

AI Adoption, Ethical Software Testing, and Academic Research Excellence in State-Owned Universities in Delta State

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Abstract

This study investigated the effect of AI adoption, ethical software testing, and academic research excellence in four (4) state-owned universities in Delta State: Delta State University, Abraka; Southern Delta University, Ozoro; Dennis Osadebay University, and University of Delta, Agbor using the multi-stage sampling technique. Data were collected through a structured questionnaire designed in line with the study objectives. Meanwhile, both descriptive and inferential statistics were employed for data analysis. A total of 180 respondents were drawn from the sampled universities. However, 165 copies of questionnaire were filled properly. The study reported that, ChatGPT and Quillbot were the most regularly used AI tools. Again, paraphrasing/theft through paraphrasing, data falsification, conflict of authorship, data privacy breaches and algorithmic bias are the key ethical issues impending AI usage and ethical software testing. Additionally, ethical awareness ($\beta = 0.416$, $t\text{-value}=6.721$, and $p=0.000$) is the strongest ethical AI tool testing predictor, next to institutional policies ($\beta = 0.339$, $t\text{-value}= 5.840$ and $p\text{-value}=0.000$) and access to AI training ($\beta = 0.270$, $t\text{-value}= 0.270$ and $p\text{-value}=0.000$). Lastly, the result affirmed that junior (graduate assistant and assistant lecturers) and mid-level academic staff (lecturer 11 and lecturer 1) are more willing to use AI tools in research activities than upper level academic staff (Senior lecturer to Professors). Thus, the study concludes that strict adherence to ethical standards and software testing protocols are essential for achieving academic excellence. Consequently, Nigerian university managements and the National Universities Commission (NUC) need to develop clear, concise, and African context-specific institutional policies and structured ethical software testing frameworks targeted at validating AI solution before deployment and at the same time provide rank-sensitive training programs for all academic staff.

Keywords: AI adoption, ethical software testing, academic research excellence, State-Owned Universities

1. Introduction

The use of Artificial Intelligence (AI) in academic research is transforming global knowledge landscape, from new data analysis software, computerized literature summarization, writing support, and even hypothesis generation (Khalifa, & Albadawy, 2024). In the Nigerian university system, particularly state universities, this new technology is fast gaining ground, albeit in an uneven manner (Adeleke et al., 2020). Institutions such as the Delta State University (DELSU) and

Southern Delta University are more open to the utilization of AI tools with guarantees of research productivity and quality. The rapid evolution of the tools, however, has surpassed the evolution of infrastructural supporting ethical standards, institutional policy, and quality assurance protocols (Nwonye et al., 2025). So, the application of AI in these environments is essentially unregulated and informal and compromises authenticity, academic integrity, and long-term value of scholarship concerns (Mandira Bairagi & Lihitkar, 2024; Guanah, & Bebenimibo, 2025).

Avoiding AI usage risks can be achieved by applying the principles of software testing to academic contexts. Historically used by computer science to validate the function, dependability, and performance of software systems, testing of software offers a scientific approach to testing AI tools prior to, and while in use (Kakkonen, 2024). Utilized in academic research applied to AI, such standards of quality control can dictate the validity, reliability, and moral reasonableness of outputs generated by AI. AI software can be tested for fairness, explainability, and compliance with academic standards through input testing, output testing, bias testing, and stress testing. Software testing is thus transformed into a tool not just of technology but also of ethics (Chen, et al., 2024).

This research is hence theoretically grounded in two competing paradigms: the Technology Acceptance Model (TAM) and Responsible Research and Innovation (RRI). TAM explains researchers' intentions to use AI based on how helpful they perceive it to be and how convenient it is to use, and the focus is laid on user experience and institutional support (Davis, 1989). RRI aims towards building a focus on anticipation, reflexivity, inclusivity, and responsibility in technological appropriation (Owen & Pansera, 2019). These frameworks combined provide us with an overview under which to consider not only how AI is being used, but how it must be regulated in order to make innovation socially responsible and morally accountable.

Within Delta State public universities, the current researchers' exposure to AI adoption is institutional preparedness mismatched with technical feasibility (Luwoye et al., 2024). Some researchers are positively implementing AI in literature review, data analysis, and manuscript writing, whereas others are non-supportive or indifferent to AI use and misuse (Lamdjad & Bouhella, 2024). There is also a very wide gap in formal training programs, ethical standards, or quality control procedures for AI use in research. Such lack of a formal framework compels researchers to go through the field of ethics by themselves, with all the dangers of abuse, misuses, or even naively innocent academic misconduct.

This gap, between low levels of ethical and technical regulation and high levels of AI use, is the subject of concern here (Osang et al., 2025). It is a basic question: How do Delta State government-owned universities leverage AI to support research excellence without undermining academic integrity? To this end, the study examines the extent to which AI is being adopted by management science researchers, determines how sensitive they are to ethics concerns, and investigates governance arrangements (or the absence thereof) in institutions. Above all, it opens the possibility of going back to software testing as feasible means of making AI-enabled research trustworthy and ethically acceptable at scale.

Software testing here moves beyond technical verification; it is a cultural transformation towards accountability in computer-mediated scholarship (Landers & Behrend, 2023). Also, software testing requires institutional investment, multidisciplinary cooperation, and capacity building (Beale, 2025). It is only through working out such broad strategies that AI can be aligned with the agenda of academic excellence. As such, by reconciling software testing and ethical AI adoption, this research develops a novel transdisciplinary quality assurance paradigm for African higher education (Hassan 2025). This conforms to debunking the myth of regulation of AI as a matter of policy problem or ethical rule-making and rather suggests scraping out a hybrid solution of moral norms as well as technical testing (Greenstein, & Zamboni, 2025). The proposed model is not only solving Delta State's immediate problems but also providing a blue print for other Nigerian universities and the entire Globally South which is under-resourced.

Ultimately, this research seeks to develop an AI integration plan that will combine innovation and integrity, efficiency and ethics, and automation and accountability. Hence, it is expected that the university managements of the sampled universities will not only adopt AI, but excel at it successfully, in ways in which technological advancement elevates, rather than degrades, the pursuit of genuine, genuine, and higher scholarship research (Ofor-Douglas 2025).

2. Material and Methods

The study employed a descriptive survey research design. This design was considered appropriate given the study's objective to systematically collect and analyze data on perceptions, frequencies of AI usage, and ethical implications of testing AI software in academic research. The study targeted academic staff across four (4) state-owned universities in Delta State, Nigeria: Delta State University, Abraka; Southern Delta University, Ozoro; Dennis Osadebay University, and University of Delta, Agbor. Specifically, we focused on academic staff within the ranks of Graduate Assistant, Assistant Lecturer, Lecturer II, Lecturer I, Senior Lecturer, Associate Professor, and Professor using a multi-stage sampling technique. Forty five (45) respondents were each proportionate selected from each stratum in each sampled universities, amounting 180 respondents.

We collected data from the field using a structured questionnaire. The questionnaire was divided into six (6) key sections. Section 1 captured demographic information of the sampled academic staff. Section 2 addressed focused on the extent of awareness and utilization of AI tools such as ChatGPT, Quillbot Grammarly, and Turnitin, and used in academic research. Section 3 focused on ethical considerations associated with AI usage. Section 4 assessed correlation between ethical awareness and AI Usage. Section 5 focused on ethical AI Tool Testing and AI Adoption Predictors while the section 6 focused on the variations across various academic ranks. The questionnaire items were measured on a five-point Likert scale, ranging from “Strongly Disagree (SD)” to “Strongly Agree (SA). To ensure the questionnaire’s content validity, the questionnaire was given to two management experts to review. Their feedback was used to revise questionnaire before sending it out to various respondents.

A pilot study involving 25 academic staff yielded a Cronbach's Alpha ranging from 0.78 and 0.91, indicating that the questionnaire is internally consistent and reliable. The questionnaire retrieved was first coded and then analyzed using the SPSS version 23.0. Descriptive statistics such as means (average), frequencies (f), and standard deviations (SD) were used to summarize responses. Inferential statistical techniques, including Pearson’s correlation, multiple regression analysis, and Analysis of Variance (ANOVA)

3. Results and Discussions

3.1 Demographic Profile of Respondents

Out of 180 copies of questionnaire distributed, 164 questionnaires were returned. The total questionnaire returned representing a 91.1% response rate. Table 1 presents the demographic profile of our participants:

Table 1. Demographic Profile of Respondents (N = 164)

Variable	Category	Frequency (F)	Percentage (%)
Academic Rank	Graduate Assistant / Assistant Lecturer	35	21.34
	Lecturer II	38	23.17
	Lecturer I	32	19.51
	Senior Lecturer	21	12.80
	Associate Prof.	28	17.07
	Professor	10	6.10
Years of Experience	< 5 years	71	43.29
	6–10 years	54	32.93
	> 10 years	39	23.78

Table 1 provides responses from a diverse pool of academic staff across different ranks and years of experience in the lecturing profession. From Table 1, out of the 164 respondents, 35 respondents are Assistant Lecturers, 38 respondents are Lecturer II, 32 respondents are Lecturer I, 21 respondents are Senior lecturers, 28 respondents are Associate Professors while 10 respondents are Professors. Overall, majority of the respondents are Lecturer II. In terms of years of experience, the 43.29% of respondents had been in the lecturing profession below 5 years, followed by those with 6–10 years of experience (32.93%), while only 23.78% had been in the lecturing profession above 10 years of experience suggesting that majority of the respondents are majorly early and mid-career academics.

3.2 Awareness and Utilization of AI Tools

Table 2 presents respondents’ awareness and the extent of usage of AI tools in academic research. The four key AI tools considered are ChatGPT, Quillbot, Grammarly, and Turnitin. Out of the four key AI tools, ChatGPT and Quillbot were the most regularly used AI tools, with 89.60% and 84.22% level of awareness and regular usage of 62.30% and 61.92%, respectively. However, Grammarly and Turnitin were less consistently adopted, with lower usage rates. These findings indicate that AI solutions are currently gang high momentum in Nigerian academic research as these solutions supports writing, content refinement, and plagiarism detection. The high adoption of ChatGPT and Quillbot lays the foundation for aiding academic research excellence.

Table 2. Extent of Awareness and Use of AI Solutions

AI Solutions	Extent of Awareness (%)	Extent of AI Use		
		Regular (%)	Occasional (%)	Rare/ Never (%)
ChatGPT	89.60	65.30	21.64	13.06
Quillbot	84.22	61.92	19.21	18.87
Grammarly	72.49	43.01	31.10	25.89
Turnitin	61.51	28.66	32.90	38.44

3.3 Perceived Benefits of AI Adoption

Table 3 clearly accounts for the perceived benefits of AI Adoption using Mean and Standard Deviation Scores on a 5 point Likert Scale. Various perceived benefits identified are enhances research productivity, improves quality of publication outputs, reduces repetitive tasks, supports intellectual contribution, and assist literature review & references. Overall, all the perceived benefits of AI Adoption are above 2.5 mean score and that their respective standard deviation values are below their respective mean values suggesting that most Nigerian academics are using the AI solutions are highly beneficial.

Table 3. Perceived Benefits of AI Adoption (Mean and Standard Deviation Scores)

Benefit	Average (Mean) Score	Standard Deviation (SD) Score	Decision	Ranking
Enhances research productivity	4.12	0.74	Agree	1 st
Improves quality of publication outputs	4.07	0.69	Agree	2 nd
Reduces repetitive tasks	3.98	0.72	Agree	3 rd
Supports intellectual contribution	3.86	0.77	Agree	4 th
Assist literature review & references	3.91	0.70	Agree	5 th

3.4 Ethical Software Testing Issues in AI Usage

Table 4 explicitly addresses ethical software testing by highlighting concerns associated with AI usage. Respondents reported that plagiarism risks through paraphrasing/theft through paraphrasing, data falsification, conflict of authorship, data privacy breaches and algorithmic bias are the key ethical issues impeding AI usage in the sampled state owned universities. These ethical issues underscore the need for ethical software testing, which ensures that AI tools are verified; AI tools performed optimally, data integrity maintained, and academic integrity upheld.

Table 4. Ethical Software Testing Issues Associated with AI Use

Ethical Software Testing Issues	Average (Mean) Score	Standard Deviation (SD) Score	Decision
Plagiarism/Theft	3.98	0.71	Agree
Data falsification	3.81	0.78	Agree
Conflict of Authorship	3.72	0.83	Agree
Data privacy/ breaches of confidentiality	3.69	0.76	Agree
Algorithmic bias and discrimination	3.65	0.80	Agree

3.5 Ethical Awareness and AI Usage

Table 5 shows a **strong positive correlation** between ethical awareness and AI usage ($r = 0.780$, $p\text{-value} < 0.01$) suggesting that the more academics become more ethically conscious, the more they use AI tools responsibly. The high strength of the correlation between ethical awareness and AI usage further confirmed that ethical knowledge shapes how AI is deployed and at the same time reduces the likelihood of misuse of AI tools in terms of plagiarism and data falsification.

Table 5. Correlation between Ethical Awareness and AI Usage

Variables	Ethical Awareness	AI Usage
Ethical Awareness	1.000	
AI Usage	0.780*	1.000

Note: * significant at 1% level.

3.6 Ethical AI Tool Testing and AI Adoption Predictors

The regression results in Table 6 evidenced that ethical awareness ($\beta = 0.416$, $t\text{-value}=6.721$, and $p=0.000$) is the strongest ethical AI tool testing predictor, next to institutional policies ($\beta = 0.339$, $t\text{-value}= 5.840$ and $p\text{-value}=0.000$) and access to AI training ($\beta = 0.270$, $t\text{-value}= 0.270$ and $p\text{-value}=0.000$). Overall, the model explained 53% and 51.20% of the variance in responsible AI tool testing and adoption ($R^2 = 0.530$ and adjusted $R^2 = 0.512$). By implication, ethical software testing (responsible software testing) is both a procedural safeguard and a strategic tools the management of the sampled state Universities can use to ethically integrate AI into the Nigerian academic environment.

Table 6. Regression Analysis Predicting Responsible AI Adoption

Predictor Variables	Beta (β)	t-value	p-value
Ethical Awareness (ETA)	0.416	6.721	0.000*
Institutional Policies (ITP)	0.339	5.840	0.000*
Access to AI Training (AAT)	0.270	4.955	0.000*
Model Summary			
$R^2 = 0.530$	Adjusted $R^2 = 0.512$	$F(3, 160) = 15.63$, and $p = 0.000$	

Note: * significant at 1% level.

3.7 Variations across Academic Ranks

Table 7 presents AANOVA results showing significant differences in AI adoption across academic ranks (F-statistics = 4.37, p-values = 0.012) suggesting that the extent of AI adoption is differs significantly across various academic staff categories in the sampled state-owned universities. The result further affirmed that junior (graduate assistant and assistant lecturers) and mid-level academic staff (lecturer 11 and lecturer 1) are more willing to use AI tools in research activities thereby exposing them to higher ethical issues than upper level academic staff (Senior lecturer to Professors) who often serve as mentors and gatekeepers of academic standards. This insight underscores that ethical software testing and training programs should be rank sensitive.

Table 7. ANOVA by Academic Ranks

Source	SS	Df	MS	F	Sig.
Between Groups	18.27	5	3.65	4.37	.012
Within Groups	127.54	158	0.81		
Total	145.81	163			

4. Concluding Remarks

This study appraised AI adoption, ethical software testing, and academic research excellence nexus among academic staff in 4 state-owned universities in Delta State, with a focus on the management sciences discipline. The study evidenced that many academics agreed that ethical use of AI solutions improves their article publications. However, Nigerian University management are yet to address AI dehumanisation, algorithmic bias, falsified results/claims, plagiarism risks, ethical usage, data integrity/falsification, and data privacy/confidentiality. Lack of institutional guidelines on how AI solutions should be used further heighten the challenges. Thus, the study concludes that strict adherence to ethical standards and software testing protocols are essential for achieving academic excellence. Consequently, the Nigerian university managements and the National Universities Commission (NUC) need to develop clear, concise, and African context-specific institutional policies and ethical guidelines for AI usage. Also, they need to collaborate with software developers in order to develop a structured ethical software testing frameworks that can be used to validate AI solution before they are deployed. Lastly, the management of the sampled state universities need to provide AI- ethical software testing training programs.

The study, however, acknowledges some limitations. First, the study only focused on academic staff in state-owned universities within Delta State, though there are private and federal universities in Delta State. To cover a wider scope, future studies should include academic staff of private and federal universities. Second, the study only focused on academics from management sciences. Since all academics use AI solutions, future researchers should consider including academics from other disciplines such as allied sciences, engineering, education, and arts and humanities. This will offer practical insights on the relevance of in the university system. Lastly, the study used only questionnaire. The challenge is that, questionnaire administration is faced with response bias. To overcome the response bias associated with the use of questionnaire, future researchers should adopt mixed-method approaches, such as in-depth interviews, observational techniques, and focus group discussions.

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Authors contributions

Daniel Mevayerore Igbini drafted the introduction while re-finetuned the drafted introduction. Udoka Benard Alajekwu conducted the literature review. Daniel Mevayerore Igbini and Michael Tonbraladoh Sinebe were responsible for handling the questionnaire distribution, study design and the whole methodology. Agary N. Nwokoye, Patrick Chinedu Bosah ran the analysis while Daniel Mevayerore Igbini, and Michael Tonbraladoh Sinebe did the discussion and conclusion. Ifeoma Ethel Ezeabasili drafted the concluding remarks. However, all authors read through the entire manuscripts and made all necessary contributions, corrections and amendments.

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Data sharing statement

No additional data are available.

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