New Technology and Academic Research: AI 'Alternative' in Students' Research Writing at University of Calabar and Arthur Jarvis University, Nigeria

[1] Patrick Edem Okon; [2] Romanus Aboh;
[3] Esekong Andrew-Essien
[1, 2&3] University of Calabar, Calabar, Nigeria
Corresponding author: **Patrick Edem Okon**
Paper Number: 240274

Abstract:

Artificial Intelligence (AI) is fast changing the way we think, communicate and carryout our daily tasks. In academic research AI has introduced new methods and approaches to research with telling benefits and challenges. This paper addressed the ways students of the University of Calabar and Arthur Jarvis University (both in Nigeria) use AI for academic research. A mixed methods approach was adopted for the study, which allowed for the integration of data from survey and oral interviews. McLuhan's technological determinism provided the conceptual directions. Key findings showed a relatively high level of AI awareness, familiarity and usage among students from both institutions. While the adoption of Chabot and other conversational AI tools was dominant across the two universities, moderate shifts towards other technically-based tools were recorded. While a substantial number use AI frequently or always, the data skill areas were varied, with data analysis and data interpretation recorded as the least utilized. The challenge of choosing the most appropriate AI tool for each data skill was also evident. The credibility of AI-based research outcomes and the ethical implications of usage, however, remained doubtful among the students. Findings, additionally, underlined the urgent need for educators and university administrators to design official ethical guidelines on the use of AI for research by students, as well as integrate AI literacy courses into their school curricula to help prepare students for what has come to stay in the use of AI for research.

Keywords: *Artificial Intelligence, Complementarity,Research Methodology, Technological Determinism, Traditional Research Methods.*

I. INTRODUCTION

Most recently, students across tertiary educational institutions in Nigeria and elsewhere tend to depend on a number of new technologies (including Generative Artificial Intelligence - GAI) to help them execute their academic assignments and carry out academic research. A recent study [1] shows that 86% of students already regularly use AI for research and academic writing purposes. The study further shows that ChatGPT remains the most commonly used tool among the students sampled. Grammarly and Microsoft Copilot were only moderately used.

Another report [2] from two separate national surveys, carried out in collaboration with the Center for Digital Thriving, indicates the concern of students about the AI technology and its impact. Many of the students surveyed admitted that AI is not used only to cheat on assignments and homework; it is also useful in starting research papers or creating a personal learning plan. According to the report, half of the students surveyed have used generative AI, but only a few (4%) use it frequently. The "most commonly reported use for AI was getting information (53%) and brainstorming (51%). While Black and Latinx young people were more likely to use AI than others surveyed, the report further indicated that "generative AI could help teens get answers to questions they may be too afraid to ask adults, or for guidance on what to say in conversations" (www.gse.harvard.edu). The report also recognized not only the potential of generative AI for bullying, lying, and disinformation; but its spatial opportunities for creativity and deep exploration on a subject field [2].

These findings and reports are highly significant, but should be accepted only with care, bearing in mind existing contextual differences and the growing developments in the field with regards to the adaptability of AI for different academic purposes. While the usages of AI are now widespread and could have some negative implications for the students, such as low critical thinking ability in relation to specific subject fields as well as poor direct personal engagements with critical texts or printed materials on statistics, it should be acknowledged that their usages also hold out enormous positive benefits especially in relation to the innovative uses of AI in designing research approaches and methods.

Artificial Intelligence (AI), as a scientific innovation, grew out of a broad field of science concerned with computing, data analytics, statistics, hardware and software engineering, linguistics, neuroscience, and psychology. It involves the building of machines that can reason, learn, talk and act like human beings or in a way that would normally require human intelligence. As argued by Copeland [3], since the evolution of robotic systems endowed with intelligence processes in the 1940s, "digital computers have been programmed to carry out very complex tasks … with great proficiency" (www.britannica.com).

Though no computer-based programme has as yet competed with or fully matched human flexibility in the performance of tasks requiring much of everyday knowledge, "some programs have attained the performance levels of human experts and professionals in executing certain specific tasks" [3], including computer search engines, medical diagnosis, handwriting or voice recognition, etc. Optical Character Recognition (OCR) in AI, for example, can function to stimulate data mining and collection, as well as innovations in scientific research approaches and meaning-making that far exceeds what human beings with only average intelligence could achieve. Artificial Intelligence is, therefore, revolutionizing academic writing by managing complex ideas and extensive information, necessitating not only the need for broader integration, but also the ethical use of the tool in research and academic writing [4].

In view of these available facts, this paper sets out to investigate how the students of two universities in Cross River State, Nigeria – Arthur Javis University (AJU) (a private institution) and the University of Calabar (Unical) (a government-owned institution) – use AI as an 'alternative' tool in carrying out scientific research and research report writing. The study focuses on a five-year academic research practice period (2020 – 2025), bearing in mind the possible differences in usage between undergraduate and post-graduate students of the chosen universities. The research outcome is intended to provide a fresh perspective to the field as well as additional and complementary data to the information already available on the research subject from other national or global regions.

While the general objective of the study is to investigate and interpret the existing relationship between academic research and the use of AI in research context across the chosen academic establishments, the specific research objectives are tied around the following:

- To establish the level of AI usage for academic research across the selected universities of study.
- To streamline what is 'alternative' about the use of AI in Students' academic research and writing in the selected universities of study.
- To highlight the implications (the challenges and prospects) of AI usage in students' academic research across the selected universities of study.
- To investigate the integrity (credibility and reliability) of the outcomes of AI-based academic research in the selected universities of study.
- To explore the adaptability of AI tools to different research fields (natural and social sciences) within the selected universities of study.

II. THEORETICAL FRAMEWORK

Marshall McLuhan's *technological determinism* is adopted to provide the conceptual directions for this study. At the core of McLuhan's *technological determinism* is the belief that inventions in technology do invariably cause cultural change [5: 315]. This may include changes in academic writing and research culture when the innovative technologies of new media are applied to the field. Because the electronic new media hardware was retribalizing the human race by way of instant communication that overcame space and time simultaneously, McLuhan predicted that "even the staggering cultural impact of the electronic communication hardware would be insignificant compared with the upheaval caused by the computer software to come" [5: 318].

Though critiqued, among others, for its placement of technology in a position of absolute power over society and its undermining of the idea that humans have a choice of how to use technology [6], McLuhan's *technological determinism* is still useful for this study, precisely because of its unique claim that innovations in channels of communication are the primary cause of cultural or historical change. From family life to healthcare, recreation to entertainment, and politics to modes of education or research, nothing can remain untouched when innovations in communication technology occur (whether this happens gradually or revolutionary).

Secondly, McLuhan's conviction that every new form of media innovation and the cultural change it necessitates was an extension of some human faculty is crucial in understanding and appreciating the sociocultural value of electronic circuitry media (especially computers and computer-based robotics). In this regard, the significance of AI, for example, could be anchored on its functionality as an extension of a vital human bodily organ, sense, or function [5]. Artificial Intelligence, as a new media form, could therefore be valued, not only for extending our reach and increasing our thinking and operational efficiency in relation to academic writing and research, but also for acting as a filter to organize, manage, and interpret our social existence and investigative cultural activities.

III. ARTIFICIAL INTELLIGENCE AND RESEARCH

Artificial Intelligence (AI), an expression coined by John McCarthy in 1956, is a broad term that encompasses various technologies and systems that can reproduce and recreate intelligent human thoughts and actions [7]. This mechanism can be applied to various fields, including medicine, law, education and entertainment.

Artificial Intelligence (AI) has extended deeply into the realm of academic research, where it enhances data collection and analysis, promotes innovation,

and accelerates discovery across disciplines. Academic research, as a systematic and organized process of inquiry, aims to discover new knowledge, theories, and applications across various fields of knowledge. In this regard, the definition of research as the management of knowledge creation is apt because it involves multiple activities that must be executed systematically to create knowledge [8: 53; 9: 2).

Following the diverse activities involved in managing knowledge creation through research, certain AI tools have been developed to facilitate or simplify research processes. For example, IBM Watson offers tools for language processing, machine learning, and data analysis. Researchers can use IBM Watson to analyze large datasets and extract insights from unstructured data. Zotero and Mendeley, and EndNote are reference management tools that use AI for organizing research papers and creating citations. They help researchers manage bibliographies and streamline the citation process. Scite.ai is a citation analysis tool that provides insights into how a paper has been cited and whether the citations support or contradict the original work. It allows researchers to assess the impact and context of research papers quickly.

Chat GPT by Open AI, one of the most popular, is a conversational AI tool that can generate human-like text responses and assist in brainstorming ideas or writing. Researchers often use it for drafting text, generating summaries, or brainstorming research questions. There are also some AI-based data analysis tools, such as Rapid Miner and Knime. These tools incorporate AI algorithms for data mining, machine learning, and statistical analysis. Researchers use them to analyze large datasets, derive insights, and create predictive models. Generally, these AI tools enhance productivity, streamline processes, and provide valuable insights, making them beneficial for researchers in virtually any field. Selecting the right tools depends on the specific requirements of the research project, and integrating these technologies can lead to more innovative and efficient research outcomes.

Following the proliferation of AI-based research tools, concerns have however, arisen over the dependency on AI, or in a broader sense, machines for research and other solutions. The question is, “Who is controlling whom?”. While some scholars assert that machines are instruments built and operated by humans only to the extent of their infused capacities, others insist that machines appear to have developed a “tyrannous control of human beings” [10: 81]. Proponents of technological determinism even assert that machines drive or dictate cultural change [11]. If the assumption that machines control humans is right, to what extent can machines, or in this case, AI, control human researchers? This issue can be resolved, in part, by reviewing the constraints of AI in research.

From the angle of qualitative research, where 'humanistic' logical approaches are often required in analyses, machines are deficient in certain circumstances. Machines cannot accurately decipher the complexities and flexibilities of human attitudes and behaviors, and the conditions or circumstances that cause them to change. Not all research variables are subject to computer software analysis. For instance, it is not easy to evaluate emotions.

AI is constrained in many more research situations. Research that requires in-depth investigations into new knowledge domains, maybe in a remote study area, may not benefit much from AI. Artificial Intelligence typically draws from an existing knowledge database, and where information is unavailable on a given subject matter, AI may mislead investigators. Some AI sites, such as Meta, often warn clearly before displaying information: "Messages are generated by AI from Meta. Some may be inaccurate or inappropriate: You can improve the quality by sending feedback…" A situation where AI doubts its capacity indicates that it is not a dependable research tool; it can only be used with caution. The deficiency of AI's acclaimed 'competencies' has further been proven in a recent study where humans were seen to have significantly outperformed AI in a structured medical microbiology examination [12]. Again, this study shows that AI is not fully dependable.

Moreover, AI may not be very useful in some qualitative data collection procedures. For example, it may not be able to conduct interviews to the extent of following up with incidental questions, and may not be very useful in moderating Focus Group Discussions. Humans must be involved in contacting the resource persons, gathering them, and moderating discussion sessions. AI tools may, however, be useful in recording and transcribing the information generated in the process.

In the process of data gathering, humans apply subjective discretion where machines cannot navigate. Traditionally, human enumerators have been responsible for gathering research data from the field. Where necessary, humans consult and negotiate with communities for clearance before any field research activity. In situations that require Participatory Research Appraisal (PRA) as a data-gathering option, humans are better positioned for the activity [13: 69-70).

Human discretion is also required to resolve ethical issues, such as securing informed consent before engaging some classes of people, such as mentally challenged respondents and minors in research. Issues related to data privacy, algorithmic bias, and the transparency of AI models is also paramount. The datasets used to train AI systems can inherently carry biases, leading to skewed results that may perpetuate inequalities and subjectivities in research. Furthermore, the use of AI in writing research findings and summaries

necessitates a re-evaluation of intellectual property rights and authorship. Questions have emerged about ownership and the need to segment human contributions from machine contributions in academic reports and publications [14; 15].

Despite all the challenges, it must be acknowledged that AI can be incredibly useful across various aspects of research. It is obvious that there is a significant shift in knowledge management systems. One of the most significant contributions of AI to research is its ability to analyze vast datasets quickly and effectively. Traditional research methods often involve manual data collection and analysis, which can be time-consuming and prone to human error. AI can handle large datasets much more efficiently than traditional methods, using machine learning algorithms, which can quickly analyze data, identify trends, and generate insights. AI tools can perform complex statistical analyses, making it easier for researchers to draw valid conclusions from their data.

In content analysis, AI can recognize patterns and identify trends in datasets that might be overlooked by humans. In literature review, AI can use Natural Language Processing (NLP) to scan and summarize vast amounts of literature. It can highlight key findings, trends, and relevant articles for researchers. AI technologies have, therefore, fundamentally transformed the way researchers can access and utilize existing literature.

AI encourages interdisciplinary collaboration, as it transcends traditional academic boundaries. For instance, researchers in the arts and humanities, in conjunction with computer scientists, have developed the hybrid discipline, Digital Humanities, to explore the intersections of digital technology and the arts [16].

Artificial intelligence is, therefore, undoubtedly reshaping the landscape of research, providing tools that enhance data analysis, accelerate discoveries, and encourage collaborative efforts across disciplines. While the benefits of AI are significant, it is essential to navigate the associated challenges diligently. The future of research, empowered by AI, holds promise for addressing one of the foremost aspirations of humanity – breaking knowledge barriers and paving the way for a more informed world.

IV. METHODS OF THE STUDY

A mixed methods research approach was adopted for the study, whereby survey and oral interviews provided the main tools of empirical investigations. The use of mixed methods was to ensure a complementarity of findings and robust data collection to address the research objectives [17]. For the survey, a questionnaire was developed and administered to a select number of final year students at the Arthur Jarvis University (AJU, Akpabuyo) and the University of

Calabar (Unical, Calabar Municipality), respectively. While the questionnaire contained a total number of twenty (20) questions, four (4) were open-ended and sixteen (16) were of Likert Scale ('Yes', 'No', and 'Not Sure') pattern. The choice of final year students was based on the belief that they were more active than other levels in the regular use of AI tools for scientific research.

Based on the information obtained from Unical's website and AJU's administrative office, the total population of students for the two universities currently stands at 42,645 (40,645 for Unical and 2,000 for the AJU). Using the Australian Sampling Calculator (www.abs.gov.au), a total sample size of 381 (100 for AJU and 281 for Unical) was drawn out from that students' total population. The confidence level used in the calculations was 95% and the confidence interval was 0.05. The calculator itself generated the standard error of 0.02551 when the population size and other variables were entered into it. Thus, a total of 381 students were sampled from across the two select universities for the survey. This size was considered representative of the experiences of all the students of the two universities. Data obtained from the survey were first analysed using Claude AI tool. Survey responses were captured in the form of thematic categories, frequency and percentages. But in order to build authenticity around the AI-generated analytical outcomes, the Statistical Package for Social Sciences (SPSS) was also introduced as the second analytical tool. Claude AI tool, in particular, assisted in comparative analysis of survey data as well as the visualization of data through Pie-Charts, Bar Charts, and Histograms.

Again, two academic staff members (one from each university) were purposively selected for oral interviews. The oral interviews were aimed to provide complementary theoretical information to the information gathered through the survey. The academic staff from AJU is designated here as R2 and the one from Unical as R1. Deliberate preference was made for those more experienced in academia and better grounded in research projects. Below are the data from the survey and oral interviews – survey data are represented by way of descriptive statistics in categories, frequency, and percentages, while data from oral interviews are analysed thematically to respond, accordingly, to research objectives:

V. Results

Our research has therefore revealed, among others, the following key findings in relation to our research objectives:

i. **Level and pattern of AI usage**.

Results from the survey indicated a high level of familiarity with AI concept among students from both institutions (82.0% at AJU vs 77.0% at Unical).

While 13.0% were not familiar at AJU and 8.0% at Unical, only 5.0% at AJU were unsure and 15.0% expressed uncertainty at Unical. This suggests that AI awareness is generally high across both institutions, although uncertainty is more pronounced among respondents from Unical.

The majority of respondents in both institutions, however, reported prior use of AI in academic studies. Specifically, 82.0% from AJU and 81.0% from Unical indicated they had used AI in their studies. In contrast, 9.0% in each institution reported non-use, while 9.0% and 10.0% of respondents from AJU and Unical, respectively, were unsure. These findings suggest widespread adoption of AI tools for study-related activities (outside practical academic research) among students in both institutions.

The engagement levels with AI in academic research were comparatively lower than for general studies in both institutions. At AJU, 63.0% of respondents reported having used AI in academic research, while 20.0% reported non-use. At Unical, 67.0% indicated AI use in research, compared with 13.0% who had not used AI. This indicates that, although AI use in academic research is relatively common, a substantial proportion of students have not yet adopted AI tools for research purposes. Figures 1a, 1b & 1c, however, provide a comparative analysis of responses across the two institutions as well as complete response distributions in relation to familiarity with AI and use of AI tools for research. Figures 2, 3 and 4, in turn, offer summary comparisons across AI tools usage for research and data skills distributions.

Findings from the survey further showed that students in both AJU and Unical reported using AI across multiple stages of academic research, although the specific areas of use varied slightly between the institutions. At AJU, AI use was most commonly reported in other research-related activities (22.0%) outside research report writing (19.0%), data sourcing (17.0%) and data organization (17.0%). The least reported area of AI use in this institution was data analysis (12.0%). Similarly, respondents from Unical reported using AI for research report writing (19.0%) and data analysis (19.0%), while data sourcing (17.0%) and data organization (18.0%) were also commonly reported. These findings indicate that AI is predominantly applied to support research preparation, report writing, and data-related tasks in both institutions (see also Figures 2a & 2b).

With regard to the frequency of AI use (see Figure 3), respondents from both institutions reported regular engagements with AI technologies. At AJU, 35.0% of respondents indicated using AI frequently, while 33.0% reported using AI sometimes and 30.0% reported using AI always. Only 2.0% reported rare use. A similar pattern was observed at Unical, where 34.3% of respondents reported using AI sometimes, 32.3% reported using AI always, and 30.3% reported

frequent use, with 3.0% indicating rare use. This suggests that AI usage is generally routine rather than occasional among students in both institutions.

Respondents from AJU, however, most commonly reported using other AI tools (23.0%) outside chatbots (20.0%), natural language processing tools (16.0%), and virtual assistants (15.0%) for research (see Figure 4). Lower levels of usage were reported for machine learning (9.0%), robotics (9.0%), and computer vision (8.0%). In contrast, Unical students reported higher usage of machine learning tools (18.0%), with notable use of computer vision (14.0%), robotics (14.0%), chat bots (15.0%), and virtual assistants (14.0%). These patterns suggest slight institutional differences in the types of AI technologies accessed, with more conversational tools being more common among AJU students and technically-oriented tools being relatively more common among respondents from Unical. Unical, however, has more balanced distribution across AI types. Overall, findings indicate that AI is widely used across different academic research activities, with most students' engagements with AI being sometimes, frequently, or always (see Figures 2).

AI usage pattern, however, showed that 65% of AJU students use AI frequently or always, with very minimal rare usage (2%). 62% of Unical students use AI frequently or always, showing similar adoption rates to AJU. Both institutions, however, show remarkably similar AI adoption patterns - AJU has a slightly higher "Frequency" usage (35% vs 30%), while Unical shows marginally higher "Always" usage (32% vs 30%). The rare usage category is negligible at both institutions (2-3%), indicating widespread AI integration among students.

In summary, AI awareness is generally high across both institutions, although uncertainty is more pronounced among respondents from Unical. There is, however, widespread adoption of AI tools for study-related activities (outside practical academic research) among students in both institutions. Although AI use in academic research is relatively common, a substantial proportion of students have not yet adopted AI tools for research purposes or are certain of the most appropriate AI tools to use for specific data skills.

While Unical demonstrated limited diversity in AI tools usage with more emphasis on technically-oriented and conversational AI tools, AJU showed slightly better diversity in AI tool adoption beyond Chatbots, but with a greater focus on the use of conversational AI tools. The diversity in AI tools usage reported further suggests growing exposure to AI tools, although Chatbots and other conversational tools still dominate, and the nature and depth of use appear to vary by institution and research task. Again, Unical was more prepared in terms of AI usage, whereas AJU was slowly building practical AI skill diversity. AI is predominantly applied to support research preparation,

report writing, and data-related tasks in both institutions. The least reported areas of AI use in the two institutions were data analysis (12.0%) and data interpretation (13.0%). A slightly similar usage rate was, however, recorded from both institutions (with 65% using AI either frequently or always at AJU and 62% at Unical).

ii. The 'alternative' about AI usage for research.

Information from both oral interviews and survey indicated the following issues as what is 'alternative' about AI usage, compared to the traditional way of doing academic research. These issues essentially define the benefits of AI to scientific research.

While R1 placed emphasis on speed and ease in locating information as well as variety in information availability to allow for options in data search, R2 stressed the fact that AI could help a researcher locate a large chunk of information that may be ordinarily scanty and difficult to find. The two interviewees, however, acknowledged the use of AI for easy access to information as the utmost; and its limited assistance in handling analytical and experiential data particularly in the fields of literary studies and social sciences, as the secondary.

Survey theoretical data further highlighted the following issues:

- AI use reduces the burden of too much work on a person, by lightening the burden of carrying and consulting multiple textbooks and notes.
- AI makes research seamless, faster and more reliable, by providing clearer definitions of research categories, concepts, topics, etc.
- It speeds up the research process - hastens literature review, data processing, and research report writing.
- It enables more precise and straight-to-the-point data analysis and interpretation.
- It allows for the comparison of answers with other sources.
- AI use in research makes for easy understanding of a subject.

In summary, empirical data suggest a wide variety of benefits in the use of AI for research. These include speed, ease of access to information, variety in information base, clearer definitions of topics and categorization of concepts, analysing data, better and faster organization of literature, as well as report writing. These and many more clearly define why the use of AI in academic research is significant, differentiating this technology-driven approach from the traditional way of doing scientific research. Respondents, however, admitted a number of other things that the traditional methods of doing research (especially qualitative research) can do, but AI cannot, including face-to-face interface with social actors, critical thinking, emotional expressions in relation

to social phenomena, and experiential data processing as it relates particularly to social sciences or participatory research.

iii. Challenges and prospects of AI usage.

Respondents also expressed fear about AI being abused by students and staff. Students surveyed, noted that AI could make students lazy, less studious, and less creative, as it sustains a form of dependency that reduces students' willingness to admit the fact that AI could make mistakes. Respondents also expressed concern about the tendency of AI to invade private spaces for data as well as for some students to skip offline lectures on research because they believe in the availability of AI to do everything for them in their research projects. R1 and R2, however, maintained that AI cannot replace human intelligence and, thus, should be used sparingly and approached only as a complementary tool.

R1, in particular, argued that AI is artificial and anything artificial is greatly limited. This challenge is intrinsic to the computerized nature of AI. While AI can help scan for and organize a variety of information, depending entirely on the information AI generates and neglecting other sources of information that even AI cannot access, is not advisable. Physical interface with social actors, for example, can further enrich qualitative research. This aspect will be absent if one has to depend on AI alone, particularly for a qualitative study. Thus, a researcher undertaking qualitative research will be bereft of the depth of personal experiences, emotions and human connections required. Such data could be obtained only through physical interface with others.

R2, however, acknowledged that AI has come to stay. It would keep advancing and impacting in all its ramifications. Students should be encouraged to keep up with the times. For the interviewee, the basic challenge is the availability of some of the high-tech AI tools, knowing what tool is best for each data skill, as well as the needed usage skills particularly within developing societies. Thus, "while AI is useful for research, we still need natural intelligence and critical thinking in research; that is because, AI cannot do everything. The lack of necessary human factors must always be recognized. In this regard, AI should be approached; not as a total or perfect tool, but only as "a complementary research tool" (R2, Oral interview, 2025).

R1 also emphasized that, while students should be encouraged to use AI for research, a condition should be placed on its usage because of the identified inherent challenges. Observing a needed operational ethics should remain paramount. Also, students "…should not copy information from AI word for word, but should subject it to verification and use it to establish their positions grounded in humanity" (R1, Oral interview, 2025). The copy-and-paste pattern

common among students should be discouraged entirely. Students can, however, use AI in a limited way to scan for ideas and sources, as well as organize and process information.

Findings from the survey further showed that respondents from both AJU and Unical also expressed diverse ethical concerns regarding the use of AI in academic research. At AJU, the most frequently reported ethical concern was 'bias and discrimination' (27.0 %). This was followed by concern for 'lack of human interaction' (17.0%) and the problem of 'reliability and accuracy' (16.0%). Concerns related to 'privacy and data security' were reported by 15.0% of respondents, while nearly an equal proportion (16.0%) selected other ethical issues. The least reported concern in AJU was 'critical thinking displacement' (9.0%).

Similarly, at Unical, 'bias and discrimination' also remained a prominent concern (20.0%). 'Lack of human interaction', however, emerged as the most frequently reported ethical issue (22.0%). Concerns regarding the 'reliability and accuracy' of AI data were reported by 19.0%, while 'privacy and data security', and other concerns, were each reported by 13.0%, respectively. As observed at Unical, 'critical thinking displacement' was among the least reported concerns, although it was identified by a slightly higher proportion of respondents (13.0%).

Survey data further indicated mixed reactions about AI among students from both institutions. At AJU, 36.0% of respondents reported that their initial experience with AI was exciting, while 27.0% indicated it was not and 37.0% were unsure. In contrast, at Unical, only 19.0% of respondents were excited, whereas a larger proportion (42.0%) was not excited and 39.0% expressed uncertainty. This pattern suggests that respondents from AJU generally reported a more positive impression compared to their counterparts from Unical. While a significant proportion in both institutions (39% for Unical vs 35% for AJU) indicated experiencing some form of disorientation at the initial use, 31.0% of respondents in each institution, notably, remained unsure; reflecting considerable ambivalence about initial encounters with AI.

Thirty-eight percent (38.0%) of respondents from AJU, however, believed that AI could enhance their research experience, compared to 27.0% from Uncial. 27.0% of respondents from AJU and 36.0% from Uncial, however, disagreed; while 35.0% and 37.0%, respectively, expressed uncertainty. This suggests a relatively more favorable perception of AI's research benefits among respondents from AJU, although uncertainty remained substantial in both institutions. The perception of AI's potential for creativity and innovation in research was, however, evenly distributed. At AJU, equal proportions of respondents (33.0% each) agreed and disagreed that AI enhances creativity and

innovation, while 34.0% were unsure. At Unical, 33.0% of respondents agreed, 28.0% disagreed, and a larger proportion (39.0%) expressed uncertainty. These findings indicate divided views on the creative potential of AI, with uncertainty being particularly prominent among respondents from Unical.

Concerning the desire for increased AI integration for research within the universities, similar response patterns were observed across both institutions. At AJU, 34.0% expressed a desire for more AI integration, while 32.0% did not and 34.0% were unsure. Likewise, at Unical, 35.0% of respondents supported further AI integration, 33.0% did not, and 32.0% expressed uncertainty. This indicates moderate support for increased AI integration alongside considerable indecision among students. But the preparedness of students to engage with AI for research was relatively mixed. Less than one-third of respondents in both institutions reported feeling adequately prepared. At AJU, 31.0% of respondents felt prepared, while 37.0% did not and 32.0% were unsure. Similarly, at Unical, only 29.0% of respondents felt prepared, compared with 47.0% who did not feel prepared and 24.0% who were unsure. This highlights a notable gap in perceived readiness to engage with AI tools effectively across both institutions.

Overall, both schools had almost similar patterns of concerns about AI usage in academic research. Respondents expressed fears about possible abuses in usage, especially breaches of privacy and data security. The problem of bias and discrimination in usage between students from rich and poor backgrounds, however, remained the highest challenge. This was followed by perceived lack of human interaction in AI usage. Unical showed slightly more diversity of concerns, reflecting its broader population. These perceived challenges were generally addressed as questions of ethics in the adoption of AI for research.

In spite of these challenges, most respondents admitted that AI is still valuable. They expressed, in varying ways, ardent desires to learn more about AI or how to use the technology; that is because AI gives 'perfect' assistance to research. For the students, the use of AI for research, apart from enabling them to key into global technological development, also enhances their research skills beyond what is given in the classrooms. There were, therefore, expressions of different levels of excitement, preparedness, experience, and readiness for AI use, some of which highlighted the different prospects students of the two universities associated with the integration of AI into academic research.

iv. Integrity of AI-based Research Outcomes.

R1 and R2 agreed that, because AI is a computerized system and source of knowledge, it is limited and could provide misleading information. As such, any

"data obtained through AI should always be subjected to verification" (R1, Oral interview, 2025). R2, for example, noted that because some of the data from AI could be questionable and unacceptable, though difficult to detect, this can raise questions about the integrity of a research fieldwork. For the interviewee, the integrity of AI-based data, data sources, and conclusions should not just be taken at it face value; "it should be checked absolutely" (R2, Oral interview, 2025). Additionally, R1 advised that AI should be used only sparingly both by staff and students; and if used, such usages should be, accordingly and appropriately, acknowledged.

In summary, because AI is a computerized system of knowledge, respondents generally held that its research-based outcomes would be limited in a number of ways. In this regard, data obtained from AI should not just be taken at face value; but should be subjected to further verifications. Again, AI's lack of subjective human elements was seen as bearing serious negative implications for any conclusions drawn out from AI, particularly in social and management sciences, as such lack could render some of its data questionable and doubtful. In this regard, AI datasets should be used only as complementary data, not as 'perfect' data. This finding aligns with Copeland [3] and Grant's [10] studies of the computerized nature of AI, especially their distinctive analyses of AI's capabilities and limitations.

v. Adaptability of AI tools to different research fields.

From Faculty-based comparative analysis of data, the following patterns of adaptability and adoption of AI emerged from both Unical and AJU across the fields of basic and applied sciences, basic medical sciences, law, management sciences, and social sciences:

AI awareness was generally high across all five Faculties of Unical and AJU sampled (averaging 80% vs 78%). At Unical's Basic Medical Sciences, for instance, the awareness level was 100%. But at AJU, it was 78.0%. At Unical's Social Science, the awareness of AI use for research was slightly lower (75%) than Basic and Applied Sciences (76%) of the same university; the difference being simply marginal. There was also evidence of good awareness of AI tools (84%) at Unical's Law Faculty. The actual familiarity with AI concepts was slightly lower (68%) than that of Management Sciences (71%) at the same university. At AJU's Law Faculty, a significant number of students (73%) were aware of the use of AI for research, a percentage similar to the Law Faculty at Unical.

AI tools usage is skewed towards Chatbots in all five Faculties of the two universities, with only minimal usage of other tools beyond Chatbots noticed only at AJU. Other tools like Machine Learning, NLP, and Computer Vision are

minimally used. In terms of data skills, most students of Unical focus on data sourcing and report writing, with less emphasis on data analysis or interpretation. A similar pattern was noticed at AJU, where data analysis and interpretation were also less emphasized across the five Faculties.

At Basic Medical Sciences of Unical, for instance, data sourcing and report writing again led in relation to data usage skills. This faculty seems more technically inclined. Data sourcing, again, led at AJU in terms of data skills, while students showed moderate engagements with AI for other research purposes. Usages for different data skills at Unical's Faculty of Social Sciences were more evenly spread across, suggesting practical and creative applications of data usage skills. But at the Basic and Applied Sciences Faculty of the same university, data sourcing and data interpretation led in actual usage, showing a pattern in skill focus. But at AJU, data skills were more evenly distributed across the same Basic and Applied Sciences Faculty, reflecting practical familiarity with data rather than deep analysis. Sourcing and interpretation led at AJU's Law Faculty as the data skill, with data analysis taking a lower percentage.

At the Management Science of Unical, the highest percentages (33%) in data usage skills were in data sourcing and data interpretation (25%). But at the same Faculty in AJU, data usage skills focused primarily on data sourcing (24%), followed by analysis and interpretation. Respondents at this Faculty showed balanced AI awareness with modest adoption beyond Chatbots

Overall, while the awareness trend is high across the five Faculties in Unical, diversity in AI tools usage is limited, with clear differences in the adoption of either technically-based or conversationally-oriented AI. AJU, equally, showed a high awareness trend across the five Faculties sampled, with more emphasis on conversational tools and limited practical use of AI beyond Chatbots across all Faculties. This is slightly more consistent with the young age and rural location of the university.

VI. Discussion

When compared to previous studies, our research findings have, however, shown some areas of alignment, revisions and refutations. Kelly's [1] study, for example, had earlier established 86% of students already used AI regularly in their studies. Kelly's study did not focus more specifically on academic research. This is one area of difference between this research and Kelly's. While our study of the Nigerian experience has successfully established a near similar percentage of usage in academic studies (82% vs 77%; averaging 70%), our findings in relation to AI usage for scientific research (63% AJU vs 67% for Unical; averaging 60%) further expands and revises Kelly's earlier discovery in

relation to DEC. Again, while Kelly's study showed 54% regularity of use, our research shows much lower frequency (averaging 32.5%). This may be a proof of the effect of enduring inequality in technology distribution and access across African societies.

Kelly's [1] study was, however, advantaged by the use of a broader sample base (3,839 respondents) to garner results. While Kelly's responses were drawn across a wide range of students' levels, our own survey was limited only to the final year undergraduate students of the two universities. Both studies are, however, valuable in providing useful insights to guide educators and university administrators on AI integration and students' driven AI adoption and usage to avoid intellectual amnesia and social liabilities.

Kelly's [1] study further showed that Chat GPT remained the most commonly used AI tool among students in Asia, while other tools were only moderately used. Our study has established a similar pattern, indicating the dominance of Chat bots and other conversational AI tools in students' research processes across the two universities. Only a few showed evidence of moderate use of other AI tools outside Chabot. The challenge of knowing the most appropriate AI tool to use for each data skill, however, remained widespread.

Our study also affirms Nagelhout's [2] findings in relation to young adults' use of AI at Harvard School of Education (Project Zero), that AI could be used to support research preparations and professional development. Though Nagelhout's discovery did not stress AI use for data-related processing and interpretations, our findings show that while data sourcing was critical to students' use of AI in universities, data analysis and interpretations as vital elements of improved critical thinking, remained low. Also, while analysis through conversational AI tools was high in the Social Sciences, Law, and Management Sciences, more technically-oriented AI received higher attention across Basic and Applied Sciences as well as Basic Medical Sciences. In this regard, our findings further support Inyabri and Ekaya's [16] emphasis on interdisciplinary collaboration in the use of AI and other digital technologies. It should be seen as a necessary call for integration across disciplines, especially as it relates to digital humanities and the push to transcend traditional academic boundaries in the 21st century.

The frequency of use of AI in the two universities in Nigeria (see Figure 3) is, however, higher (averaging 32.05%) than the 4.0% of frequency established earlier by Nagelhout [2], showing progressive familiarity with and access to AI across different parts of the world as well as increasing realization of its value to research. The expansion in the data skill areas available to the students of the two universities in Nigeria, is again further proof that students are now increasingly using AI for other research purposes, beyond mere information

gathering and brainstorming established earlier by Nagelhout [2]. With data analysis and interpretation still remaining the least developed data skill area, the increasing use of AI to improve critical thinking in research among students remain doubtful. This then is one of the dangers to watch against and discourage in the use of AI, especially where a copy-and-paste culture thrives.

While Nagelhout's [2] analysis sought simply to differentiate between how Blacks and Latinx young adults use AI, our own study rejected this color approach, but sought to understand how socio-economic differences could further introduce bias and discrimination into the adoption of the technology between students from poor and rich backgrounds. Our findings, however, align with Agbor et al. [18] and Vieriu and Petrea's [19] findings that when personalized, AI use can offer each student, regardless of socio-economic background, the attention and resources necessary for him or her to succeed. By eliminating social inequalities in relation to its usage, AI presents a level playing field for every student in need of such technological support. The only difference could, perhaps, be located in the power of acquisition of the technology and data usage skills.

Both our research and Nagelhout's [2] study, however, recognize the potential of AI for creative research opportunities for young adults, as well as for deeper information on a subject field. Both studies also admit that there is now a significant shift in knowledge management facilitated and driven by AI and that AI is truly reshaping different fields of study, including research. But AI's value at the extension of critical human thinking among students and expression of personalized emotions and experiences remains doubtful. The studies further re-affirm not only McLuhan's technological determinism and AI's power at revolutionizing cultural industries and practices, but more importantly, the effectiveness of users' active engagements in the technological revolution now taking place in academia, especially in the field of scientific research. Through regular exposure to AI and frequent usage of the same by educators and students, the research field is no longer the same. AI's enormous benefits to the field constitute the 'alternative' to research, offering processes and approaches slightly different from the structured approaches embedded in the traditional research methods. AI, for example, can handle large datasets far better and faster than the traditional methods of research that are grounded more in manual research processes.

While the prospects are high, the constraints of AI on academic research, as indicated by the students of the two universities, have further shown the extent to which AI alone can influence human researchers towards research success. Its capacity to assist depends largely on the potential of the different AI tools

available, on students' ability to navigate the terrains and the capacity to use the tools to achieve intended research purposes. Thus, the technology alone, because it is limited, cannot do the magic. Its complementary infusion with human research capabilities and physical interface is what is needed for success.

In spite of these common findings, the need for educators and students to exercise caution and care is also being emphasized in our study [cf. 20]. In this regard, special attention should be given to the ethical norms and requirements necessary for the effective use of AI in academia. Khalifa and Albadawy [4] and other authors have offered significant insights on the ethical use of AI that could be drawn upon. A formal ethical guideline that makes a clear-cut distinction between what is appropriate and inappropriate in students' use of AI for academic research should be considered as necessary. Additionally, the development of AI literacy courses to equip students with the necessary operational skills should also be given high consideration within every university in Nigeria.

Our results, therefore, suggest that AI-based academic research can be an effective complement to the traditional ways of doing scientific research, particularly in the areas of data sourcing, data processing and visualisation, as well as literature review and research report writing. AI tools are, however, more effective in areas requiring descriptive statistical analysis, but less effective in fields requiring personalized feedback in terms of expressions of personal feelings, thinking and reactions in relation to social phenomena. AI's fruitful benefits could, however, help bridge the gap in educational inequality, providing helpful support to both underprivileged students and those from well-to-do backgrounds. The preparedness of students for the practical use of the technology in terms of exposure and skills, regardless of their background, still remains a challenge requiring urgent attention by the educators in Nigeria.

VII. Conclusion

This study addressed how students of tertiary educational institutions in Nigeria use Artificial Intelligence (AI) for academic research, using the experiences of two universities – Unical and AJU – as case study. The study focused on students' familiarity with AI, the pattern of use, AI preferences, perception of AI and readiness for AI use, the alternative about AI compared to the known traditional way of doing scientific research, challenges and prospects, as well as adaptability across different subject fields. Key findings indicate that while awareness of and familiarity with AI is high among the students, the practical integration into academic research varies. Chabot and other conversational AI tools remain dominant across the two universities, with moderate shifts towards other technically-based tools also recorded. The level of students who use AI for research is above average, but still lower than those

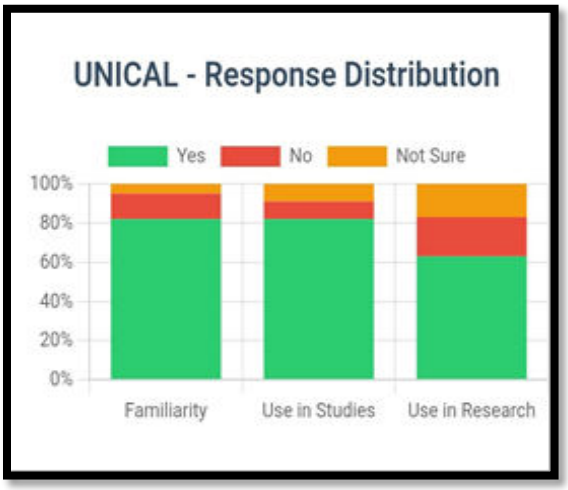
who use it for studies (outside practical academic research). While a substantial number use it frequently or always, the data skill areas of use vary, with data analysis and data interpretation remaining the least. While AI is seen as valuable for research, the credibility of its research outcomes remains doubtful, necessitating the call to use AI only sparingly or only as a complementary tool. Regardless, doubts still abound on how AI use in research could protect against possible breaches of privacy data as well as facilitate physical human interactions in research. The implications of these findings are profound. They underline the urgent need for educators and university administrators to design official ethical guidelines on the use of AI for research by students, as well as integrate AI literacy courses into their school curricula to help prepare students for what has come to stay in the use of this technology.

Despite the insightful empirical results obtained from the fields, our study is still limited by its narrow focus on the experiences of only two universities. The study also had a relatively small sample size (n = 381), which may limit generalizability. Additionally, the study was conducted over a short period of time (roughly 4 months), and the long-term effects of the integration of AI into academic research among students of the two universities still remain unclear.

In view of the limitations in the research, future studies on the subject should explore a broader scope in terms of context and experience, as well as assess the long-term impact of AI-based research on critical thinking, capability at research innovations among students, and AI's research effectiveness in the different learning environments within universities. A larger and more diverse subject areas and sample size could provide deeper theoretical insights.

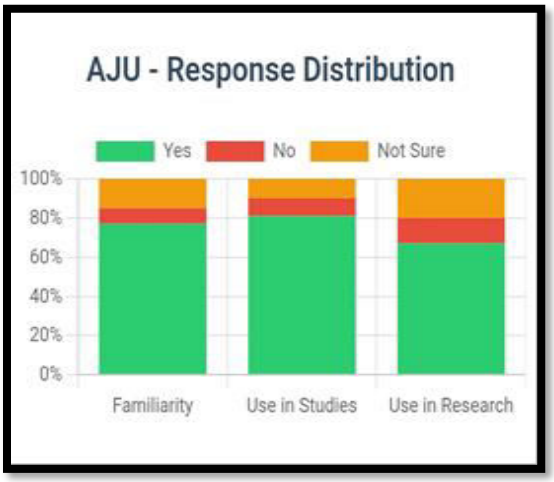
VIII. Figures and Tables

Figure 1a: Comparative Analysis of Familiarity and Use of AI by Institutions



Source: Authors (Cloud AI)

Figure 1b: Complete Response Distribution



Source: Authors (Claude AI)

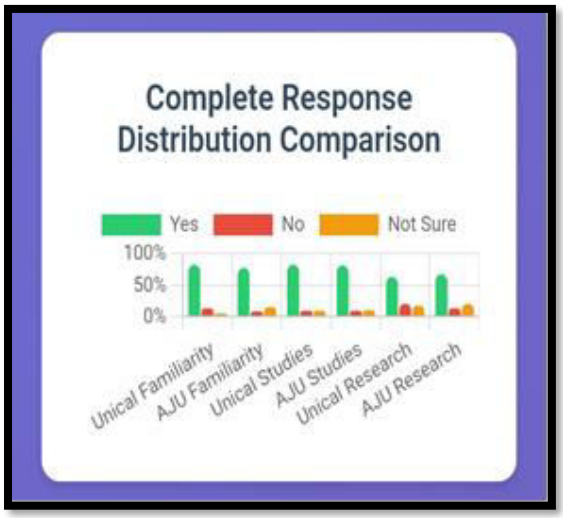
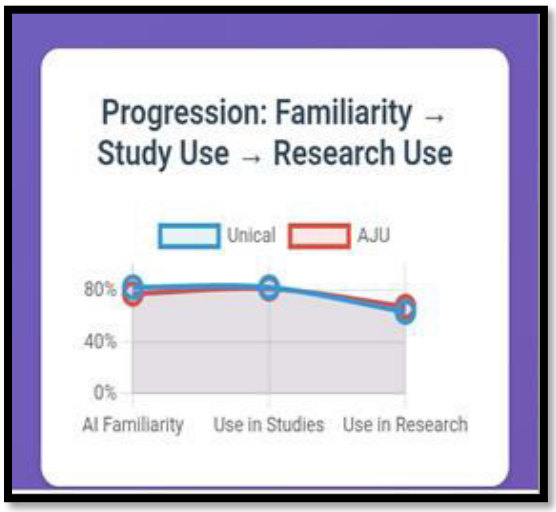
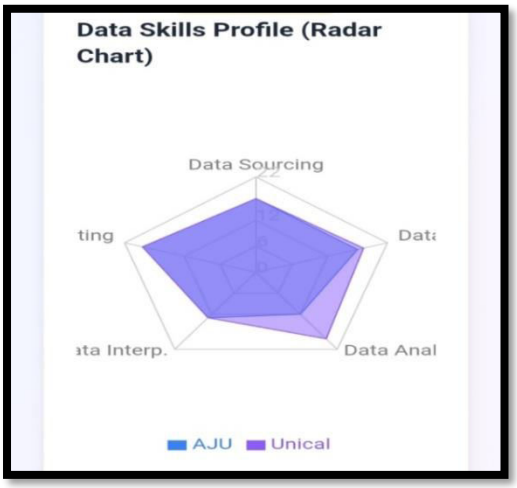


Figure 1c: Distribution Progression



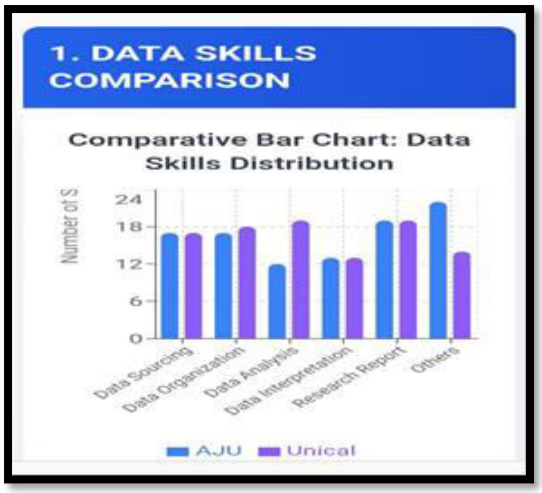
Source: Authors (Claude AI)

Figure 2a: Radar Chart of Skills Profiles



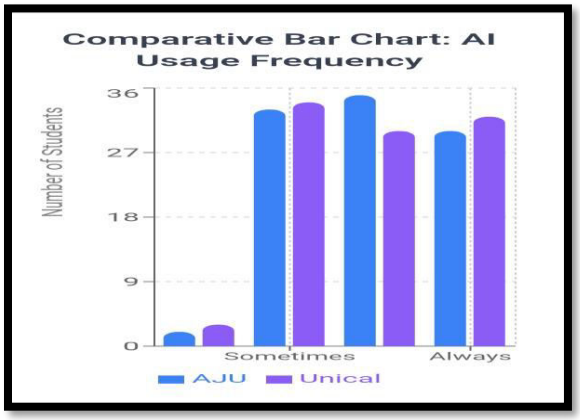
Source: Authors (Cloud AI)

Figure 2b: AI Skills Distribution



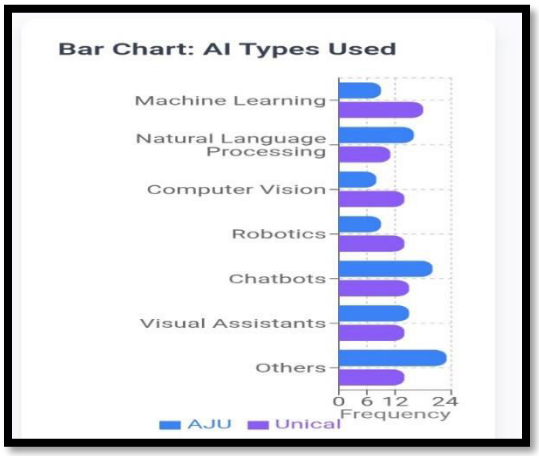
Source: Authors (Claude AI)

Figure 3: AI Usage Pattern



Source: Authors (Cloud AI)

Figure 4: AI Preferences



Source: Authors (Claude AI)

References

1. *Agbor, U.I. Et al. (2024). Artificial intelligence and academic research: Understanding the potential and the threats to academic writing. Ianna Journal of Interdisciplinary Studies 6(2), pp. 33-52.*
2. *Amirjalili F., Neysani M. and Nikbakht A. (2024). Exploring the boundaries of authorship: a comparative analysis of AI-generated text and human academic writing in English literature. Frontiers in Education. 9:1347421.*
3. *Andrew-Essien, E. (2023). Research methods: A simplified approach for scholars in the arts. 2nd Edition. Uncial Press.*
4. *Baran, S. J. (2010). Introduction to mass communication, media literacy and culture. 6th Edition. McGraw-Hill.*
5. *Copeland, B. J. (2025, April 27). 'Artificial Intelligence'. In Encyclopedia Britannica. www.britannica.com*
6. *Gleisberg, K. (2008). Cutting fields of knowledge: The problem of knowledge transfer in field research on land use in Burkina Faso. In Wall, C. and Mollinga. P (eds). Fieldwork in Difficult Environments: Methodology as Boundary Work in Research Development. Transaction Publishers, pp. 69 – 81.*

7. *Grant, G. (2007). Science, Technology and the Human: Thinking About Technology. In B'beri, B. Belanger, P., Eid, M., Lowes, M. and Porter, E. (eds). Introduction to Media Studies. Oxford University Press, pp. 81 -85.*
8. *Griffin, E. (2000). A First Look at Communication Theory. Fourth Edition. Boston: McGraw Hill.*
9. *Howard, J. (2019). Artificial intelligence: Implications for the future of work. American Journal of Industrial Medicine 62(11), pp. 917-926.*
10. *Inyabri, I. and Ekaya, O. (2025). Introduction to digital humanities. In Inyabri, I (ed). Digital humanities: application of computer to the arts. University of Calabar Press, pp 1 – 4.*
11. *Kelly, R. (2024, 28th August). Survey: 86% of Students Already Use AI in Their Studies. campustechnology.com.*
12. *Khalifa, M. and Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. Computer Methods and Programs in Biomedicine Update5 (2024)100145. www.sciencedirect.com*
13. *Mainzer, K. (2019). Introduction: What is AI? In Artificial Intelligence: When do machine take over? Berlin: Springer, pp. 1-5.*
14. *Mazi, F. (2024). Authorship in artificial intelligence-generated works: Exploring originality in text prompts and artificial intelligence outputs through philosophical foundations of copyright and collage protection. The Journal of World Intellectual Property. WWW. wileyonlinelibrary.com*
15. *Molina-Azorin, J. F. (May 2016). Mixed methods research: An opportunity to improve our studies and our research skills. European Journal of Management and Business Economics, 25(2), pp. 37-38.*
16. *Morales, C. (2023, Mar 17). Strengths and Weaknesses of McLuhan's Technological Determinism Theory. Medium. www.medium.com*
17. *Nagelhout, R. (2024, September 10). Students Are Using AI Already. Here's what they Think Adults Should Know. www.gse.harvard.edu*

18. *Obanya, P.A.I. (2013). Workbook and complementary reader on quality teaching for quality learning in higher education. University Press/Center for Teaching and Learning Excellence, University of Calabar.*
19. *Sallam, M. & Al-Sahalat, K. (2023). Below average Chat GPT performance in medical microbiology exam compared to university students. Frontiers in Education. 8:1333415.*
20. *Vieiru, A.M. and Petrea, G. (2025). The impact of artificial intelligence (AI) on students' academic development. Education Science 15(3), pp. 1-12.*