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REVOLUTION OR DISTRACTION? ANALYZING GENERATIVE AI'S IMPACT ON UNDERGRADUATE STUDENT PERFORMANCE

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ABSTRACT

Using ChatGPT regularly produces academic success, plus it develops moral critical thinking abilities and problem-solving capabilities. The use of ChatGPT creates ongoing concerns for stakeholders regarding system dependency and ethical implications that surface when users implement it. However, stakeholders continue to raise multiple concerns about both dependence on ChatGPT and the moral ramifications that come from using it. This study aims to analyze the impact of generative AI, particularly ChatGPT, on the academic performance of undergraduate students in five federal leading universities in Nigeria. A statistical analysis using Chi-square tests together with independent t-tests discovered meaningful relationships connecting academic achievements to ChatGPT usage. The study reveals that educational institutions can achieve effective results when combining AI tools like ChatGPT with conventional methods under strategic circumstances and need continuous ethical monitoring. Academic liability and the sustained advancement of critical thinking competence remain unharmed when ChatGPT use is implemented correctly.

Keywords: AI, ChatGPT, Generative AI, Impact, Performance, Student, Undergraduate

INTRODUCTION

New technologies since machine learning momentum helped develop superior machines like generative AI according to Hu (2022). Since Hwang and Chang (2023) reported its growth the Artificial Intelligence (AI) chat-box application in educational settings has experienced exponential growth. These tools were designed to have conversations and give responses that imitate human conversations using set of data and computers algorithms to propose solution or give out knowledge on diverse topics. There has been rapid growth, integration and enhancement of generative AI due to progress in technology and natural language processing (NLP) (Lo et al., 2024). ChatGPT has emerged to be an informative tool, particularly in education. It has significantly impacted learning practices and methods of impacting knowledge (Baidoo-Anu & Ansah, 2023).

GPT whose full meaning is Generative Pre-Trained Transformer was launched by OpenAI in November 2022 (Ray, 2023). A study conducted by Ali et al., 2023 described GPT to be 'a massive autocomplete system'. GPT make use of large data sets, that are accessible to generate texts and responses that is human-like with the use of natural language processing (NLP). It can convincingly (or nearly convincingly) write anything from a paragraph to a full research article on almost any topic (Aydın & Karaarslan, 2023). These models are also capable of engaging customers in human-like conversations, such as those with customer service chatbots or fictional characters in video games (Aydın & Karaarslan, 2022; Jovanović, 2022; Pavlik, 2023).

In education, large language models have become a subject of interest due to their wide range of applications, with options such as Bing Chat, Bard, and Ernie now available (Rudolph, Tan, & Tan, 2023). However, the integration of ChatGPT in education has sparked concerns regarding the dissemination of inaccurate information and the potential for academic dishonesty (Gödde et al., 2023; Lo, 2023; Zhang & Tur, 2023). When students use ChatGPT excessively, their learning encounters become compromised because they lose chances to perform critical thinking and solve problems (Sallam, 2023; Vargas-Murillo et al., 2023). Investigating this matter becomes essential to curriculum development. Assessments of ChatGPT's effects on student engagement must guide educational developers for its effective implementation while determining research pathways for ChatGPT-enhanced learning (Lo et al., 2024). Researchers have investigated ChatGPT's impact on education after the tool's November 2022 launch targeting disciplines at the university level, according to Dwivedi et al. (2023). Educational staff members currently face decisions regarding the integration or prohibition of ChatGPT across learning environments. The reluctance to use generative AI in educational processes stems from educators' concerns about students producing fraudulent work and distributing inaccurate content while wielding manipulated models (Dwivedi et al., 2023; Gregorcic & Pendrill, 2023; Lim et al., 2023; Tlili et al., 2023).

To address the need for future research directions in ChatGPT-enhanced learning, as recommended by Lo et al. (2024). This study aims to assess the impact of generative AI, particularly ChatGPT, on the academic performance of undergraduate students in five federal leading universities in Nigeria. To guide the review, the following research questions (RQ1 to RQ2) have been formulated:

RQ1: How does the awareness and usage of ChatGPT influence undergraduate students' academic performance and learning approaches?

RQ2: How does the use of ChatGPT compare to traditional learning methods in terms of its impact on academic performance and critical thinking skills?

Review of related literature

Artificial intelligence (AI) research has resulted in swift advancement that now influences many fields particularly education (Lo, 2023). Research projects conducted recently identified positive along negative impacts of AI implementations in educational environments on educational outcomes.

Malinka et al. (2023) extend the discussion around education benefits produced by ChatGPT through their empirical research. The research shows that programs that combine

ChatGPT with coding assignments lead to better student results in computational thinking and greater motivation among learners while also boosting programming self-confidence compared to traditional instruction.

Lo (2023) conducted a literature review to examine 50 research papers to check the abilities and educational impact of ChatGPT during the first 3 months of its launch. The review discovered that the effectiveness of ChatGPT in the educational sector is subject to fields. The effectiveness of the tool thrived among subjects such as Economics while it lagged in Mathematics. However, the tool proved to be a potential asset as a teaching and learning aid. The review noted the issues of plagiarism and misinformation to be a potential concern for usage among students.

Another study by Ayman et al. (2023) investigated the influence of ChatGPT in undergraduate education. The research shows the advantages of ChatGPT to be its ability to improve the critical thinking analysis of students, student involvement in problem-solving, and writing abilities, and a tailored learning experience for the students. Concerns in this study were centered around AI bias, copyright, privacy issues, and the need to reconcile AI with traditional learning techniques.

Vargas-Murillo et al. (2023) studied how ChatGPT impacts higher education through applications and digital learning impact evaluations. The research found ChatGPT's impressive abilities to enhance educational work while recognizing the requirement to establish moral standards to assess both academic outcomes and educational frameworks.

Researchers from Lee et al. (2022) examined how AI-based chatbots might improve both review experiences following classes and academic results among students taking public health courses at a Taiwanese higher education institution. A quasi-experimental research design allowed the investigators to compare chatbot assessment results with traditional academic evaluation methods. A student-targeted chatbot investment yielded increased academic outcomes, elevated personal confidence, and modified learning behaviors and engagement levels. Students obtained rapid responses from the AI system, which supported them in better perceiving course content while improving their learning space alongside active involvement.

768 students from across Oman, Jordan, and Yemen, participated in a review conducted by Jaboob et al. (2025) to observe the implications of generative AI on behaviour of learners and thinking abilities in higher education. According to the research results using the Structural Equation Modeling (SEM-PLS), generative AI tool has significantly improved students' performance. It emphasized the ability of AI tool to positively impact the academic performance and engagement of students such as; boost engagement and foster innovation among students. The study stressed that the behavior of students in connecting AI usage to academic achievement.

Chiu (2024) collected data from 88 participants which included educators and leaders as part of a qualitative research to examine how generative AI tool such as ChatGPT and Midjourney affects teaching methods in schools. Four main themes emerged from the study; multidisciplinary training, an informed mindset, the need for fundamental knowledge, and creative evaluation methods. Other twelve sub-themes were mentioned to be impact of generative AI usage in evaluation, education and school management. The study suggested that students should be encouraged to have a know-it-all mindset, blending new information, and supporting interdisciplinary education.

Recent research on generative AI tools has emphasized the positive impact to be enhanced engagement, motivation and cognitive abilities while the adverse impact to be plagiarism and ethical concerns. However, there is limited research on ChatGPT's impact on undergraduate students' academic performance and learning approaches in Nigerian federal universities. This study aims to address these gaps by assessing whether generative AI tools, particularly ChatGPT, act as a revolution or distraction for undergraduate students' performance in selected federal leading universities in Nigeria. Specifically, it seeks to answer how awareness and usage of ChatGPT influence academic performance and learning approaches (RQ1) and how its use compares to traditional learning methods in fostering academic performance and critical thinking skills (RQ2).

MATERIALS AND METHODS

The survey method was employed in this research, utilizing a structured quantitative questionnaire to collect the necessary data. The survey questionnaire was distributed online to selected federal institutions in Nigeria via a Google Forms link "https://forms.gle/6nnUFYnm2S57yAbV7", shared through WhatsApp and Facebook platforms. A total of 1,016 responses were recorded. The collected data was analyzed using the Statistical Package for Social Sciences (SPSS) version 23, a widely recognized and powerful tool for data processing and analysis.

Hypothesis testing

The hypothesis testing is grouped into two;

Hypothesis 1: Awareness and Usage of ChatGPT and Academic Performance

H_0: There is no significant relationship between the frequency of ChatGPT usage and undergraduate students' academic performance.

H_1: There is a significant positive relationship between the frequency of ChatGPT usage and undergraduate students' academic performance.

Hypothesis 2: Traditional Learning Methods vs. ChatGPT Usage

H_0: There is no significant difference in academic performance and critical thinking skills between students who use ChatGPT frequently and those who rely on traditional learning methods.

H_1: There Students who use ChatGPT frequently show significantly different academic performance and critical thinking skills compared to those who rely on traditional learning methods.

RESULTS AND DISCUSSION

Results

Demographic characteristics

The demographic characteristics of the overall respondents are presented in Table 1. The study surveyed a total of 1,016 respondents, with the majority aged between 18-22 years (35.2%), followed by 28 years and above (34.1%), 23-27 years (24.4%), and those under 18 (6.3%). In terms of gender distribution, males constituted a larger proportion (57.7%) compared to females (42.3%). Participants were drawn from various academic levels, with the highest representation from lecturers (31.9%), followed by students in 400-level (19.3%), 300-level (16.7%), 200-level (13.0%), 100-level (11.8%), and 500-level (7.3%). The sample spanned five leading federal universities in Nigeria: Ahmadu Bello University, Zaria (20.5%), University of Lagos (19.9%), University of Ibadan (20.3%), University of Nigeria, Nsukka (19.7%), and Obafemi Awolowo University (19.7%) as shown in table 1.

Table 1: Demographic Characteristics of Respondents

Demographic Items	Frequency	Percentage
Age		
Under 18	64	6.3
18-22	358	35.2
23-27	248	24.4
28 and above	346	34.1
Total	1016	100.0
Gender		
Male	586	57.7
Female	430	42.3
Total	1016	100.0
Level of Study		
100 level	120	11.8
200 level	132	13.0
300 level	170	16.7
400 level	196	19.3
500 level	74	7.3
Lecturer	324	31.9
Total	1016	100.0
University		
Ahmadu Bello University, Zaria	208	20.5
University of Lagos (UNI LAG)	202	19.9
University of Ibadan (UI)	206	20.3
University of Nigeria, Nsukka (UNN)	200	19.7
Obafemi Awolowo University (OAU)	200	19.7
Total	1016	100.0

Students' perception of ChatGPT

The survey findings reveal that respondents became aware of ChatGPT and generative AI tools primarily through social media (44.7%), followed by friends/peers (33.2%), online articles/blogs (11.3%), lecturers (8.6%), and other means (2.3%). The main reasons for using ChatGPT include its ability to help complete tasks faster (40.4%) and enhance understanding of topics (39.4%), while a smaller proportion prefers traditional methods (10.2%) or has concerns about its impact on learning (8.5%).

Regarding academic performance, half of the respondents (50%) reported a positive influence of ChatGPT, while 30.9% noted a negative impact, and 19.1% observed no significant change. Over 64% of respondents indicated improved critical thinking and problem-solving skills, while 33.3% reported no changes, and only 2.2% experienced a decline. Frequent users of ChatGPT claimed improved academic performance (53.9%), compared to 31.5% who saw no change and 14.6% who reported a decline. Those who rarely or never use ChatGPT described their performance as satisfactory (81.9%), excellent (15.2%), or unsatisfactory (3.0%). Furthermore, 56.7% of respondents noted significant differences in academic outcomes between ChatGPT users and non-users, while 35% observed minor differences.

For specific purposes, respondents commonly used ChatGPT for completing assignments, studying/revising, conducting research, and generating project ideas, with 24.1% combining all four purposes. All these and other responses from the participants are shown in Table 2

Table 2: Perception of respondents

Variable items	Options	Frequency	Percentage
How did you first become aware of ChatGPT and other generative AI tools?	Social media	454	44.7
	Friends/Peers	337	33.2
	Lecturers	87	8.6
	Online articles/blogs	115	11.3
	Other	23	2.3
	Total	**1016**	**100.0**
What is your main reason for using or not using ChatGPT?	It helps me complete tasks faster	410	40.4
	It enhances my understanding of topics	400	39.4
	I prefer traditional learning methods	104	10.2
	I'm concerned about its impact on my learning	86	8.5
	I'm not aware of its benefits	16	1.6
	Total	**1016**	**100.0**
How has using ChatGPT affected your approach to completing assignments and studying?	I rely on it heavily	340	33.5
	I use it moderately	448	44.1
	I use it sparingly	164	16.1
	It has not affected my approach	64	6.3
	Total	**1016**	**100.0**

How has your use of ChatGPT influenced your academic performance?	Positively	508	50.0
	Negatively	314	30.9
	No significant impact	194	19.1
	Total	**1016**	**100.0**
Have you noticed any changes in your critical thinking or problem-solving skills since using ChatGPT?	Yes, they have improved	656	64.6
	Yes, they have declined	22	2.2
	No noticeable changes	338	33.3
	Total	**1016**	**100.0**
If you use ChatGPT frequently, how does your academic performance compare to periods when you used more traditional learning methods?	Improved	548	53.9
	Declined	148	14.6
	No significant change	320	31.5
	Total	**1016**	**100.0**
For those who rarely or never use ChatGPT, how would you describe your academic performance?	Satisfactory	832	81.9
	Unsatisfactory	30	3.0
	Excellent	154	15.2
	Total	**1016**	**100.0**
Have you noticed any differences in academic outcomes between your peers who use ChatGPT frequently and those who do not?	Yes, significant differences	576	56.7
	Yes, minor differences	356	35.0
	No differences	84	8.3
	Total	**1016**	**100.0**

Hypothesis Testing

The results of the hypothesis testing are shown below:

Chi-square Test for Hypothesis 1

The Chi-Square test of independence was conducted to examine the relationship between the frequency of ChatGPT usage and academic performance. The results showed a statistically significant association, $\chi^2(6, N = 1016) = 19.984$, $p = .003$. Since the p-value is less than 0.05, we reject the null hypothesis, indicating that there is a significant relationship between how often students use ChatGPT and their academic performance. Additionally, the linear-by-linear association value (17.232, $p = .000$) suggests a strong trend in the data, where the increased frequency of ChatGPT usage may be linked to improved academic outcomes. The analysis meets the assumptions of the Chi-Square test, as no cells had an expected count below 5.

Independent Samples T-Test for Hypothesis 2

An Independent Samples T-Test was conducted to determine if there is a significant difference in academic performance between students who use ChatGPT frequently and those who use it rarely or not at all. Levene's Test for Equality of Variances shows $F = 0.651$, $p = 0.420$, indicating that the assumption of equal variances is met. The t-test results under equal variances assumed show $t(1014) = -1.428$, $p = 0.154$. Since the p-value is greater than 0.05, we fail to reject the null hypothesis. This suggests that there is no statistically significant difference in academic performance between the two groups.

Discussion

The findings from this study provide valuable insights into the relationship between ChatGPT usage and undergraduate students' academic performance and learning approaches. The results of Hypothesis 1 indicate a significant association between the frequency of ChatGPT usage and academic performance. The Chi-Square test result, $\chi^2(6, N = 1016) = 19.984$, $p = .003$, highlights that students who use ChatGPT more frequently tend to report better academic outcomes. This trend is further supported by the linear-by-linear association value (17.232, $p = .000$), suggesting that increased awareness and frequent usage of generative AI tools like ChatGPT positively influence students' ability to complete tasks efficiently and enhance their understanding of academic topics. This finding aligns with previous studies, such as those by Malinka et al. (2023), which highlight that integrating ChatGPT with structured learning activities, such as coding assignments, improves computational thinking, programming self-confidence, and motivation among students. Similarly, Jaboob et al. (2025) found that generative AI tools significantly boost student engagement and innovation, leading to improved academic performance in higher education settings.

However, the findings for Hypothesis 2 present a contrasting perspective. The Independent Samples T-Test showed no statistically significant difference in academic performance between students who use ChatGPT frequently and those who rely on traditional learning methods, with $t(1014) = -1.428$, $p = .154$. This suggests that while students perceive improved outcomes with ChatGPT, the actual difference in performance is not substantial when compared to traditional learning methods. One possible explanation for this outcome could be the varied ways students integrate ChatGPT into their academic routines some use it to complement traditional methods, while others rely heavily on it, potentially diminishing its effectiveness for critical thinking development. Similar concerns were raised by Ayman et al. (2023), who found that while ChatGPT enhances critical thinking and problem-solving skills, concerns such as AI bias, privacy, and copyright issues must be considered to ensure its effective integration into education. Additionally, the reported improvements in critical thinking skills (64.6%) versus no noticeable changes (33.3%) reflect diverse experiences among users, further emphasizing the need for balanced and intentional use of ChatGPT in academic contexts.

In a nutshell, while ChatGPT usage is significantly associated with positive academic performance, its benefits appear to be more subjective and contextual rather than universally measurable. The findings show that AI tools should be used carefully to support, not replace, traditional learning methods, especially when it comes to developing critical thinking and problem-solving skills.

CONCLUSION

This study examined and analysed how generative AI, especially ChatGPT, affects students' academic achievements and their learning methods within Nigeria. The research

results show a direct positive link between the frequency of the usage of ChatGPT and self-reported academic performance. The study shows perceived improvements in the ability of students to complete tasks and understand academic topics with the use of ChatGPT especially among students who use ChatGPT frequently. Nevertheless, the research investigation did not discover substantial statistical differences based on the educational results between students who used ChatGPT frequently and those who depended on conventional educational techniques. Evidence from the study reveals that the advantages of ChatGPT seem to differ from actual performance change results. The majority of the students from this study reported that their critical thinking skills improved after using ChatGPT, however, a considerable number of students failed to observe any changes. Students are implored to utilize ChatGPT strategically to improve their educational process and maintain the proper development of critical thinking capabilities. These findings need to be understood within their restricted application range because of their specific nature. The research analysed the usage of ChatGPT in five Nigerian universities which an online source indicated as top-ranked for 2024. Future studies should study how ChatGPT affects different university environments such as state-owned colleges, private institutions, and other federal universities throughout Nigeria. ChatGPT receives use and effectiveness applications from different universities because these institutions employ various student bodies and faculty resources alongside diverse educational methods. Extended research on diverse areas will enable deeper insight into the advantages and obstacles that ChatGPT and similar generative AI tools present to Nigerian higher education institutions.

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