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CHATGPT TECHNOLOGY AND RESEARCH ETHICS AMONG STUDENTS IN THE UNIVERSITY OF BENIN, BENIN CITY

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ABSTRACT

This study examined ChatGPT technology and research ethics among students in the University of Benin, Benin City. Specifically, it investigated key dimensions of ChatGPT technology, including awareness and understanding, usage pattern, integration into academic workflow, impact on research skills, and impact on research integrity, and their influence on research ethics. A cross-sectional survey research design was adopted in 2025, and data were collected from a sample of 396 undergraduate students selected through a simple random sampling technique from a population of 41,404 students. Primary data were obtained using structured questionnaires and analysed using descriptive and inferential statistics, including Ordinary Least Squares regression. The findings revealed that students demonstrated a relatively high level of awareness and understanding of ChatGPT technology, with widespread integration of the technology into academic activities. The regression results showed that awareness and understanding of ChatGPT technology, integration into academic workflow, impact on research skills, and impact on research integrity exert significant positive effects on research ethics. However, ChatGPT usage pattern did not have a statistically significant effect on research ethics. Among the explanatory variables, impact on research skills emerged as the strongest predictor of research ethics. The study recommended that universities establish comprehensive ethical guidelines for AI usage, strengthen awareness and sensitisation programmes, promote structured integration of ChatGPT into academic activities, and implement research skill development initiatives that encourage responsible and ethical use of AI technologies in higher education.

Keywords: ChatGPT Technology, Awareness and Understanding, Usage Pattern, Academic Workflow, Research Skills, Academic Integrity, and Research Ethics

1. INTRODUCTION

The rapid advancement of artificial intelligence (AI) has fundamentally transformed knowledge creation, learning systems, and research practices across diverse academic environments (Haluza & Jungwirth, 2023; Rudolph et al., 2023; Holmes et al., 2021). Within the broader context of the fourth industrial revolution, generative AI technologies such as ChatGPT have emerged as influential tools capable of enhancing cognitive processes, improving research productivity, and reshaping higher education systems (Schwab, 2017; Qadir, 2022; Zhuo et al., 2023). ChatGPT, developed by OpenAI, leverages advanced natural language processing to generate human-like responses, thereby supporting academic writing, idea development, and information synthesis (Alawida et al., 2023; Biswas, 2023; Khlaif et al., 2023). Its increasing integration into academic environments has introduced new possibilities for personalised learning and improved research efficiency.

Notwithstanding these benefits, the adoption of ChatGPT has generated significant ethical concerns, particularly in relation to research integrity, authorship, and the authenticity of academic outputs (Nam & Bai, 2023; Guleria et al., 2023; Rane et al., 2023). Research ethics, which encompasses principles such as honesty, accountability, transparency, and respect for intellectual property, remains central to credible scholarly practice (Resnik, 2018; Steneck, 2006; Mahnabi, 2023). Scholars contend that AI-generated content may undermine these principles by facilitating plagiarism, misinformation, and excessive reliance on automated systems (Rosyanafi et al., 2023; Frigerio, 2023; Guleria et al., 2023). Empirical evidence further indicates that students increasingly utilise ChatGPT for academic tasks, often without sufficient awareness of its ethical implications (Castillo et al., 2023; Huallpa et al., 2023; Ayoola et al., 2023).

In developing contexts such as Nigeria, the ethical implications of AI adoption are influenced by institutional capacity, digital literacy, and regulatory frameworks (Mhlanga, 2022; Nguyen et al., 2022; Adebayo, 2022). Public universities, including the University of Benin, face challenges related to limited resources and weak enforcement of academic integrity policies (Okeke, 2021; Nwankwo, 2020). Consequently, while ChatGPT offers opportunities to enhance learning and research, its misuse may exacerbate existing ethical concerns. Therefore, this study examines the association with ChatGPT technology on research ethics among students, contributing to ongoing discourse on responsible AI integration in higher education.

The broad objective of this study is to examine the relationship between ChatGPT technology and research ethics among students in the University of Benin, Benin City. The specific objectives are to assess the extent to which awareness and understanding of ChatGPT technology influence research ethics among students in the University of Benin, Benin City, to investigate the relationship between ChatGPT technology's usage pattern and research ethics among students in the University of Benin, Benin City, to ascertain the effect of ChatGPT technology's integration into academic workflow on research ethics among students in the University of Benin, Benin City and to determine the effect of ChatGPT technology's perceived impact on research skills on research ethics among students in the University of Benin, Benin City and to observe the effect of ChatGPT technology's impact on research integrity on research ethics among students in the University of Benin, Benin City.

2. LITERATURE REVIEW

2.1 Conceptual Review

ChatGPT Technology

ChatGPT technology represents a significant advancement in artificial intelligence, particularly within the domain of natural language processing (NLP), and has increasingly become a focal point of scholarly discourse in education, business, and research contexts (Brown et al., 2020; Bender et al., 2021; Zhuo et al., 2023). Developed by OpenAI, ChatGPT is a generative pre-trained transformer model designed to produce human-like text based on user inputs, leveraging deep learning techniques and large-scale datasets to simulate conversational intelligence (Radford et al., 2019; Vaswani et al., 2017; OpenAI, 2023). Scholars conceptualise ChatGPT as a form of generative AI that not only processes language but also generates contextually coherent and semantically meaningful outputs, thereby extending the capabilities of traditional computational systems (Floridi & Cowls, 2019; Haluza & Jungwirth, 2023; Rudolph et al., 2023).

From a definitional perspective, ChatGPT has been described as a large language model trained on extensive corpora of text data to predict and generate sequences of words based on contextual probabilities (Brown et al., 2020; Radford et al., 2019). Vaswani et al. (2017) emphasise that its underlying transformer architecture enables the model to capture long-range dependencies in language, enhancing its ability to generate coherent responses. Bender et al. (2021) further argue that while ChatGPT demonstrates remarkable linguistic fluency, it operates based on pattern recognition rather than genuine understanding, raising questions about its interpretive capabilities. Contemporary scholars extend this definition by situating ChatGPT within broader AI ecosystems, highlighting its role in augmenting human cognition and automating knowledge-intensive tasks (Floridi & Cowls, 2019; Zhuo et al., 2023; Alawida et al., 2023).

Conceptually, ChatGPT can be understood through multiple perspectives that reflect its technological and

socio-functional dimensions. From a technological perspective, it is viewed as a machine learning system driven by neural networks and probabilistic modelling, capable of generating adaptive and context-aware outputs (Radford et al., 2019; Vaswani et al., 2017; Brown et al., 2020). From a socio-technical perspective, ChatGPT is considered a tool that interacts with human users, shaping and being shaped by social practices, institutional norms, and user behaviours (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Ayoola et al., 2023). A third perspective, often associated with critical AI studies, highlights concerns related to bias, misinformation, and ethical implications, emphasising that AI systems reflect the data on which they are trained (Bender et al., 2021; Sheng et al., 2021; Zuboff, 2019). These perspectives collectively underscore the complexity of ChatGPT as both a technological artefact and a socially embedded system.

ChatGPT technology is also characterised by several key components that define its functionality and application. These include its transformer-based architecture, pre-training on large and diverse datasets, and fine-tuning processes that enhance its conversational capabilities (Vaswani et al., 2017; Radford et al., 2019; OpenAI, 2023). Its ability to perform tasks such as text generation, summarisation, translation, and dialogue interaction has made it applicable across multiple domains, including education, customer service, and research (Rudolph et al., 2023; Kasneci et al., 2023; Firat, 2023). However, scholars note that its reliance on pre-existing data introduces limitations, including the potential for bias, inaccuracies, and lack of contextual understanding (Bender et al., 2021; Sheng et al., 2021; Zhuo et al., 2023).

The growing adoption of ChatGPT in academic and organisational contexts has significant implications for knowledge production and decision-making processes. In higher education, it is increasingly used to support learning, enhance writing, and facilitate research activities, thereby improving efficiency and accessibility (Kasneci et al., 2023; Rudolph et al., 2023; Alawida et al., 2023). However, its integration also raises critical concerns related to academic integrity, ethical usage, and over-reliance on automated systems (Floridi & Cowls, 2019; Bender et al., 2021; Guleria et al., 2023). In developing contexts such as Nigeria, where digital transformation is rapidly evolving, the adoption of ChatGPT presents both opportunities and challenges, particularly in relation to access, regulation, and ethical awareness (Adebayo, 2022; Mhlanga, 2022; Okeke, 2021).

Accordingly, ChatGPT technology in this study is conceptualised as a generative AI system that influences how individuals access, process, and generate knowledge within academic environments. Its impact is shaped by both its technological capabilities and the socio-institutional context in which it is utilised, making it a critical construct for understanding contemporary transformations in research and education.

ChatGPT Technology's Awareness and Understanding

ChatGPT technology's awareness and understanding has emerged as an important construct in contemporary discussions on digital literacy, artificial intelligence adoption, and ethical technology use in academic environments (Nguyen et al., 2022; Floridi & Cowls, 2019; Bernabei et al., 2023). Within the broader literature, awareness refers to individuals' recognition of the existence, functions, and applications of a technology, while understanding relates to the depth of knowledge regarding its underlying mechanisms, capabilities, and limitations (Davis, 1989; Venkatesh et al., 2003; Rogers, 2003). In the context of ChatGPT, this construct captures the extent to which students are informed about the model's generative capabilities, its reliance on large-scale training data, and its implications for academic work (Brown et al., 2020; Bender et al., 2021; Zhuo et al., 2023). Scholars argue that awareness and understanding are critical determinants of how individuals interact with emerging technologies and the extent to which such technologies are used responsibly (Venkatesh et al., 2003; Rogers, 2003; Nguyen et al., 2022).

From a definitional standpoint, ChatGPT awareness and understanding can be conceptualised as the cognitive and informational state through which users comprehend the functionality, applications, and ethical implications of generative AI systems (Bernabei et al., 2023; Floridi & Cowls, 2019; Mittelstadt et al., 2016). Brown et al. (2020) emphasise that understanding large language models involves recognising their probabilistic nature and their dependence on training data rather than true reasoning. Similarly, Bender et al. (2021) highlight that users must understand the limitations of such systems, particularly their susceptibility to bias and

misinformation. Contemporary perspectives extend this definition by incorporating ethical awareness, including knowledge of issues such as data privacy, intellectual property, and algorithmic accountability (Floridi & Cowls, 2019; Jobin et al., 2019; Mittelstadt et al., 2016). These definitions collectively suggest that awareness and understanding are multidimensional, encompassing technical knowledge, functional awareness, and ethical consciousness.

Conceptually, this construct can be examined through several theoretical lenses. From the technology acceptance perspective, awareness and understanding are precursors to perceived usefulness and ease of use, which influence adoption behaviour (Davis, 1989; Venkatesh et al., 2003). From a digital literacy perspective, awareness and understanding are viewed as critical competencies that enable individuals to critically evaluate and effectively utilise digital tools (Nguyen et al., 2022; Bernabei et al., 2023). A socio-technical perspective further emphasises that understanding technology involves recognising the interaction between technological systems and social contexts, including institutional norms and user practices (Floridi & Cowls, 2019; Ayoola et al., 2023; Mittelstadt et al., 2016). These perspectives highlight that awareness and understanding are not merely cognitive states but are shaped by broader social and institutional environments.

The construct is also inherently multidimensional, comprising several interrelated components. One dimension is functional awareness, which involves knowledge of ChatGPT's applications, such as content generation, academic writing assistance, and conversational interaction (Brown et al., 2020; Kasneci et al., 2023; Rudolph et al., 2023). A second dimension is technical understanding, which relates to knowledge of how the model operates, including its transformer architecture and reliance on training data (Vaswani et al., 2017; Radford et al., 2019; Bender et al., 2021). A third dimension is critical awareness, which encompasses the ability to evaluate the accuracy, reliability, and limitations of ChatGPT outputs (Zhuo et al., 2023; Sheng et al., 2021; Floridi & Cowls, 2019). A fourth dimension is ethical awareness, which involves understanding issues such as bias, plagiarism, data privacy, and responsible use in academic contexts (Jobin et al., 2019; Mittelstadt et al., 2016; Guleria et al., 2023). Scholars argue that these dimensions collectively influence how users engage with AI technologies and determine whether such engagement aligns with ethical standards (Bernabei et al., 2023; Nguyen et al., 2022; Floridi & Cowls, 2019).

The importance of ChatGPT awareness and understanding is particularly evident in higher education, where students increasingly rely on AI tools for academic tasks (Kasneci et al., 2023; Rudolph et al., 2023; Alawida et al., 2023). Adequate awareness enables students to leverage ChatGPT for learning enhancement, while a deeper understanding allows them to critically assess its outputs and avoid misuse (Nguyen et al., 2022; Bernabei et al., 2023; Zhuo et al., 2023). Conversely, limited awareness and understanding may lead to over-reliance, academic misconduct, and the uncritical acceptance of inaccurate information (Bender et al., 2021; Sheng et al., 2021; Guleria et al., 2023). These risks underscore the need for educational interventions that promote digital literacy and ethical awareness in the use of AI technologies (Floridi & Cowls, 2019; Jobin et al., 2019; Mittelstadt et al., 2016).

In the context of Nigerian public universities, ChatGPT awareness and understanding is shaped by factors such as access to digital resources, institutional support, and exposure to AI-related education (Adebayo, 2022; Okeke, 2021; Mhlanga, 2022). Variations in these factors may influence students' ability to use ChatGPT effectively and ethically, thereby affecting research outcomes and academic integrity. Accordingly, this construct is conceptualised in this study as a multidimensional cognitive and ethical capacity that determines how students perceive, interpret, and utilise ChatGPT technology within academic research environments.

ChatGPT Technology's Usage Pattern

ChatGPT technology's usage pattern has become an important construct in understanding how generative artificial intelligence is adopted and utilised across academic, organisational, and social contexts (Rogers, 2003; Venkatesh et al., 2003; Rudolph et al., 2023). In the literature, usage pattern generally refers to the frequency, intensity, purpose, and manner in which a technology is employed by users over time (Davis, 1989; Venkatesh et al., 2003; Ajzen, 1991). Within the context of ChatGPT, usage pattern captures how students and other users interact with the system, the specific tasks it is applied to, and the behavioural tendencies associated with its adoption in academic and research activities

(Kasneci et al., 2023; Firat, 2023; Jo, 2024). Scholars argue that understanding usage patterns is essential for evaluating both the benefits and risks of emerging technologies, particularly in relation to productivity, learning outcomes, and ethical implications (Rudolph et al., 2023; Zhuo et al., 2023; Ayoola et al., 2023).

From a definitional perspective, ChatGPT usage pattern can be conceptualised as the observable and measurable behaviours associated with the application of generative AI tools in specific contexts (Brown et al., 2020; Venkatesh et al., 2003). Davis (1989) suggests that usage behaviour is influenced by perceived usefulness and ease of use, while Rogers (2003) emphasises the role of innovation diffusion in shaping how technologies are adopted and utilised. Extending these perspectives, contemporary scholars define usage pattern as a multidimensional construct that includes frequency of use, diversity of applications, and the level of dependence on the technology (Kasneci et al., 2023; Rudolph et al., 2023; Firat, 2023). These definitions collectively highlight that usage pattern is not merely about whether a technology is used, but how, why, and to what extent it is integrated into users' activities.

Conceptually, ChatGPT usage pattern can be examined through multiple theoretical lenses. The technology acceptance perspective posits that usage is driven by cognitive evaluations of usefulness and ease of use (Davis, 1989; Venkatesh et al., 2003), while the innovation diffusion perspective highlights the role of social influence, compatibility, and trialability in shaping adoption behaviours (Rogers, 2003; Venkatesh et al., 2003). A socio-technical perspective further suggests that usage patterns are shaped by the interaction between technological affordances and social contexts, including institutional norms and user competencies (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Ayoola et al., 2023). These perspectives underscore that ChatGPT usage is influenced by both individual and contextual factors.

The construct is inherently multidimensional, comprising several key components. One dimension is frequency of use, which reflects how often individuals engage with ChatGPT for academic or non-academic tasks (Venkatesh et al., 2003; Kasneci et al., 2023). Another dimension is purpose of use, which includes applications such as content generation, information retrieval, problem-solving, and academic writing assistance (Firat, 2023; Jo, 2024; Rudolph et al., 2023). A third dimension is intensity or depth of use, referring to the extent to which users rely on ChatGPT for completing tasks or decision-making (Brown et al., 2020; Zhuo et al., 2023). Additionally, diversity of use captures the range of activities for which ChatGPT is employed, indicating its versatility across different domains (Kasneci et al., 2023; Firat, 2023). Scholars further highlight dependency as a critical dimension, reflecting the degree to which users substitute their own cognitive effort with AI-generated outputs (Bender et al., 2021; Zhuo et al., 2023).

The importance of ChatGPT usage patterns is particularly evident in educational and research contexts, where the technology is increasingly used to support learning, writing, and knowledge generation (Kasneci et al., 2023; Rudolph et al., 2023; Alawida et al., 2023). Appropriate usage patterns can enhance efficiency, improve access to information, and facilitate innovation in academic work (Firat, 2023; Jo, 2024; Zhuo et al., 2023). However, problematic usage patterns, such as excessive reliance or misuse, may lead to ethical concerns including plagiarism, misinformation, and reduced critical thinking (Bender et al., 2021; Guleria et al., 2023; Rane et al., 2023). These implications highlight the need to critically examine how ChatGPT is used rather than simply whether it is adopted.

In the context of Nigerian public universities, ChatGPT usage patterns are likely influenced by factors such as accessibility, digital literacy, institutional policies, and academic pressures (Adebayo, 2022; Okeke, 2021; Mhlanga, 2022). Variations in these factors may shape how students engage with the technology, potentially affecting both academic performance and research ethics. Accordingly, ChatGPT technology's usage pattern in this study is conceptualised as a multidimensional behavioural construct reflecting the frequency, purpose, intensity, and diversity of students' interaction with ChatGPT in academic research contexts.

ChatGPT Technology's Integration into Academic Workflow

ChatGPT technology's integration into academic workflow represents a critical dimension of contemporary digital transformation in higher education, reflecting how generative artificial intelligence is embedded within teaching, learning, and research processes (Lozano & Fontao, 2023; Kasneci et al., 2023;

Rudolph et al., 2023). In the literature, academic workflow refers to the structured sequence of activities involved in knowledge creation, including information search, literature review, data analysis, writing, and dissemination (Creswell, 2014; Rowley, 2007; Bourner et al., 2001). The integration of technology into this workflow is conceptualised as the extent to which digital tools are incorporated to enhance efficiency, collaboration, and knowledge production (Venkatesh et al., 2003; Rogers, 2003; Zhuo et al., 2023). Within this context, ChatGPT represents a transformative tool that augments traditional academic processes through automation, intelligent assistance, and real-time interaction (Alawida et al., 2023; Firat, 2023; Waltzer et al., 2023).

From a definitional perspective, ChatGPT integration into academic workflow can be understood as the systematic incorporation of generative AI capabilities into various stages of academic tasks, including research design, writing, collaboration, and learning (Lozano & Fontao, 2023; Kasneci et al., 2023). Scholars define technological integration as the alignment of digital tools with task requirements to improve performance and outcomes (Venkatesh et al., 2003; Davis, 1989). Extending this view, recent studies conceptualise AI integration as a socio-technical process involving interaction between human users, institutional systems, and intelligent technologies (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Ayoola et al., 2023). These perspectives suggest that integration is not merely technical adoption but involves restructuring academic practices and workflows.

Conceptually, the integration of ChatGPT into academic workflow can be examined through multiple theoretical lenses. The technology acceptance perspective highlights that integration is influenced by perceived usefulness and ease of use, which determine the extent to which users embed the technology into their activities (Davis, 1989; Venkatesh et al., 2003). The innovation diffusion perspective emphasises compatibility, trialability, and institutional support as key drivers of integration (Rogers, 2003; Venkatesh et al., 2003). A socio-technical perspective further underscores that integration is shaped by the interaction between technological capabilities, organisational structures, and user behaviours (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Lozano & Fontao, 2023). These perspectives collectively highlight that successful integration depends on both individual acceptance and institutional alignment.

The construct is inherently multidimensional, encompassing several key components of academic workflow. One dimension is research support integration, where ChatGPT assists in literature reviews, idea generation, and methodological clarification (Waltzer et al., 2023; Aljanabi et al., 2023; Kasneci et al., 2023). Another dimension is writing and content development, involving the use of ChatGPT for drafting, editing, summarising, and refining academic texts (Firat, 2023; Rudolph et al., 2023; Aydin & Karaarslan, 2022). A third dimension is learning facilitation, where ChatGPT provides personalised tutoring, explanations, and feedback to enhance students' understanding (Kasneci et al., 2023; Lozano & Fontao, 2023; Waltzer et al., 2023). Additionally, collaboration and communication integration reflects the use of ChatGPT in group work, brainstorming, and academic discussions (Firat, 2023; Zhuo et al., 2023). Automation of routine tasks, such as summarisation, citation generation, and information retrieval, represents another critical dimension that enhances efficiency in academic workflows (Shangying et al., 2024; Jo, 2024).

The integration of ChatGPT into academic workflow has significant implications for productivity, learning outcomes, and research quality. Studies indicate that effective integration can enhance efficiency, reduce cognitive load, and support innovative learning practices (Kasneci et al., 2023; Rudolph et al., 2023; Alawida et al., 2023). However, scholars also caution that excessive or unregulated integration may lead to over-reliance, reduced critical thinking, and ethical concerns such as plagiarism and misrepresentation (Bender et al., 2021; Guleria et al., 2023; Rane et al., 2023). These contrasting outcomes highlight the need for balanced and responsible integration strategies.

In the context of Nigerian public universities, the integration of ChatGPT into academic workflow is influenced by factors such as digital infrastructure, institutional policies, and students' technological competencies (Adebayo, 2022; Okeke, 2021; Mhlanga, 2022). While the technology offers opportunities to enhance academic efficiency and access to knowledge, challenges related to regulation, ethical awareness, and resource disparities remain significant. Accordingly, ChatGPT technology's integration into academic workflow in this study is conceptualised as a

multidimensional socio-technical process through which students embed generative AI tools into their academic tasks, shaping both their learning experiences and research practices.

ChatGPT Technology's Impact on Research Skills

ChatGPT technology's impact on research skills has become a critical area of scholarly inquiry within the broader discourse on artificial intelligence and academic capability development (Kasneci et al., 2023; Rudolph et al., 2023; Alawida et al., 2023). Research skills are generally conceptualised as the cognitive, analytical, and methodological competencies required for conducting systematic inquiry, including problem identification, information retrieval, critical analysis, and scholarly writing (Creswell, 2014; Bourner et al., 2001; Rowley, 2007). In contemporary literature, these skills are increasingly examined within digital environments, where AI tools such as ChatGPT are reshaping how individuals access, process, and generate knowledge (Zhuo et al., 2023; Floridi & Cowls, 2019; Mittelstadt et al., 2016). Scholars argue that the integration of generative AI into research processes has both transformative and disruptive implications for the development of these competencies (Frigerio, 2023; Rane et al., 2023; Guleria et al., 2023).

From a definitional perspective, the impact of ChatGPT on research skills can be understood as the extent to which the use of generative AI influences the acquisition, enhancement, or erosion of research-related competencies (Li et al., 2024; Pividori, 2024). Aydin and Karaarslan (2022) suggest that AI tools can support writing proficiency and idea development, while Aljanabi et al. (2023) highlight their role in facilitating brainstorming and conceptual exploration. Conversely, scholars such as Bender et al. (2021) argue that reliance on AI-generated outputs may limit deep cognitive engagement and reduce the development of independent analytical skills. These perspectives indicate that the impact of ChatGPT is multifaceted, encompassing both positive and negative dimensions.

Conceptually, this construct can be examined through several theoretical lenses. The cognitive augmentation perspective views ChatGPT as a tool that enhances human intellectual capacity by supporting information processing and decision-making (Floridi & Cowls, 2019; Zhuo et al., 2023). In contrast, the dependency perspective suggests that excessive reliance on AI tools may lead to skill degradation, particularly in areas requiring critical thinking and originality (Bender et al., 2021; Guleria et al., 2023). A socio-technical perspective further emphasises that the impact of ChatGPT on research skills is shaped by the interaction between technological affordances, user behaviour, and institutional contexts (Mittelstadt et al., 2016; Ayoola et al., 2023). These perspectives collectively underscore the dual nature of AI's influence on research competencies.

The impact of ChatGPT on research skills is inherently multidimensional. One dimension is information retrieval and synthesis, where ChatGPT enables rapid access to relevant information and facilitates the summarisation of complex materials (Pividori, 2024; Kasneci et al., 2023). Another dimension is idea generation and creativity, as the technology supports brainstorming and the exploration of diverse perspectives (Aljanabi et al., 2023; Rudolph et al., 2023). A third dimension is academic writing proficiency, with ChatGPT assisting in drafting, editing, and structuring research outputs (Aydin & Karaarslan, 2022; Firat, 2023). Additionally, methodological understanding is enhanced through the provision of explanations and examples of research designs and analytical techniques (Waltzer et al., 2023). Scholars also identify critical thinking as a key dimension, noting that interaction with ChatGPT can either stimulate or hinder analytical reasoning depending on how the technology is used (Shangying et al., 2024; Zhuo et al., 2023).

Despite these benefits, the literature highlights several challenges associated with ChatGPT's impact on research skills. Over-reliance on AI-generated content may undermine originality, reduce cognitive effort, and weaken the development of independent research capabilities (Bender et al., 2021; Rane et al., 2023; Guleria et al., 2023). Furthermore, the potential for inaccuracies and biases in AI outputs may affect the quality of research and the reliability of findings if not critically evaluated (Sheng et al., 2021; Zhuo et al., 2023). These concerns emphasise the importance of balancing the use of AI tools with the development of core research competencies.

In higher education contexts, particularly within developing countries such as Nigeria, the impact of ChatGPT on research skills is shaped by factors such as digital literacy, access to technology, and institutional

support (Adebayo, 2022; Okeke, 2021; Mhlanga, 2022). While ChatGPT offers opportunities to enhance research efficiency and learning outcomes, inadequate guidance and ethical awareness may lead to misuse and skill dependency. Accordingly, ChatGPT technology's impact on research skills in this study is conceptualised as a multidimensional influence that can both enhance and constrain students' research capabilities, depending on patterns of use and the surrounding academic environment.

ChatGPT Technology's Impact on Research Integrity

ChatGPT technology's impact on research integrity has emerged as a critical concern within contemporary academic discourse, particularly in the context of increasing reliance on generative artificial intelligence in knowledge production (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Bender et al., 2021). Research integrity is commonly defined as the adherence to ethical principles and professional standards that ensure honesty, transparency, accuracy, and accountability in the research process (Resnik, 2018; Steneck, 2006; Shamoo & Resnik, 2015). It encompasses behaviours that safeguard the credibility of scholarly outputs, including avoidance of fabrication, falsification, and plagiarism, as well as proper attribution and responsible reporting (National Academy of Sciences, 2009; Fanelli, 2009; Resnik, 2018). Within this framework, the integration of ChatGPT introduces new dynamics that can both support and undermine the integrity of academic research (Rane et al., 2023; Guleria et al., 2023; Frigerio, 2023).

From a conceptual standpoint, the impact of ChatGPT on research integrity can be understood as the extent to which the use of generative AI influences adherence to ethical standards in research practices (Li et al., 2024; Hua et al., 2024). On one hand, ChatGPT can enhance aspects of research integrity by assisting in tasks such as plagiarism detection, citation verification, and language refinement, thereby improving clarity and reducing unintentional errors (Pividori, 2024; Aljanabi et al., 2023; Waltzer et al., 2023). On the other hand, scholars caution that the technology may facilitate unethical practices, including the generation of unverified content, misrepresentation of authorship, and submission of AI-generated work without proper disclosure (Bender et al., 2021; Guleria et al., 2023; Rane et al., 2023). These dual effects highlight the complex and context-dependent nature of ChatGPT's influence on research integrity.

The construct can be examined through several theoretical perspectives. The ethical compliance perspective emphasises adherence to established norms and guidelines governing research conduct, suggesting that the use of ChatGPT must align with institutional and professional standards (Resnik, 2018; Steneck, 2006; Shamoo & Resnik, 2015). In contrast, the socio-technical perspective highlights the interaction between technological capabilities and human behaviour, arguing that ethical outcomes are shaped by how users engage with AI tools within specific contexts (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Ayoola et al., 2023). A third perspective, often associated with critical AI studies, emphasises the risks of algorithmic opacity, bias, and misinformation, which may compromise the reliability and transparency of research outputs (Bender et al., 2021; Sheng et al., 2021; Zuboff, 2019). These perspectives collectively underscore that research integrity in the age of AI is influenced by both technological and human factors.

Research integrity in the context of ChatGPT is inherently multidimensional. One key dimension is honesty and originality, which involves ensuring that research outputs are genuinely produced and appropriately acknowledge the use of AI tools (Resnik, 2018; Steneck, 2006; Rane et al., 2023). Another dimension is transparency, which requires clear disclosure of AI assistance in the research process to maintain accountability (Shangying et al., 2024; Hua et al., 2024). A third dimension is accuracy and reliability, referring to the need to critically evaluate AI-generated content to avoid the dissemination of incorrect or misleading information (Bender et al., 2021; Zhuo et al., 2023). Additionally, accountability and responsibility are central dimensions, emphasising that researchers must take ownership of their work, regardless of AI involvement (Resnik, 2018; Shamoo & Resnik, 2015; Guleria et al., 2023). Scholars also highlight fairness and bias as important considerations, given that AI systems may reproduce or amplify biases present in training data (Sheng et al., 2021; Floridi & Cowls, 2019; Mittelstadt et al., 2016).

The integration of ChatGPT into academic research has significant implications for maintaining research integrity. While the technology can improve efficiency and support ethical practices when used appropriately, its

misuse may lead to academic misconduct, erosion of scholarly standards, and diminished trust in research outputs (Frigerio, 2023; Rane et al., 2023; Guleria et al., 2023). Empirical studies indicate that students may rely on ChatGPT to generate content without fully understanding its limitations or ethical implications, thereby increasing the risk of plagiarism and misrepresentation (Rosyanafi et al., 2023; Castillo et al., 2023; Huallpa et al., 2023). These challenges underscore the need for clear guidelines, ethical training, and institutional oversight to ensure responsible use of AI technologies in research.

In higher education contexts, particularly within developing countries such as Nigeria, the impact of ChatGPT on research integrity is further shaped by factors such as digital literacy, institutional capacity, and regulatory frameworks (Adebayo, 2022; Okeke, 2021; Mhlanga, 2022). Limited awareness and weak enforcement of ethical standards may exacerbate the risks associated with AI-assisted research, highlighting the importance of strengthening ethical education and policy frameworks. Accordingly, ChatGPT technology's impact on research integrity in this study is conceptualised as a multidimensional influence that can either reinforce or undermine ethical research practices, depending on how the technology is understood, utilised, and regulated within academic environments.

Research Ethics

Research ethics is widely acknowledged as a fundamental construct in academic inquiry, underpinning the legitimacy, credibility, and societal relevance of scientific knowledge production (Resnik, 2018; Shamoo & Resnik, 2015; Steneck, 2006). Within management and social science research, it extends beyond procedural compliance to function as a normative framework that guides responsible scholarly behaviour, ethical decision-making, and professional accountability (Beauchamp & Childress, 2019; Israel & Hay, 2006; Creswell, 2014). As research environments become increasingly complex, particularly with the integration of digital and artificial intelligence technologies, the scope of research ethics has expanded to address emerging ethical challenges (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Zuboff, 2019). Consequently, research ethics has evolved into a multidimensional construct encompassing moral reasoning, institutional governance, and professional responsibility (Resnik, 2018; Shamoo & Resnik, 2015; Steneck, 2006).

Scholarly definitions reflect the conceptual breadth of research ethics. Resnik (2018) conceptualises it as the application of moral principles to research design, conduct, and reporting, while Shamoo and Resnik (2015) emphasise its role in promoting integrity, accountability, and transparency. Steneck (2006) further defines research ethics as adherence to norms such as honesty, objectivity, accuracy, and efficiency that ensure responsible conduct of research. From a philosophical standpoint, Beauchamp and Childress (2019) situate research ethics within the principles of autonomy, beneficence, non-maleficence, and justice, which have been widely adopted across disciplines. Contemporary perspectives extend these definitions to include digital ethics, data governance, and algorithmic accountability, reflecting the transformation of research practices in technologically mediated environments (Floridi & Cowls, 2019; Mittelstadt et al., 2016; Jobin et al., 2019). Conceptually, research ethics is interpreted through multiple theoretical lenses. The normative perspective draws on deontological and utilitarian traditions, emphasising moral duties and consequences in guiding ethical decisions (Kant, 1785; Mill, 1863; Beauchamp & Childress, 2019).

In contrast, the professional ethics perspective focuses on institutional standards, codes of conduct, and regulatory mechanisms governing research practices (Israel & Hay, 2006; Resnik, 2018; Steneck, 2006). A reflexive perspective further highlights the association with context, power relations, and inclusivity, emphasising continuous ethical awareness in research processes (Guillemin & Gillam, 2004; Lincoln & Guba, 1985; Alvesson & Sköldberg, 2018). These perspectives collectively demonstrate the dynamic and multifaceted nature of research ethics.

Research ethics is also widely conceptualised as a multidimensional construct comprising key components that guide ethical research behaviour. Core dimensions include informed consent, confidentiality, and the minimisation of harm, which safeguard participants' rights and well-being (Beauchamp & Childress, 2019; Israel & Hay, 2006; Creswell, 2014). Integrity and honesty in data collection, analysis, and reporting are equally central, ensuring accuracy and preventing fabrication or falsification (Steneck, 2006; Fanelli, 2009;

Resnik, 2018). In digital contexts, data protection and privacy have become increasingly significant due to risks associated with data misuse and breaches (Floridi et al., 2018; Mittelstadt et al., 2016; Zuboff, 2019).

Emerging scholarship further highlights ethical challenges associated with AI-driven research environments, including algorithmic bias, misinformation, authorship ambiguity, and lack of transparency (Bender et al., 2021; Floridi & Cowls, 2019; Jobin et al., 2019). The use of tools such as ChatGPT introduces new ethical dilemmas, necessitating the integration of traditional ethical principles with evolving digital considerations (Mittelstadt et al., 2016; Floridi et al., 2018; Zuboff, 2019). These developments underscore the need for continuous adaptation of ethical frameworks in response to technological advancements.

Theoretical models reinforce the complexity of research ethics. The Responsible Conduct of Research framework emphasises values such as honesty, accuracy, and objectivity (Steneck, 2006; Resnik, 2018; Shamoo & Resnik, 2015), while principlism provides a structured ethical foundation based on autonomy, beneficence, non-maleficence, and justice (Beauchamp & Childress, 2019; Emanuel et al., 2000). Ethical decision-making models further demonstrate that ethical behaviour is influenced by individual cognition, organisational culture, and institutional pressures (Treviño et al., 2006; Rest, 1986; Jones, 1991).

In higher education, particularly within developing contexts such as Nigeria, research ethics assumes heightened importance due to institutional constraints, varying levels of ethical awareness, and evolving technological adoption (Adebayo, 2022; Okeke, 2021; Nwankwo, 2020). The integration of AI technologies introduces additional concerns related to authorship, originality, and academic integrity (Floridi & Cowls, 2019; Bender et al., 2021; Mittelstadt et al., 2016). Empirical evidence suggests that inadequate ethical awareness and weak institutional controls may lead to misuse of such technologies, thereby undermining research credibility (Steneck, 2006; Resnik, 2018; Fanelli, 2009).

2.2 Theoretical Framework

This study adopts an integrated theoretical framework combining the Social Construction of Technology (SCOT) and Technological Determinism to explain the relationship between ChatGPT technology and research ethics among students in public universities in Nigeria. The integration of these theories provides a comprehensive understanding of how ChatGPT is both socially shaped by users and capable of shaping academic behaviours, research practices, and ethical standards.

The Social Construction of Technology (SCOT), developed by Pinch and Bijker (1984), argues that technology does not possess a fixed meaning or purpose. Rather, its interpretation, application, and consequences are socially constructed by relevant social groups. According to this perspective, students, lecturers, researchers, and university administrators may perceive and utilise ChatGPT differently depending on their academic experiences, disciplinary orientations, and ethical values. The concept of interpretive flexibility suggests that the ethical implications of ChatGPT depend largely on how users understand and apply the technology within specific academic contexts. Consequently, students' awareness and understanding of ChatGPT influence whether the technology is used responsibly as a research support tool or misused in ways that compromise research ethics.

Technological Determinism provides a complementary perspective by emphasising the capacity of technological innovations to shape human behaviour, organisational practices, and social institutions (Smith & Marx, 1994). The theory suggests that the introduction of ChatGPT can transform academic workflows, information access, knowledge creation, and research practices. As students increasingly integrate ChatGPT into their academic activities, the technology may influence how research is conducted, how information is generated, and how ethical decisions are made. In this regard, ChatGPT functions not only as a tool but also as a technological force capable of reshaping research behaviour and academic norms.

The integration of SCOT and Technological Determinism is particularly relevant because the study examines multiple dimensions of ChatGPT usage. Awareness and Understanding of ChatGPT Technology are primarily explained by SCOT through the concept of interpretive flexibility, which emphasises that students' perceptions and understanding of the technology influence its ethical application. Usage Pattern is explained by both theories. While SCOT suggests that

usage behaviours are shaped by users' social interpretations and contextual experiences, Technological Determinism argues that continued exposure to technology influences behavioural routines and patterns of use. ChatGPT Technology's Integration into Academic Workflow is primarily explained by Technological Determinism because the technology transforms how students conduct research, access information, organise academic tasks, and complete assignments. Similarly, the Perceived Impact on Research Skills reflects the deterministic perspective that technological innovations can enhance research capabilities, information processing, and knowledge acquisition. The Impact on Research Integrity is explained by both theories because ethical standards emerge through social interactions and institutional expectations, while technological capabilities simultaneously influence how research practices are performed and evaluated.

Furthermore, SCOT's concept of closure and stabilisation explains how consensus gradually emerges regarding acceptable uses of ChatGPT within academic environments (Pinch & Bijker, 1984). As universities develop policies, ethical guidelines, and instructional frameworks governing AI-assisted learning and research, the use of ChatGPT may become increasingly standardised. Simultaneously, Technological Determinism suggests that the widespread adoption of AI technologies may contribute to broader transformations in academic culture, research methodologies, and ethical expectations. Together, these perspectives provide a robust theoretical foundation for understanding how ChatGPT technology and research ethics are related within contemporary higher education environments.

Theoretical Mapping of Study Variables

Variable	Social Construction of Technology (SCOT)	Technological Determinism
Awareness and Understanding of ChatGPT Technology	Interpretive flexibility influences how students understand and ethically utilise ChatGPT.	Technology awareness shapes behavioural responses and adoption decisions.
ChatGPT Technology's Usage Pattern	Usage patterns are influenced by social interpretation, academic context, and user experiences.	Continued interaction with technology influences behavioural routines and usage habits.
ChatGPT Technology's Integration into Academic Workflow	Academic communities determine how ChatGPT is incorporated into learning and research activities.	Technology transforms research processes, learning methods, and academic workflows.
ChatGPT Technology's Perceived Impact on Research Skills	Perceived benefits depend on users' experiences and social evaluation of the technology.	Technology enhances research capability, information access, and knowledge development.
ChatGPT Technology's Impact on Research Integrity	Ethical norms are socially constructed through interactions among students, lecturers, and institutions.	Technological capabilities influence ethical decision-making and research practices.

Source: Researcher's Conceptualisation Based on Pinch and Bijker (1984), Bijker (1995), Smith and Marx (1994), Heilbroner (1994), and Misa (2003).

2.3 Empirical Review

The empirical literature demonstrates a consistent scholarly effort to examine the implications of ChatGPT across academic, technological, and ethical domains. For instance, Khlaif et al. (2023) aimed to assess the potential of ChatGPT in generating high-quality academic research, with specific focus on its contributions to research frameworks, data analysis, and literature review. Using an experimental design, the authors generated four full articles and 500 abstracts evaluated by 23 reviewers through quantitative (ANOVA) and qualitative (thematic) analyses. The findings revealed that structured prompting significantly improves output quality, although limitations were evident in literature synthesis, alongside concerns regarding authorship and research integrity.

Similarly, Evans et al. (2023) examined the broader socio-economic implications of ChatGPT, focusing on access, efficiency, employment, education, and ethics, using SCOT and Technological Determinism as analytical frameworks. Through a conceptual and analytical approach, the study found that ChatGPT enhances learning and productivity but raises concerns about contextual accuracy and ethical usage, emphasising the need for policy frameworks and human oversight.

Alawida et al. (2023) conducted a technical and analytical investigation into ChatGPT's architecture, applications, and limitations in natural language processing. Their study, based on comparative and evaluative analysis, found that while ChatGPT demonstrates strong performance in language tasks, it

struggles with contextual nuance and raises ethical, privacy, and cybersecurity concerns, necessitating safeguards and regulatory mechanisms.

Rane et al. (2023) focused on the ethical challenges of ChatGPT in education, with specific objectives relating to its role in academic writing, research productivity, and scholarly communication. Using a critical analytical approach, the study found that although ChatGPT enhances productivity and supports innovative pedagogy, it presents risks related to bias, misinformation, and academic misconduct, thereby requiring ethical guidelines and detection mechanisms.

Nam and Bai (2023) investigated perceptions of ChatGPT's ethical implications in STEM and higher education using a comparative media discourse analysis of 72 articles. The findings revealed widespread concern regarding academic integrity, authorship, and teaching practices, highlighting the need for policy development and ethical awareness.

Frigerio (2023) explored the role of ChatGPT in academic research through critical analysis of online discourse and system interaction. The study found that while ChatGPT enhances research productivity, it introduces challenges related to bias, authorship, and ethical accountability, necessitating new evaluation metrics and ethical standards.

Mahnabi (2023) examined research ethics in relation to ChatGPT using a descriptive analytical approach. The study emphasised the importance of ethical principles such as accountability, transparency, and integrity, while identifying risks such as plagiarism and misuse, and recommending ethical guidelines for responsible AI usage.

Castillo et al. (2023) investigated the impact of ChatGPT on digital learning among 216 university students using survey data and regression analysis. The findings showed high adoption due to ease of use and cost advantages, with a positive relationship between ChatGPT usage and task completion, indicating its strong influence on learning processes.

Guleria et al. (2023) examined ethical concerns in academic and research contexts using experimental evaluation of ChatGPT outputs. The study found inaccuracies, bias, and risks of plagiarism, particularly in technical fields, underscoring the need for regulation and critical awareness.

Rosyanafi et al. (2023) explored research misconduct associated with ChatGPT through qualitative survey analysis among students. The findings indicated that reliance on ChatGPT without ethical awareness increases risks of academic dishonesty, highlighting the need for institutional intervention.

Finally, Huallpa et al. (2023) investigated ethical considerations in higher education using survey data from 220 participants and regression analysis. The results showed moderate acceptance of ChatGPT, influenced by demographic and contextual factors, while emphasising the importance of institutional policies on privacy, ethics, and responsible use.

3. METHODOLOGY

This study adopted a cross-sectional survey research design, which is appropriate for examining relationships among variables at a single point in time within a defined population. The design was considered suitable because it enables the collection of quantitative data on students' perceptions, experiences, and behaviours regarding ChatGPT technology and research ethics. Furthermore, the design facilitates the use of statistical techniques to examine the association with ChatGPT technology dimensions on research ethics and allows for the generalisation of findings within the study context.

The population of the study comprised undergraduate students of the University of Benin, Benin City, Edo State, Nigeria. According to records obtained from the Academic Planning Division of the University of Benin, the total undergraduate student population stood at 41,404 students as at 2025. Undergraduate students constituted an appropriate population for the study because they are actively engaged in academic activities such as assignments, term papers, projects, seminars, and research exercises where the use of ChatGPT technology may influence research practices and ethical behaviour.

The University of Benin was selected because it is one of Nigeria's leading public universities with a large and diverse student population drawn from various academic disciplines. The institution also provides a suitable environment for investigating the use of emerging digital technologies in academic activities due to its established ICT infrastructure and increasing student exposure to artificial intelligence applications such as ChatGPT.

The sample size was determined using the Taro Yamane (1967) formula for finite populations:

$$n = \frac{N}{1 + N(e^2)}$$

Where:

n = Sample size
N = Population size (41,404)
e = Level of significance (0.05)

$$n = \frac{41{,}404}{1 + 41{,}404(0.05)^2}$$

$$n = \frac{41{,}404}{104.51}$$

$$n \approx 396$$

Accordingly, a minimum sample size of 396 respondents was adopted for the study. The calculated sample size satisfies the minimum requirement for obtaining statistically reliable estimates at a 95% confidence level and a 5% margin of error. Although the Yamane formula does not explicitly incorporate a non-response adjustment factor, the researchers adopted a distribution strategy that ensured broad coverage across faculties and departments to minimise the likelihood of inadequate responses. This approach enhanced participation and reduced the risk of non-response bias.

To ensure that the sample adequately reflected the diversity of the undergraduate population, respondents were selected from different faculties and academic departments within the university. This distribution strategy helped to improve representativeness by capturing students from various disciplinary backgrounds, levels of study, and academic experiences. Consequently, the sample was considered sufficiently representative of the broader undergraduate student population.

A simple random sampling technique was employed to select respondents, ensuring that every undergraduate student had an equal probability of being included in the sample. Student lists obtained from relevant academic units served as the sampling frame from which respondents were randomly selected.
Of the 396 questionnaires administered, all copies were successfully retrieved and found suitable for analysis, representing a response rate of 100%. The complete retrieval of questionnaires eliminated concerns regarding non-response bias and ensured that the minimum sample size requirement established by the Yamane formula was achieved. The response rate also strengthened the reliability and validity of the study findings.

Notwithstanding these strengths, the study was conducted within a single public university. Consequently, caution should be exercised when generalising the findings to all universities in Nigeria, as institutional characteristics, technological infrastructure, academic cultures, and patterns of technology adoption may vary across institutions. Future studies should therefore replicate the investigation across multiple public and private universities to enhance the generalisability of the findings.

Primary data were collected using a structured questionnaire adapted from relevant literature on ChatGPT technology, artificial intelligence adoption, academic integrity, and research ethics. The instrument was divided into two sections. Section A captured respondents' socio-demographic characteristics, while Section B measured the study variables, including Awareness and Understanding of ChatGPT Technology, ChatGPT Usage Pattern, Integration into Academic Workflow, Impact on Research Skills, Impact on Research Integrity, and Research Ethics. All items were measured using a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

The instrument was subjected to face and content validity through expert review by academics and practitioners in management, educational research, and social science disciplines. Their observations and recommendations ensured that the questionnaire items were relevant, clear, and aligned with the objectives of the study.

A pilot study involving thirty respondents was conducted to assess the reliability of the instrument. Based on feedback obtained from the pilot exercise, necessary modifications were made to improve clarity and comprehensibility. The reliability of the instrument was assessed using Cronbach's Alpha after conducting item analysis and examining item-total correlations. The results revealed Cronbach's Alpha coefficients ranging from 0.723 to 0.805 across the study constructs, exceeding the minimum acceptable threshold of 0.70 recommended by Nunnally and Bernstein (1994) and Hair et al. (2019). The overall reliability coefficient for the instrument was 0.759, indicating satisfactory internal consistency among the measurement items. These results suggest that the instrument possesses adequate reliability and is suitable for subsequent statistical analyses.

Table 1: Summary of Cronbach's Alpha Reliability Coefficients

Variables	Cronbach's Alpha	Items

Awareness and Understanding of ChatGPT Technology	0.741	4
ChatGPT Technology's Usage Pattern	0.723	4
ChatGPT Technology's Integration into Academic Workflow	0.769	4
ChatGPT Technology's Perceived Impact on Research Skills	0.781	4
ChatGPT Technology's Impact on Research Integrity	0.805	4
Research Ethics	0.736	4
Overall Average Alpha for the instrument (α)	**0.759**	**20**

Source: Researchers' Computation (2025)

The study model was specified with Research Ethics (RE) as the dependent variable and ChatGPT Technology operationalised through five dimensions as independent variables:

$$RE = f(AU, UP, IAW, IRS, IRI) \quad (1)$$

The econometric model is expressed as:

$$RE = \beta_0 + \beta_1 AU + \beta_2 UP + \beta_3 IAW + \beta_4 IRS + \beta_5 IRI + \varepsilon \quad (2)$$

Where:

RE = Research Ethics
AU = Awareness and Understanding
UP = Usage Pattern
IAW = Integration into Academic Workflow
IRS = Impact on Research Skills
IRI = Impact on Research Integrity
β_0 = Constant
$\beta_1 - \beta_5$ = Coefficients
ε = Error term

A Priori Expectation

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 > 0$$

This implies that increases in students' awareness and understanding of ChatGPT technology, usage pattern, integration into academic workflow, impact on research skills, and impact on research integrity are expected to positively influence research ethics among students of the University of Benin.

Data collected were coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 24.0. Both descriptive and inferential statistical techniques were employed. Descriptive statistics such as means and standard deviations were used to summarise the responses and describe the characteristics of the variables. Inferential statistics comprising Pearson correlation analysis and Ordinary Least Squares (OLS) multiple regression analysis were used to examine the relationships among variables and test the study hypotheses. All hypotheses were tested at a 5 per cent level of significance.

4. RESULTS AND DISCUSSION

Table 2 presents the results of the descriptive statistics and inter-correlation among the study variables. The correlation coefficients indicate that all variables exhibit positive relationships with research ethics, suggesting that increases in ChatGPT-related dimensions are associated with improvements in ethical research behaviour among students.

Furthermore, although none of the correlation coefficients exceeded the critical threshold of 0.80, multicollinearity was further assessed using Tolerance and Variance Inflation Factor (VIF) statistics. The results confirmed that all VIF values were below the recommended threshold of 5.0 and all tolerance values exceeded 0.10, indicating the absence of harmful multicollinearity among the independent variables.

Table 2: Mean, Standard Deviation and Pearson's Correlation Coefficient for All Variables

Variables	Mean	Std. Dev.	RE	AU	UP	IAW	IRS	IRI
RE	3.61	1.28	1.000					
AU	3.58	1.26	0.662**	1.000				
UP	3.27	1.25	0.524**	0.681**	1.000			
IAW	3.41	1.17	0.591**	0.671**	0.785**	1.000		
IRS	3.55	1.18	0.735**	0.740**	0.552**	0.681**	1.000	
IRI	3.34	1.17	0.617**	0.679**	0.641**	0.694**	0.748**	1.000

Source: Field Survey, 2025 (SPSS Output)

The mean scores indicate that students demonstrate a moderately high level of engagement with ChatGPT technology, with awareness and understanding recording the highest mean, followed by impact on research skills and integration into academic workflow. Usage pattern recorded the lowest mean, suggesting relatively varied levels of actual usage among students.

The mean value of research ethics (3.61) exceeds the neutral benchmark of 3.0, indicating that students generally exhibit above-average adherence to ethical research practices. Overall, the results suggest that ChatGPT technology is actively utilised and positively

associated with research-related behaviours in academic settings.

Table 2A: Multicollinearity Diagnostics

Variable	Tolerance	VIF
Awareness and Understanding (AU)	0.365	2.740
Usage Pattern (UP)	0.305	3.279
Integration into Academic Workflow (IAW)	0.256	3.906
Impact on Research Skills (IRS)	0.302	3.311
Impact on Research Integrity (IRI)	0.285	3.509

Source: Researchers' computation based on the field survey (2025) using SPSS version 24.

Multicollinearity Diagnostics

To further assess the possibility of multicollinearity among the independent variables, Variance Inflation Factor (VIF) and Tolerance statistics were examined. The results presented in Table 2A indicate that the tolerance values range from 0.256 to 0.365, while the VIF values range from 2.740 to 3.906. These values fall within the acceptable thresholds recommended in the literature, where tolerance values should exceed 0.10 and VIF values should remain below 5.0 (Hair et al., 2019). Although the correlation matrix revealed a relatively high correlation between Usage Pattern and Integration into Academic Workflow (r = 0.785), the VIF statistics suggest that the degree of shared variance among the predictors is not sufficiently high to threaten the stability of the regression estimates. Consequently, all independent variables were retained in the regression model because each variable contributes unique explanatory information regarding the relationship between ChatGPT technology and research ethics. The findings therefore confirm the absence of harmful multicollinearity and support the suitability of the data for Ordinary Least Squares regression analysis.

Regression Analysis

Table 4: Regression Analysis Using Ordinary Least Square Estimation Technique

Model	Unstandardized Coefficients		t-Statistics	Probability Value	Hypotheses
	B	Standard Error			
(Constant)	2.089	0.510	4.097	0.000	Significant
AU	0.202	0.049	4.112	0.000	Significant
UP	0.068	0.063	1.071	0.285	Insignificant
IAW	0.313	0.067	4.695	0.000	Significant
IRS	0.510	0.054	9.419	0.000	Significant
IRI	0.410	0.050	8.203	0.000	Significant
R=0.760[a]; R Square=0.577; Adjusted R Square=0.573; Standard Error of the Estimate= 2.72461; F-Stat = 139.490; Durbin-Watson = 1.992					

Source: Researchers' computation based on the field survey 2025 using SPSS version 24.

The regression results indicate that the model is statistically significant. The R value of 0.760 shows a strong relationship between ChatGPT technology variables and research ethics. The coefficient of determination ($R^2 = 0.577$) implies that approximately 57.7% of the variation in research ethics is explained by the independent variables.

The F-statistic confirms that the overall model is significant at the 1% level, indicating good model fit. The Durbin-Watson value of 1.992 suggests the absence of autocorrelation, confirming the reliability of the regression estimates.

Discussion of Hypotheses

The findings reveal that awareness and understanding of ChatGPT technology has a significant positive effect on research ethics ($\beta = 0.202$, $p < 0.001$). This suggests that students who possess better knowledge of ChatGPT are more likely to use it responsibly, thereby enhancing ethical research practices.

However, usage pattern was found to be insignificant ($\beta = 0.068$, $p > 0.05$), indicating that frequency of use alone does not necessarily influence ethical behaviour. The insignificant relationship between Usage Pattern and Research Ethics suggests that frequency of ChatGPT use alone does not necessarily translate into ethical or unethical research behaviour. Students may use ChatGPT frequently while still adhering to ethical standards if they possess adequate awareness, critical evaluation skills, and institutional guidance. Conversely, infrequent users may still engage in unethical practices. This finding indicates that ethical outcomes depend more on how ChatGPT is utilised rather than how often it is utilised. The result supports the argument of SCOT that

user interpretation and contextual application of technology are more important than mere exposure to the technology.

The results further show that integration into academic workflow significantly influences research ethics ($\beta = 0.313$, $p < 0.001$). This implies that structured and guided use of ChatGPT within academic processes promotes ethical research conduct.

Similarly, impact on research skills exhibits the strongest positive relationship ($\beta = 0.510$, $p < 0.001$), indicating that ChatGPT enhances analytical and writing capabilities, which in turn supports ethical research practices.

Finally, impact on research integrity also shows a significant positive effect ($\beta = 0.410$, $p < 0.001$), suggesting that when properly utilised, ChatGPT can reinforce ethical standards such as transparency and accountability.

Ethical Implications of ChatGPT Use in Academic Research

The findings of this study have important ethical implications for the use of artificial intelligence technologies in higher education. While the results indicate that Awareness and Understanding, Integration into Academic Workflow, Perceived Impact on Research Skills, and Impact on Research Integrity are significantly associated with Research Ethics, the relationship between ChatGPT technology and ethical behaviour may not be entirely unidirectional.

An alternative explanation is that students who already possess stronger ethical values and greater commitment to responsible academic conduct may be more likely to utilise ChatGPT in ethically appropriate ways. Such students may view the technology as a supplementary research tool rather than a substitute for independent critical thinking, proper citation practices, and original scholarly work. Conversely, students with weaker ethical orientations may be more inclined to misuse the technology irrespective of their level of awareness or frequency of use. Consequently, the observed relationships may reflect reciprocal interactions between technology use and ethical behaviour rather than a simple one-way relationship.

This perspective is consistent with the Social Construction of Technology, which emphasises that the consequences of a technology depend on how users interpret and apply it within particular social and institutional contexts. It also suggests that the ethical implications of ChatGPT cannot be understood solely by examining patterns of technology use but must also consider individual values, academic norms, and institutional guidance. Therefore, universities should not only regulate the use of artificial intelligence tools but also strengthen ethical awareness, academic integrity education, and responsible research practices among students.

5. CONCLUSION AND RECOMMENDATIONS

This study examined the association with ChatGPT technology on research ethics among students in public universities in Nigeria. The findings revealed that the key dimensions of ChatGPT technology, namely awareness and understanding, integration into academic workflow, impact on research skills, and impact on research integrity, exert a significant positive effect on research ethics. This indicates that when students possess adequate knowledge of ChatGPT and apply it within structured academic processes, the technology contributes positively to ethical research conduct and academic integrity.

The study further established that although ChatGPT technology is widely utilised among students, usage pattern alone does not significantly influence research ethics. This suggests that ethical outcomes are not determined by frequency of use, but rather by the level of understanding, institutional regulation, and the manner in which the technology is integrated into academic activities.

Drawing from the theoretical foundations of the Social Construction of Technology and Technological Determinism, the study affirms that while ChatGPT technology possesses the capacity to shape academic behaviour, its ethical implications are largely dependent on how it is socially interpreted, guided, and regulated within the university system. Consequently, ChatGPT technology can enhance research quality, improve students' research skills, and support ethical academic practices when properly managed.

Therefore, the study concludes that ChatGPT technology has a significant positive influence on research ethics among students in public universities in Nigeria, particularly when supported by appropriate awareness,

institutional frameworks, and responsible usage practices.

Based on the findings of this study, the following recommendations are proposed:

i. Public universities in Nigeria should invest in enhancing students' awareness and understanding of ChatGPT technology through regular workshops, seminars, and training programmes that emphasise both its academic benefits and ethical implications. Such programmes should be organised at least once every academic semester to ensure that students remain informed about evolving AI technologies and responsible usage practices.

ii. Universities should develop and enforce comprehensive policies and guidelines governing the ethical use of ChatGPT and similar artificial intelligence tools. These policies should require students to provide mandatory AI disclosure statements in assignments, projects, seminar papers, and research reports, indicating the nature and extent of AI assistance received during the completion of academic tasks.

iii. Academic institutions should promote the structured integration of ChatGPT into teaching, learning, and research activities while ensuring that the technology complements rather than replaces students' critical thinking, analytical reasoning, and intellectual effort. Lecturers should design classroom exercises that require students to critically evaluate, verify, and improve ChatGPT-generated outputs as part of their learning process.

iv. Universities should introduce AI usage logs as a compulsory component of major academic projects, dissertations, and research assignments. Such logs should document when, how, and for what purposes ChatGPT or other AI tools were utilised, thereby enhancing transparency, accountability, and responsible technology use.

v. Research methodology courses and related academic programmes should incorporate dedicated modules on artificial intelligence ethics, responsible AI use, academic integrity, plagiarism prevention, and proper attribution of AI-assisted content. This will strengthen students' understanding of the ethical dimensions of emerging technologies and promote responsible research behaviour.

vi. Universities should organise semester-based AI ethics workshops involving students, lecturers, researchers, librarians, and information technology specialists. These workshops should focus on emerging ethical challenges associated with AI-assisted learning and research, including authorship, citation practices, misinformation, bias, privacy concerns, and academic integrity.

vii. Academic institutions should strengthen mechanisms for promoting research integrity through continuous ethical orientation programmes, the use of plagiarism detection systems, regular monitoring of AI-assisted submissions, and the consistent enforcement of academic standards and disciplinary procedures where violations occur.

viii. Finally, policymakers, regulatory agencies, and educational stakeholders should establish national frameworks and standards for the responsible use of artificial intelligence in higher education. Such frameworks should provide clear guidance on acceptable AI usage, disclosure requirements, ethical compliance, and quality assurance mechanisms to ensure that technological innovation supports sustainable academic development without compromising research ethics and academic integrity.

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