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Examining the Epistemological Status of "AI-Aided Research" in the Information Age: Research Integrity of Margaret Lawrence University in Delta State

ETAOGHENE PAUL POLO
Lecturer, Departments of Philosophy and Bioethics, Margaret Lawrence University, Galilee, Ika North-East L.G.A., Delta State
DR. HELEN EMMANUEL
Senior Lecturer, Department of Library and Information Science, University of Abuja **3.**
BONNIE OBEKA OBANDE
Lecturer, Department of Library and Information Science, Igbinedion University, Okada, Edo State

Abstract: *This study examines the epistemological implications of the adoption of Artificial Intelligence (AI) in researches within the information age. Focusing on the particular case of Margaret Lawrence University, a leading research institution situated in Galilee, Ika North-East Local Government Area of Delta State, Nigeria, this study assesses the implications of AI-aided research and questions the integrity of AI-generated knowledge. Precisely, this study discusses the epistemological status of AI-generated knowledge by weighing the prospects and shortcomings of using AI in research. Also, this study explores a number of ethical considerations associated with AI-aided research, such as potential bias, digital piracy, and the risk of misinterpretation of results. Collectively, the findings of this study reveal that although AI has great potentials for advancing research, it has far-reaching implications for the integrity of research. This study concludes by recommending a number of measures which can be employed to foster responsible use of AI in research and ultimately ensure research integrity in Margaret Lawrence University and elsewhere.*

Keywords: *Research, Knowledge, Epistemology, Epistemological, Research Integrity (RI), Artificial Intelligence (AI), Information Age, Margaret Lawrence University*

Introduction

Undoubtedly, advanced technologies such as artificial intelligence (AI) and information communication technology (ICT) have changed the operational environment and landscape of the academia, which has the primary goal of inspiring knowledge in society by building human capacity and development through research. This change will continue into the future. Notably, availability of timely information thrives research, while the absence of information hampers substantial progress in research. Particularly, the current information age of humanity fosters research massively. This is so because the information

age has stimulated significant revolution and extension of the frontiers of human interaction, thereby fostering rapid dissemination of information (ideas, knowledge, experience, messages, opinions or thoughts) between a wide range of people in society, and eliminating the barrier of distance or lack of physical proximity in communication. In other words, by enhancing rapid dissemination of information in diverse formats amongst people, the information age can rightly be said to foster research.

Regarding information, Emmanuel and Ekoja (2020) emphasise that information is recognised as an important resource of knowledge, creativity, innovation and development. Furthermore, Emmanuel and Ekoja stress that information fuels innovation, and innovation affects the way and manner people respond to change. From the preceding statement, it will not be out of place to state that research, which drives innovation, creativity and advancement in today's world, is triggered by information, and it is information that fuels actions and results in society.

Defining research, the Federal Ministry of Health, in the Nigeria National Code of Health Research Ethics (2007), states that research is a "systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalisable knowledge." There are two notable terms in this definition, namely "systematic" and "generalisable." Thus, research is both systematic and generalisable. Firstly, when we say that research is systematic, we simply mean that it is properly organised and structured, conducted with appropriate methods, and includes clear objectives. Secondly, when we say research is generalisable, we simply mean that it is aimed at generating knowledge that will be widely applicable and relevant.

Furthermore, research, as defined by the Department of Education and Training in Western Sydney University (2023), is "the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings and this could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes." Two points are deducible from this definition; the first is that research creates new knowledge; the second is that research improves or increases already-existing knowledge. The second point is further corroborated by Frascati Manual (2015), which defines research as a "creative and systematic work undertaken to increase the stock of knowledge." Thus, a properly conducted research will certainly increase the stock of knowledge, and will be highly instrumental in tackling problems in society.

In addition, research can be construed as a systematic inquiry that involves collection of data from a targeted population and analysis of the data collected, with the aim of creating and disseminating knowledge. Accordingly, research is an enterprise with knowledge in-view. Knowledge is therefore the nucleus and product of every research, and it is the knowledge generated through research that usually drives progress in society.

Consequently, knowledge has become a prominent theme in contemporary academia. Particularly, in epistemology, which is a major branch of philosophy, just as logic, metaphysics, axiology, ethics and aesthetics, knowledge constitutes a major discourse. And

considering its comprehensive focus on knowledge, epistemology should be regarded as an 'eye-opener' that must not be disregarded, in as much as the issue of knowledge is concerned. Epistemology is derived from the merging of two Greek words; namely, *epistemé*, which means 'knowledge' and *logos*, which means 'study' or 'theory' (Steup, 2005). Hence, epistemology is literally conceived as the study or theory of knowledge. Epistemology is sometimes referred to as criteriology and gnoseology. Criteriology is derived from the Greek word *kriterion*, which means a criterion or rule by which one can differentiate between true and false knowledge, while gnoseology is gotten from the Greek word *gnosis*, which refers to knowledge in a quite general sense (Mattei, 2007, 135).

As opined by Omoregbe (1990), epistemology is the branch of philosophy that is preoccupied with questions relating to the nature, origin, foundation, methods, validity, extent, limits, reliability, objectivity, relativity, possibility and certainty of human knowledge. Anselm Jimoh (2013, 20-21) avers that epistemology studies the philosophical problems and notions associated with knowledge, such as perception, memory, proof, evidence, belief and certainty.

In simple terms, as a theory of knowledge, epistemology examines questions as to what knowledge is, what it is to know, how one knows and what one claims to know. Epistemology focuses on individuals' knowledge claims; it investigates issues such as the nature, structure, source, scope, extent, limits, kinds, possibility, creation, dissemination, certainty and reliability of human knowledge, with a view to determining its validity and tenability. From the foregoing exposition, it is obvious that knowledge is the 'epic-centre' of all discourses in epistemology.

Since research is all about knowledge-creation and dissemination of knowledge, one can say every research, by nature, has an epistemological status. That is, owing to the claim usually made to knowledge, in every research, there is always epistemological status.

Basically, when one speaks of the epistemological status of a research work, he/she is simply raising the questions to whether such research was thoroughly done, so that it successfully creates and disseminates knowledge to both the researcher and the society at large. If a research fails in this regard, it can rightly be regarded as having a poor epistemological status. Such research, within the context of the research-culture practiced in Margaret Lawrence University (MLU), Galilee, will be considered as lacking integrity or authenticity.

In MLU, the term 'research integrity' refers to the epistemological status and level of authenticity of a research. According to Imperial College London (2023), research integrity (RI) means "conducting research in a way which allows others to have trust and confidence in the methods used and the findings … [of that research]." That is, research integrity has to do with the practice of abiding by certain principles, such as honesty, responsibility, accountability and fairness, while carrying out a research. If a research lacks these basic principles, then it ultimately lacks integrity.

In MLU, there is currently a growing concern about the use of artificial intelligence (AI) in the conduct of research, since AI has risen to become a key factor driving change and

development in modern society. Artificial intelligence (AI) is a concept that has been in use since the 1950s, when it was defined as a machine's ability to perform a task that would ordinarily require human intelligence, such as self-driving cars, robots, ChatGPT or other AI chatbots, and artificially-created images (Diaz, 2023).

Put differently, artificial intelligence (AI) is "the simulation [imitation] of human intelligence processes by machines, especially computer systems" (Burns, Laskowski and Tucci, 2023). This is exactly what is implied in Nwakunor's (2021) view that AI includes computer-controlled robots that think intelligently like human beings. These robots are controlled electronically with the aid of the computer, and they are designed to mimic humans. Similarly, Copeland (2023) says AI is "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings."

Ultimately, artificial intelligence (AI) is a technological invention that currently dominates and permeates virtually every aspect of human life and endeavour. There is hardly anything today that cannot be approached with artificial intelligence. Unsurprisingly, research is also being influenced by AI, as many researchers today use AI, and this leaves us with the question as to the epistemological status of AI-aided research, especially as it relates to the culture of research integrity practiced in Margaret Lawrence University, Galilee.

No doubt, artificial intelligence has greatly revolutionised many human endeavours by making things much easier and faster. Commenting on its potentials, Abbadia (2023) submitted that AI enables researchers to process vast amounts of data, extract meaningful insights, and automate repetitive tasks, thereby accelerating the pace of scientific discovery and enhancing the quality of research-outcomes. Also, Robinson (2018) stated that research has shown that calculations carried out by artificial intelligence can make more accurate predictions than humans concerning the long term stability of circumlunar planets.

However, in the domain of research, the use of AI presents us with several ethical and epistemological concerns, which this study seeks to examine, with a view to promoting quality research culture globally. Put differently, this study is aimed at critically examining the epistemological status of AI-aided research in the information age. The specific objectives of this study are to: (a) examine the prospects of AI in research, (b) identify the shortcomings of AI in research, (c) x-ray some ethical considerations associated with AI-aided research, (d) ascertain the level of integrity in AI-aided research, (e) and suggest measures that will foster research integrity in Margaret Lawrence University and beyond.

Research Questions

The objectives of this research are informed by the following research questions:

a. What are the prospects of AI in research?
b. What are the shortcomings of AI in research?
c. What ethical considerations are associated with AI-aided research?
d. What level of integrity is there in AI-aided research (knowledge)?
e. What measures would you recommend to foster Research Integrity in Margaret Lawrence University?

Research Methodology

This study was conducted at Margaret Lawrence University, Galilee, Ika North-East Local Government Area of Delta State, Nigeria. This study employed both the survey method and the analytic method. The survey method is simply the technique of gathering data by asking questions and obtaining responses from people who are thought to have desired information (Juneja, 2023). While the analytic method basically involves analysing the information (data) collected. The population of this study is comprised by 100 academic Staff of Margaret Lawrence University (Staff nominal roll, 2023). A structured questionnaire was used as instrument for data-collection. The questionnaire is comprised of only one part, which contains psychographic data; that is, questions with different options provided alongside. It has five (5) questions. The presentation, analysis and discussion of findings are based on the study's objectives, using simple frequency count, mean and standard deviation (S/D).

Presentation and Analysis of Findings

The findings of this study are presented and analysed below in accordance with the specific objectives of the study.

Note: A means "Agree," SA means "Strongly Agree," D means "Disagree," SD means "Strongly Disagree," and S/D means "Standard Deviation."

Objective 1: Examine the Prospects of Artificial Intelligence (AI) in Research

S/N	ITEM	SA	A	D	S/D	MEAN	S/D	Total
a.	Helps in uncovering insights in previously unexplored research domains.	24	26	13	3	3.07	0.86	66
b.	Aids unbiased decisions in research.	13	31	17	5	2.78	0.85	66
c.	Increases accuracy and reliability of research results.	24	24	1	1	3.01	0.93	66
d.	Reduces time and resources needed for conduct of research.	43	21	1	1	3.60	0.60	66
e.	Reduction of human error in research.	25	26	10	5	3.07	0.91	66

Table 1 above shows that respondents with the following mean scores of 3.07, 3.07, 3.60, 3.01, and 2.78, respectively agree that all items in the table are the prospects artificial intelligence has in any research.

Objective 2: Identify the Shortcomings of Artificial Intelligence (AI) in Research

S/N	Items	SA	A	D	SD	MEAN	S/D	TOTAL
a.	AI-generated knowledge can be easily misinterpreted.	21	24	20	1	2.98	0.83	66
b.	AI lacks creativeness.	14	13	29	10	2.46	0.99	66
c.	Creates plagiarism issues by limiting creativity and critical thinking.	22	20	16	8	2.84	1.02	66
d.	Leads to skill and job loss in humans	20	25	13	8	2.86	0.99	66
e.	Fuels overreliance on technology, thereby increasing laziness in humans.	33	19	12	2	3.25	0.86	66

Table 2 is a reflection of respondents' acceptance of the shortcomings of artificial intelligence in research works, with the mean scores of 3.25, 2.98, 2.86, and 2.84, respectively, and with only item (b) 2.46 in the table disagreeing with the findings.

Objective 3: X-ray some Ethical Considerations Associated with AI-aided Research

S/N	ITEM	SA	A	D	SD	MEAN	S/D	TOTAL
a.	AI, sometimes, produces data with potential biases.	14	30	20	2	2.84	0.78	66
b.	AI, sometimes, promotes digital piracy.	23	30	11	2	3.12	0.79	66
c.	AI, sometimes, fosters violation of privacy.	17	30	14	5	2.89	0.87	66
d.	Misinterpretation of results due to fixed programming.	20	30	13	3	3.01	0.83	66
e.	Hindering of human ingenuity.	28	22	10	6	3.09	0.97	66

Table 3 x-rays some ethical considerations associated with AI-aided research. The findings affirm that all the items listed in the table are ethical issues which every researcher should consider when using AI in conducting research.

Objective 4: Ascertain the level of Integrity in artificial intelligence-aided Research

S/N	ITEM	SA	A	D	SD	MEAN	S/D	TOTAL
a.	High	16	20	22	8	2.66	0.98	66
b.	Medium	10	32	19	5	2.71	0.81	66
c.	Low	18	11	29	8	2.59	1.02	66

Table 4 exposes the level of integrity in artificial intelligence-aided research, with the following mean scores of 2.71 for medium level, 2.66 for high level, and 2.59 for low level, respectively. This simply shows that AI-aided research has a medium level of integrity, which is not too high or too low.

Objective 5: Suggest Measures that will Foster Research Integrity

S/N	ITEM	SA	A	D	SD	MEAN	S/D	TOTAL
a.	Proper citation / acknowledgement of others works used.	58	8	0	0	3.87	0.32	66
b.	Conveying valid interpretations and making justifiable claims based on research findings.	50	16	0	0	3.75	0.43	66
c.	Intellectual Honesty in Proposing, Performing, and Reporting Research.	59	7	0	0	3.89	0.31	66
d.	Peer reviewing of research.	59	17	0	0	3.74	0.44	66
e.	Using appropriate research methods and procedures.	60	6	0	0	3.90	0.28	66

Table 5 shows that, among respondents, there is a general acceptance of all the listed measures for fostering research integrity. Here we, have the following mean scores of 3.90, 3.89, 3.87, 3.75 and 3.74, respectively. Consequently, none of these measures is unaccepted by respondents.

Discussion of Findings and Answering of Research Questions

In accordance with the specific objectives of this study, the findings of this study are discussed and the research questions answered below.

Objective 1: Examine the Prospects of Artificial Intelligence (AI) in Research

The results of this study show that AI helps in uncovering insights in previously unexplored research domains, and equally aids unbiased decisions in research. The findings also affirm

that AI increases accuracy and reliability of research results. Finally, AI reduces human error, time and resources needed for conduct of research. This finding is similar to that of Abbadia (2023) who affirmed that AI enables researchers to process vast amounts of data, extract meaningful insights, and automate repetitive tasks, thereby accelerating the pace of scientific discovery and enhancing the quality of research-outcomes. As a way of further buttressing the usefulness of AI in research, let us make reference to the view of Robinson (2018). He submits that research has shown that calculations carried out by artificial intelligence can make more accurate predictions than humans concerning the long term stability of circumlunar planets. This ultimately affirms that adoption or application of AI in the conduct of any research work comes with great potentials, as it enables researchers to come out with more reliable and dependable results.

Objective 2: Identify the Shortcomings of Artificial Intelligence (AI) in Research

This study reveals that AI-generated knowledge can be easily misinterpreted, AI lacks creativeness, sometimes creates plagiarism issues by limiting creativity and critical thinking, leads to skill and job loss in humans, and fuels overreliance on technology, thereby increasing laziness in humans. Findings in the study by Robinson (2018), like this study, show that no technology, including AI, is totally perfect. Robinson (2018) also states that software or hardware crash can be highly frustrating to researchers, especially in Nigeria, where storage and retrieval systems are relatively poor. Hence, in Nigeria and even beyond, researchers applying AI are sometimes confronted by some difficulties which eventually slower the pace of their works.

Objective 3: X-ray some Ethical Considerations Associated with AI-aided Research

The results of this study show that AI, sometimes, produces data with potential biases, promotes digital piracy, violates privacy, and hinders human ingenuity, and due to fixed programming, AI can sometimes misinterpret results. In this sense, this study is in line with that of Robinson (2018) who affirms that as AI continues to evolve, it is essential for researchers to adapt and embrace this powerful tool while also being mindful of its limitations and ethical implications. Although, Al offers tremendous transformation in the conduct of research, it must be applied with care and caution, as it has challenges that often affect the integrity of research works. Besides, poor knowledge of AI by a researcher can affect a research greatly, and as stated by Oniovoghai, Idiodi and Urhiewhu (2023), lack of technical familiarity with artificial intelligence technology, indicates lack of content in the curriculum that train researchers and students to use digital databases. Thus, there is need to properly train researchers and students on the use of AI in research. This will help minimise the shortcomings of AI in research.

Objective 4: Ascertain the level of Integrity in Artificial intelligence-Aided Research

Table 4 asserts that the level of integrity in artificial intelligence-aided research is medium; that is, not too high or too low, which is a middle ground. Accordingly, while using AI in research, a researcher should not be carried away so that he/she totally fails to recognise some of the shortcomings of AI. In fact, over reliance on application of AI in any research work may affect the integrity of a research, as striking a balance between AI-driven

automation and human ingenuity is a major factor which determines the integrity of a research work.

Objective 5: Measures for Fostering Research Integrity

Table 5 reveals that the respondents agree with all the measures listed for fostering research integrity. This is simply an affirmation of the fact that AI, like every other technology, is not totally perfect. And this sharply contrasts the study of Robinson (2018) who said researchers have shown that calculations carried out by artificial intelligence can make more accurate predictions than humans concerning the long term stability of circumlunar planets.

Conclusion and Recommendations

Using Margaret Lawrence University as a point of departure, this study has shown that artificial intelligence (AI) has great potentials for advancing research in the information age. However, the use of AI in research comes with a number of ethical and epistemological concerns, some of which this study has highlighted. Thus, in as much as contemporary researchers cannot but use AI, they are expected to exercise utmost care and caution while doing so. When researchers fail to be properly guided in their use of AI in research, they stand the risk of producing works with questionable integrity. To promote research integrity in Margaret Lawrence University and beyond, the following measures are hereby recommended.

a. **Properly citing / acknowledging the works of other researchers used:** Oftentimes, some researchers use AI technologies like ChatGPT to generate contents for their works. Such contents are usually extracted from the works of other researchers published somewhere in the internet. For researches conducted in this manner to be considered as having sound epistemological status and integrity, researchers should always ensure that they give due credit to the sources by providing correct references, which include footnotes, endnotes, in-text references and bibliography.
b. **Conveying valid interpretations and making justifiable claims based on research findings:** Some researchers who generate their contents with AI are usually unable to validly interpret their research findings, and some even make claims that are not warranted by their findings. This has very fatal implications for the epistemological status and integrity of research. To ameliorate this situation, researchers are encouraged to be committed to providing proper interpretation of research findings. In the event that a researcher is unable to properly interpret research findings or make justifiable claims based on research findings, he/she should be open to collaborate with other researchers who are more expert in such research area. The experts will help such researcher do the needful.
c. **Intellectual honesty in proposing, performing, and reporting research:** Intellectual honesty demands that every researcher should always be sincere before, while and after conducting a research. Before conducting a research; that is, while proposing to do a research, a researcher should acknowledge authors whose works inform the research he/she intends to undertake. Likewise, while conducting a

research, a researcher should acknowledge authors whose works are highly instrumental. Finally, after conducting a research; that, is while reporting a research, a researcher should not fail to acknowledge authors whose findings somehow relate to, corroborate, or refute his/her research findings. If a researcher adheres to this instruction, his/her work will definitely have sound epistemological status and integrity.

d. Peer-reviewing of research: After conducting a research, a researcher should submit the entire research together with its findings for perusal and critical review by another researcher who is an expert in that field. This is exactly what peer-reviewing is all about. Usually, the reviewer will have some substantial contributions/suggestions which can further improve the quality of the research. A researcher should therefore be willing to present his/her work for peer-review, as this is capable of boosting the epistemological status and integrity of a research.

e. Using appropriate research methods and procedures: The methods and procedures employed in conducting a research can greatly influence the epistemological status and integrity of that research. Owing to this, researchers are encouraged to adopt appropriate research methods and procedures. Particularly, researchers who use AI should be very cautious while generating contents or collecting data, as failing to do so may result in findings that are inconsistent with their research aims.

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