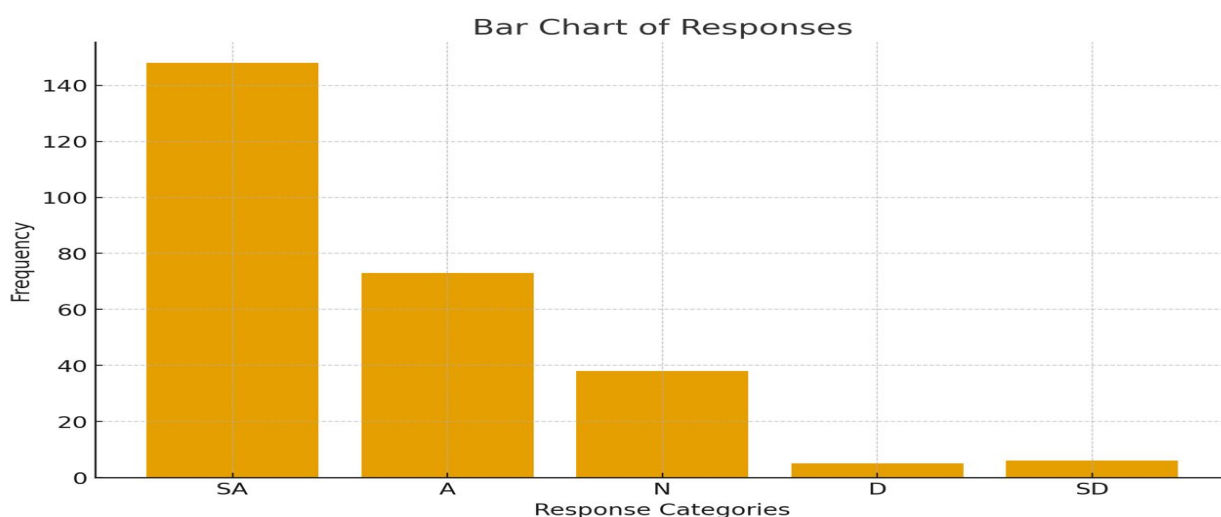


Table 3 shows Mean, and standard deviation on the influence of AI-based learning tools on Academic Achievement in River State. The result showed a grand mean of 4.27, indicating that

respondents generally agree that AI-based learning tools have a positive effect on their academic performance. The mean values of the individual items range from 4.3 to 4.25, suggesting that AI tools contribute greatly to improving students' learning outcomes. The highest mean score (4.3) corresponds to the statement "Since using AI tools, my academic performance has improved," implying that many students perceive a noticeable improvement in their grades and understanding of course materials due to the integration of AI technologies in their study routines.

Research Question 4

What challenges do science education students face in utilizing AI-based learning Tools in Rivers State?

S/N	Challenges in Using AI-Based Learning Tools	SA F (%)	A F (%)	N F (%)	D F (%)	SD F (%)	Mean	Std.	Decision
1	Limited access to internet or electricity hinders my effective use of AI-based learning Tools	35 38.5%	28 31.1%	17 18.9%	8 9%	2 2.5%	3.94	1.08	Agree
2	Over-reliance on AI-based tools reduces my critical thinking and problem-solving abilities. <i>(reverse-coded)</i>	31 33.7%	7 8.2%	6 6.7%	9 10.1%	37 41.3%	2.83	1.78	Agree
Grand mean							3.38		

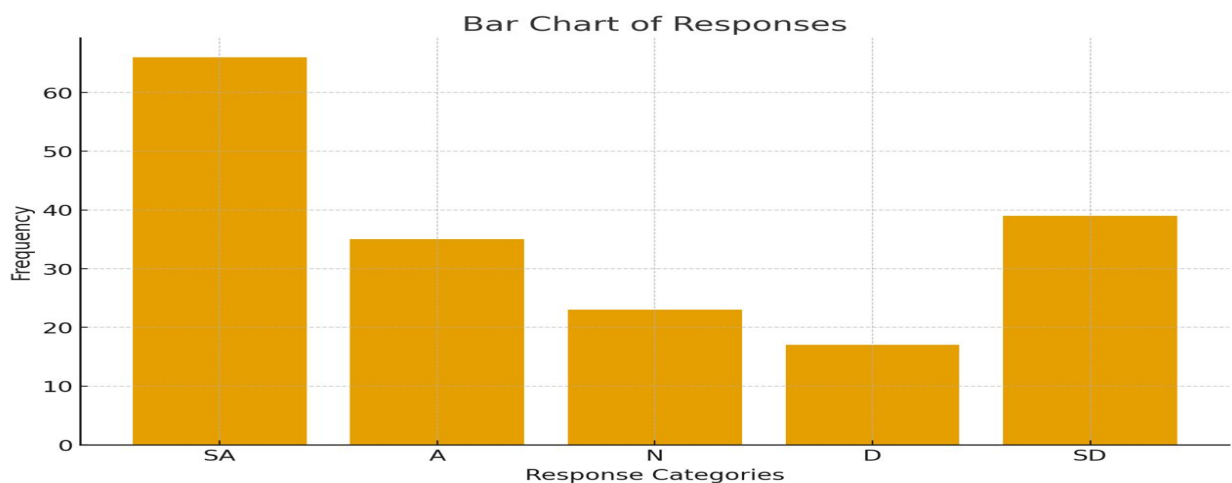


Table 4 shows mean and standard deviation on the challenges in using ai-based learning resources in River State. The result revealed that respondents agreed with all the items. The results addressing Research Question 4, which sought to identify the challenges science education students face in utilizing AI-based learning resources in Rivers State, reveal a grand mean of 3.38, indicating that respondents generally agree that they encounter moderate challenges while using AI tools. The mean scores for the individual items are 3.94 and 2.83. Among the notable challenges are poor internet access, high cost of data and difficulty verifying AI output.

DISCUSSION OF FINDINGS

The results further indicate that AI-based learning tools positively influence students' study habits by improving time management, consistency in completing academic tasks, and study efficiency. However, some students reported a moderate level of dependence on AI tools, suggesting the need for balanced use to avoid weakening independent learning skills.

In terms of academic achievement, the findings reveal a strong positive effect of AI-based learning tools. Students reported improvements in academic performance, assignment quality, and confidence during assessments, indicating that AI tools support better understanding and learning outcomes in science education.

Despite these benefits, students face challenges in utilizing AI-based learning tools, particularly limited access to reliable internet connectivity and electricity. Concerns about over-reliance on AI tools were also identified. Overall, the study concludes that while AI-based learning tools enhance study habits and academic achievement, their effective use depends on adequate infrastructure and guided integration into teaching and learning processes.

CONCLUSION

This study investigated the influence of AI-based learning resources on science education students in Rivers State, focusing on their study habits and academic achievement. The findings indicate that effective utilization of AI tools such as adaptive platforms, intelligent tutoring systems, and virtual simulations enhances study habits by promoting self-directed learning, timely feedback, and personalized study schedules. Students who engaged frequently with these AI tools achieved higher performance compared to those relying solely on traditional methods.

These results resonate with those of Nwile, Amaewhule, and Ezeugo (2025), who found that integrating AI writing tools like Grammarly, QuillBot, and Natural Reader significantly improved educational outcomes among students in public universities in Rivers State. Thus, AI-based learning resources appear to act as a catalyst for motivation, concentration, and consistency in study practices. Moreover, these tools help bridge individual learning gaps, foster deeper understanding of scientific concepts, and develop critical thinking and problem-solving abilities. Considering these insights, integrating AI into science education—when thoughtfully implemented and supported can transform learning environments and contribute to improved academic achievement.

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