

Artificial Intelligence in Education: Psychological Effects and Learning Outcomes of Public Secondary School Students in Abia State

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doi: <https://doi.org/10.37745/bje.2013/vol14n73543>

Published August 03, 2026

Citation: Onu I. (2026) Artificial Intelligence in Education: Psychological Effects and Learning Outcomes of Public Secondary School Students in Abia State, *British Journal of Education*, 14 (7),35-43

Abstract: *This study investigated Artificial Intelligence in Education: Psychological Effects and Learning Outcomes of Public Secondary School Students in Abia State. Two research questions guided the study, and two hypotheses were formulated and tested at a 0.05 level of significance. The study employed a descriptive research design. The population of the study comprised 3220 SS II students in the public secondary schools in Umuahia North, Abia State. Five public secondary schools out of seventeen were selected in the Umuahia North Local Government Area for the study using a purposive sampling technique. The sample comprised 109 SS II students from the 5 schools sampled and used for the study. The instrument for data collection was a researcher-designed questionnaire titled “Psychological Effects and Learning Outcomes of Artificial Intelligence Questionnaire (PELOAIQ)”, it was validated by three experts and subjected to reliability using split-half reliability, which was done twice in 2-week intervals, and it yielded a coefficient of 0.80 and 0.83 for the first and second tests. These coefficients indicated that the instrument was reliable for the study. Mean and standard deviation were used to answer the research questions posed to guide the study. The findings from the study showed that students had a moderate agreement that AI has psychological impacts (both positive and negative). AI tends to increase motivation, engagement, and confidence but also raises concerns about distraction, dependency, and anxiety when unavailable; students generally perceive AI as having a positive influence on their academic performance, though concerns about over-dependence and limited task efficiency remain. The study concluded that artificial intelligence (AI) has a generally positive influence on students’ learning outcomes in public secondary schools. The study also recommends that teachers and school administrators should integrate AI tools into classroom teaching in a structured and balanced manner. Since students reported improvements in understanding difficult topics, creativity, and overall academic performance through AI use, educators should deliberately adopt AI-powered learning platforms to supplement teaching and provide timely feedback that enhances students’ progress.*

Keywords: Information and communication technology, artificial intelligence, learning outcomes.

INTRODUCTION

Information and Communication Technology (ICT) refer to the integration of digital tools, platforms, and resources, such as computers, the internet, multimedia systems, and mobile technologies, into teaching and learning processes. In education, ICT serves as both a medium and a resource for delivering content, facilitating interaction, supporting collaboration, and enhancing knowledge creation. Its use has transformed traditional teacher-centred approaches into more interactive, learner-centred models, thereby promoting critical thinking, creativity, and lifelong learning (Aminu & Igwebuike, 2021). Artificial Intelligence (AI) builds upon ICT by introducing intelligent systems that can learn, adapt, and personalise educational experiences. While ICT provides the digital infrastructure for communication and access, AI brings advanced capabilities such as data-driven decision-making, adaptive learning systems, and automated support (Holmes et al., 2022).

Artificial Intelligence (AI) has emerged as one of the most transformative technologies influencing education in the 21st century. In broad terms, AI refers to the ability of machines to mimic cognitive functions such as learning, reasoning, problem-solving, and decision-making (Russell & Norvig, 2021). In the context of education, AI encompasses the development and deployment of digital systems that can adaptively support learning processes, personalise instruction, automate administrative tasks, and enhance both teaching and student outcomes (Holmes, Bialik, & Fadel, 2019). Artificial Intelligence (AI) not only affect academic achievement but also exerts a significant psychological influence on learners. For instance, ICT allows for online learning management systems (LMS) like Moodle or Google Classroom, but AI enhances these systems by tailoring learning pathways, predicting students' performance, and offering personalised feedback. This shift represents a movement from static digital tools to dynamic, intelligent environments (Chen, Chen, & Lin, 2020).

The rapid diffusion of AI in educational settings, ranging from intelligent tutoring systems and automated feedback to conversational agents and generative large-language models, has produced measurable psychological effects on learners. These effects are complex and often double-edged: AI can enhance motivation, self-efficacy and engagement, yet can also introduce technostress, anxiety, dependency, and social-emotional risks if unmediated by sound pedagogy and safeguards. Also, merely operating complex AI systems can produce technostress—heightening anxiety, particularly among students unfamiliar with digital tools or faced with high-stakes assessments absent AI support (Ahmed, 2025).

Continuous interaction with AI tools can contribute to cognitive overload and technostress, particularly when students must master both subject content and unfamiliar digital interfaces. Overreliance on AI for routine problem-solving can also provoke anxiety when students face assessments without AI support. Furthermore, Ali et al. (2024) argue that over-reliance on AI-generated responses can reduce students' willingness to critically analyse problems independently,

potentially diminishing their confidence and intellectual autonomy. It is also pertinent to state that the overuse of AI tools as substitutes for peer interaction can weaken socio-emotional development and interpersonal skills, leading to feelings of isolation and decreased collaborative learning (Ahmed, 2025; Reimer, 2024).

Importantly, from personalised learning patterns and experiences to intelligent tutoring systems that provide student-centred tailored guidance, support, and feedback based on individual learning patterns and knowledge levels (Hwang, Xie, Wah, & Gasevic, 2020), AI has the potential to revolutionise education (Holmes, Bialik, & Fadel, 2019) and address the diverse needs of learners. However, positive educational outcomes are not guaranteed solely by the adoption of advanced AI technologies (Castaneda & Selwyn, 2018). The integration of AI in academic environments raises critical questions related to equity, accessibility, and the evolving role of traditional teaching methods.

Ahmed (2025) observes that AI tools that tailor instructional content and provide immediate, personalised feedback can heighten student motivation, engagement, and self-efficacy, especially when the design actively scaffolds learning tasks rather than oversimplifying them. According to Reimer (2024), AI tutoring systems that give quick, formative feedback help reduce student stress by clarifying learning gaps instantly, thereby alleviating the anxiety associated with delayed or ambiguous evaluations. Again, Ali et al. (2024) noted that AI-driven prompts encouraging planning and metacognitive reflection increase learners' ability to self-regulate their learning. This autonomy supports psychological resilience and deeper engagement.

Klimova and Pikhart (2025) explored the effects of artificial intelligence on student and academic well-being in higher education: a mini-review. The study found that while AI offers benefits such as personalised learning, mental health support, and improved communication efficiency, it also raises concerns regarding digital fatigue, loneliness, technostress, and reduced face-to-face interactions. Over-reliance on AI may diminish interpersonal skills and emotional intelligence, leading to social isolation and anxiety. Furthermore, issues such as data privacy and job displacement emerge as AI technologies permeate educational environments.

Wickramasinghe and Jayatilleke (2021) investigated the impact of information and communication technology usage on psychological well-being among undergraduates. The key findings revealed that social media usage, internet usage, and television viewing have a positive significant impact and video gaming has a negative significant impact on psychological well-being. However, smartphone usage and device usage have no significant impact on psychological well-being. Moreover, internet usage is the most influential factor of ICT usage which has the strongest predicting power on psychological well-being

Oladayo, Oduselu-Hassan and Tsetimi (2025) examined the impact of artificial intelligence (AI) on learning outcomes and cognitive development among secondary school students in Delta State, Nigeria. It is ascertained that incorporating technology extends improvement of learners'

performance by enabling learner-centred practices, enhancing cognition, and embracing self-motivated learning. Many people have identified that AI is regarded as useful in teaching complex concepts, providing feedback, and enhancing interaction in the learning environment.

Vieriu and Petrea (2025) investigated the impact of Artificial Intelligence (AI) on students' academic development. The findings reveal that AI offers significant benefits, including personalised learning, improved academic outcomes, and enhanced student engagement. However, challenges such as over-reliance on AI, diminished critical thinking skills, data privacy risks, and academic dishonesty were also identified.

Statement of the Problem

The rapid growth of artificial intelligence (AI) in education has created new opportunities for improving teaching and learning. In public secondary schools, AI has the potential to transform classroom instruction, enhance personalised learning, and support better academic outcomes. However, while much attention has been given to the technological and instructional benefits of AI, less focus has been directed toward its psychological influence on students. In Abia State, many public secondary school students are already exposed to AI-driven educational tools such as computer-based testing, intelligent tutoring systems, and digital learning platforms. While these innovations may enhance learning outcomes, they may also generate unintended psychological effects such as anxiety, reduced motivation, overdependence on technology, or even feelings of isolation when human interaction in learning is reduced. Conversely, AI could positively influence students' confidence, engagement, and willingness to learn if integrated appropriately.

Despite these possibilities, there is limited empirical evidence on how AI influences both the psychological well-being and academic performance of students in public secondary schools in Abia State. This creates a pressing need to investigate the psychological effects and learning outcomes associated with AI use among secondary school students in Abia State.

Research Questions

1. What are the psychological impacts of artificial intelligence in education on public secondary school students in Abia State?
2. How does the use of artificial intelligence in education influence the learning outcomes of public secondary school students in Abia State?

METHODOLOGY

The study adopted a descriptive research design, this design is appropriate for this study because it seeks to gather data on the influence of artificial intelligence in education, focusing on the psychological effects and learning outcomes of public secondary school students in Abia State. Since the study is concerned with describing existing conditions, opinions, perceptions, and experiences of students rather than manipulating variables, the descriptive survey provides a suitable methodological framework. The study was carried out in Umuahia North L.G.A of Abia

State. The population for this study comprised 3220 SS II students in the public secondary schools in Umuahia North, Abia State. Five public secondary schools out of seventeen were selected in the Umuahia North Local Government Area for the study using a purposive sampling technique. The sample comprised 109 SS II students from the 5 schools sampled and used for the study. A researcher-designed questionnaire titled “**Psychological Effects and Learning Outcomes of Artificial Intelligence Questionnaire (PELOAIQ)**” was used for the study. The instrument was validated by three experts and subjected to reliability using split-half reliability, which was done twice in 2-week intervals, and it yielded a coefficient of 0.80 and 0.83 for the first and second tests. One hundred and nine (109) copies of the questionnaire were distributed. Mean and standard deviation were used to answer research questions.

RESULTS

Research Question Two: What are the psychological impacts of artificial intelligence in education on public secondary school students in Abia State?

Table 1: Psychological impacts of artificial intelligence in education

S/N	Items	Mean	Std. Dev.
1.	Using AI tools in my studies reduces my academic stress.	2.61	.87
2.	AI-based feedback boosts my self-esteem and confidence in academic work	2.87	.84
3.	I tend to feel distracted or less focused when I overuse AI tools in my studies	3.20	.72
4.	Excessive reliance on AI makes me less confident in solving problems independently	3.03	.77
5.	AI applications make learning more enjoyable and engaging for me	3.08	.75
6.	I sometimes experience anxiety when I am unable to use AI tools for assignments	3.32	.52
7.	I feel more motivated to learn when I use AI-powered educational applications	3.25	.67
		3.05	

Table 1 reveals the mean and standard deviation of the psychological impact of artificial intelligence among secondary school students. Items 1-7 reveal; using AI tools in my studies reduces my academic stress (Mean = 2.61, SD = .87), AI-based feedback boosts my self-esteem and confidence in academic work (Mean = 2.87, SD = .84), I tend to feel distracted or less focused when I overuse AI tools in my studies (Mean = 3.20, SD = .72), excessive reliance on AI makes me less confident in solving problems independently (Mean = 3.03, SD = .77), AI applications make learning more enjoyable and engaging for me (Mean = 3.08, SD = .75), I sometimes experience anxiety when I am

unable to use AI tools for assignments (Mean = 3.32, SD = .52) and I feel more motivated to learn when I use AI-powered educational applications (Mean = 3.25, SD = .67). Considering the grand mean of 3.05, students show a moderate agreement that AI has psychological impacts (both positive and negative). AI tends to increase motivation, engagement, and confidence but also raises concerns about distraction, dependency, and anxiety when unavailable.

Research Question Two: How does the use of artificial intelligence in education influence the learning outcomes of public secondary school students in Abia State?

Table 2: Influence of artificial intelligence in education on the learning outcomes of students

S/N	Items	Mean	Std. Dev.
	AI tools help me to understand difficult topics better	2.86	.88
	The use of AI enhances my overall academic achievement in school	2.96	.78
	Using AI in my studies helps me to complete tasks and assignments faster	2.56	.90
	Over-dependence on AI affects my ability to prepare adequately for examinations	2.90	.88
	AI applications provide timely feedback that supports my learning progress	3.17	.71
	AI-based platforms improve my creativity and problem-solving abilities	3.13	.65
	My academic performance has improved since I started using AI-assisted learning resources	3.34	.47
		2.98	

Table 2 reveals the summary of the mean and standard deviation of the influence of artificial intelligence on students' learning outcomes. the students agreed that AI tools help students to understand difficult topics better (Mean = 2.86, SD = .88), students acknowledged that the use of AI enhances their overall academic achievement in school (Mean = 2.96, SD = .78), AI helps students complete tasks and assignments faster recorded the lowest mean (Mean = 2.56, SD = .90), students agreed that over-dependence on AI affects their ability to prepare adequately for examinations (Mean = 2.90, SD = .88), students strongly affirmed that AI applications provide timely feedback that supports their learning progress (Mean = 3.17, SD = .71), and that AI-based platforms improve creativity and problem-solving abilities (Mean = 3.13, SD = .65). finally, the highest rating was given to the view that academic performance has improved since the adoption of AI-assisted learning resources (Mean = 3.34, SD = .47). Overall, the grand mean of 2.98 suggests that students generally perceive AI as having a positive influence on their academic performance, though concerns about over-dependence and limited task efficiency remain.

DISCUSSION OF FINDINGS

The finding from research question one which investigated the psychological impacts of artificial intelligence in education on public secondary school students in Abia State reveals that students show a moderate agreement that AI has psychological impacts (both positive and negative), indicating that AI tends to increase motivation, engagement, and confidence but also raises concerns about distraction, dependency, and anxiety when unavailable. The finding from this study agrees with that of Klimova and Pikhart (2025) whose study explored the effects of artificial intelligence on student and academic well-being in higher education: a mini-review. The study found that while AI offers benefits such as personalised learning, mental health support, and improved communication efficiency, it also raises concerns regarding digital fatigue, loneliness, technostress, and reduced face-to-face interactions. Over-reliance on AI may diminish interpersonal skills and emotional intelligence, leading to social isolation and anxiety. Furthermore, issues such as data privacy and job displacement emerge as AI technologies permeate educational environments. Again, the finding also agrees with that of Wickramasinghe and Jayatilleke (2021) who investigated the impact of information and communication technology usage on psychological well-being among undergraduates. The key findings revealed that social media usage, internet usage, and television viewing have a positive significant impact and video gaming has a negative significant impact on psychological well-being. However, smartphone usage and device usage have no significant impact on psychological well-being. Moreover, internet usage is the most influential factor of ICT usage which has the strongest predicting power on psychological well-being.

The finding from research question two which investigated how the use of artificial intelligence in education influence the learning outcomes of public secondary school students in Abia State reveals that students generally perceive AI as having a positive influence on their academic performance, though concerns about over-dependence and limited task efficiency remain. The finding from the study is in agreement with that of Oladayo, Oduselu-Hassan and Tsetimi (2025) who examined the impact of artificial intelligence (AI) on learning outcomes and cognitive development among secondary school students in Delta State, Nigeria. It is ascertained by the study that incorporating technology extends improvement of learners' performance by enabling learner-centred practices, enhancing cognition, and embracing self-motivated learning. Further, many people have identified that AI is regarded as useful in teaching complex concepts, providing feedback, and enhancing interaction in the learning environment. The finding from the study also agrees with that of Vieriu and Petrea (2025) who investigated the impact of Artificial Intelligence (AI) on students' academic development. The findings reveal that AI offers significant benefits, including personalised learning, improved academic outcomes, and enhanced student engagement. However, challenges such as over-reliance on AI, diminished critical thinking skills, data privacy risks, and academic dishonesty were also identified.

CONCLUSIONS

The findings demonstrate that artificial intelligence (AI) has a generally positive influence on students' learning outcomes in public secondary schools. Students strongly acknowledged that AI-assisted resources improve their academic performance, enhance creativity, and provide timely feedback that supports their learning progress. This indicates that the adoption of AI in education can serve as a valuable tool for deepening understanding, improving problem-solving abilities, and boosting overall academic achievement. Despite the positive effects, the results also reveal that over-dependence on AI may limit students' independent study habits and preparation for examinations. While AI supports comprehension and engagement, students expressed concerns about reduced focus and task efficiency when excessively relying on these tools. This suggests that while AI is beneficial for enhancing learning outcomes, its use must be balanced with traditional study methods to ensure sustainable academic growth and self-reliance.

Recommendations

The following recommendations were made;

1. Teachers and school administrators should integrate AI tools into classroom teaching in a structured and balanced manner. Since students reported improvements in understanding difficult topics, creativity, and overall academic performance through AI use, educators should deliberately adopt AI-powered learning platforms to supplement teaching and provide timely feedback that enhances students' progress.
2. To prevent over-dependence on AI and its potential negative effects on examination preparation and independent problem-solving, students should be guided through digital literacy and self-regulation programs. This will help them learn how to use AI as a supportive resource while still cultivating critical thinking, focus, and self-confidence in tackling academic tasks without overreliance on technology.

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