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Sir,

CONSTITUTION OF PhD SUPERVISORY COMMITTEE FOR: UNO, Comfort Adeline PhD/SSTE/FT/2022/12851
THESIS TITLE: CRITICAL REASONING AND RESEARCH ETHICS OF ENGINEERING POSTGRADUATE STUDENTS OF FEDERAL UNIVERSITIES IN USING ARTIFICIAL INTELLIGENCE FOR RESEARCH ACTIVITIES IN NORTH-CENTRAL, NIGERIA

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27/03/2024

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CRITICAL REASONING AND RESEARCH ETHICS OF ENGINEERING POSTGRADUATE STUDENTS OF FEDERAL UNIVERSITIES IN USING ARTIFICIAL INTELLIGENCE FOR RESEARCH ACTIVITIES IN NORTH-CENTRAL, NIGERIA
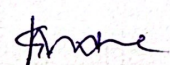
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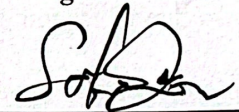**UNO, Comfort Adeline**
Ph.D/SSTE/FT/2022/12851

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MARCH, 2024

1.0. INTRODUCTION

1.1. Background to the Study

Generally, postgraduate students (PG) engage in dynamic collection of research activities that form the corner-stone of their academic journey, PG students of engineering are equally part of this course. It is a systematic investigation to acquire new knowledge or develop new theories for advancement of knowledge. These activities are usually time consuming and brain tasking, reason why PG students are continuously seeking means of easing these task. Research activities encompass a range of tasks including: academic writing, literature reviews, research design, data collection and analysis, etcetera, all of which the invention of technology has enhanced. The ultimate goal of the invention of technology was to make work easier, faster and more efficient and one of such technology is the generative Artificial Intelligence (AI) tool.

Artificial Intelligence (AI) are computer systems designed to perform tasks that will typically require human intelligence or intervention; it performs tasks such as: problem-solving, learning, reasoning, and perception and they are able to create new content, images or audios. Examples of AI tools include: chatGPT, quillbot, scholarcy, and a host of others. The advent of generative AI tools has ushered in a transformative era in the realm of research writing, offering unprecedented capabilities in content creation and textual fusion. According to Sabharwal *et al.* (2023), generative AI tools help researchers in creating better content, analytical calculations, illustrations as well as grammar, which indicates their acknowledgment that AI tools provide support for better research activity. These tools have become integral companions for researchers across diverse fields such as Engineering and it raises a concern of how overdependence on these AI tools affects the critical reasoning of postgraduate students.

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In addition to the knowledge acquired in the course of acquiring a postgraduate degree, the critical reasoning of the engineering postgraduate students is expected to improve, although in the attempt to fasten and ease up research activities, this quality could be greatly deterred.

Critical reasoning is a detailed analysis of a problem to find possible solutions, it is crucial for effective problem-solving, decision-making, and forming informed opinions, which is why Engineering PG students are expected to exhibit level of critical reasoning. According to Jariyah and Husamah (2024) critical reasoning is a type of logical reasoning which usually involves analysis and evaluation of information before making decision or arriving at a conclusion. Consequently, AI tools in research could have an effect on the critical reasoning of Engineering PG students as well as breech the guideline for research writing which is also known as research ethics.

Research ethics provide a framework that guides the ethical conduct of a research and addresses issues on confidentiality, privacy, intellectual property right and a host of others. Similarly, Dahlin-Ivanoff *et al.* (2024) stated that research ethics involves the application of ethical principles to designing, conducting and reporting of research, ensuring the protection of participants' rights, confidentiality and the integrity of the research process. Research ethics becomes an important factor to consider due to the involvement of generative AI tools in research activities.

1.2 Statement of the Research Problem

Research activity is a necessary and important assessment for university students and more so for Engineering PG students. It is usually a brain tasking and time-consuming exercise, thus, students and researchers are continually seeking means to ease up these activities. Globally, generative AI tools have been adopted and used for academic and research activities by

postgraduate students especially the Engineering students. Generative artificial intelligence tools enhance the process of research writing through providing easier referencing, quick write ups, error detections in write ups, etc. In spite of the numerous benefits and advantages of using generative AI tools, there have also been some concerns and risks in deterioration in the critical reasoning ability of students and breech in research ethics. According to the findings of Sabharwal *et al.* (2023), AI has constantly been used in improving organisation performance and decision making through students' effective utilisation of available information. Although, this has reduced the need for human intervention and also affected their cognitive ability, critical reasoning and problem-solving skills. The Study intends to investigate the influence of generative AI tools on critical reasoning and research ethics for research by Engineering Postgraduate students in Federal Universities in North-Central, Nigeria.

1.3. Aim and Objectives of the Study

The aim of the study is to investigate the influence of generative AI tools on critical reasoning and research ethics for research by Engineering Postgraduate students in Federal Universities in North-central, Nigeria. In order to achieve the stated aim, the study is designed to achieve the following specific objectives, which are to:

1. find out the level of research activities performed by Engineering PG students in Federal universities in North-central, Nigeria;

2. identify the types of generative AI tools used by PG students for research activities in North-central Nigeria;

3. find out the level of awareness of ethics for research activities by PG students in North-central Nigeria;

4. ascertain the influence of use of generative AI tools for research activities on the critical reasoning of the Engineering PG students of federal universities in North-central Nigeria;

5. assess the influence of use of generative AI tools for research activities on the research ethics of the Engineering PG students of federal universities in North-central Nigeria; and

6. Find out the effect of use of generative AI tools on research activity of Postgraduate students in North-central Nigeria.

1.4. Significance of the Study

The findings of the study if implemented will be of great benefits to the management of federal universities in North-central, Nigeria, universities, heads of department, postgraduate students and researchers.

1.5. RESEARCH METHODOLOGY

Research Design and Population of the Study

The research design for this study will be survey research design. This is because it gives description of characteristics of a large population which gives a more accurate sample to get required results. The population of the study will be Engineering postgraduate students in North-central, Nigeria.

Method of Data Collection, Analysis and Presentation

Objective 1: the data for this objective will be collected through the use of questionnaire and interview and will be analysed using frequency counts, tables, percentages, mean and standard deviation.

Objective 2: the data for this objective will be collected through the use of questionnaire and analysed using frequency counts, tables, percentages, mean and standard deviation.

Objective 3: the data for this objective will be collected through the use of questionnaire and analysed using frequency counts, tables, percentages, mean and standard deviation.

Objective 4: the data for this objective will be collected through the use of questionnaire and interview and will be analysed using frequency counts, tables, percentages, mean and standard deviation.

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Objective 6: the data for this objective will be collected through the use of questionnaire and interview and will be analysed using frequency counts, tables, percentages, mean and standard deviation.

1.6. References

Dahlin-Ivanoff, S., Berge, I., Barenfeld, E., Haak, M., & Lood, Q. (2024). Research collaboration with older people as a matter of scientific quality and ethics: a focus group study with researchers in ageing and health. *Research Involvement and Engagement, 10*(1), 6.

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