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Generative Artificial Intelligence Tools' Accessibility and Adoption and their Influence on Academic Writing Anxiety

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Abstract

The recent advancement in, and launch of numerous artificial intelligence tools for different purposes in this world of digitalization will aid the knowledge and improve the possible output of every sectors. The generative kind of artificial intelligence tools are efficient in generating and development of textual communication of a content, checking grammatical and vocabulary error, spelling mistake, paraphrasing and rephrasing among the others. This study focuses on generative artificial intelligences tools' accessibility and adoption, and their influence on academic writing anxiety. 189 respondents that involves the higher education institutions faculties, postgraduate candidate and undergraduate students' responses were used for this study. Partial least square structural equation model was employed and collected responses were analyzed using SmartPLS software version 4.0.9.2. The findings of the study reveals that the all items of academic writing anxiety scale has an average mean value and the structural model results indicated that the accessibility and adoption of generative artificial intelligence tools positively and significantly influence the academic writing anxiety. The study recommended ethical practice by the user of the tools to avoid academic issues.

Keyword: Academic Writing Anxiety, Generative Artificial Intelligence, Accessibility, Adoption.

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Academic anxiety otherwise known as academic writer's apprehension and block is a serious problem that many academic writers that include faculties, students, reporters and professionals faced. The apprehension or feelings of unfavorable anticipation often caused by self-confidence level, disbelief and fear of evaluation reports. Rezaei and Jafari (2014) asserted that writing anxiety is a main source of difficulty that has long been recognized as a challenge of researchers, tutors and learners in second language learning. Wahyuni et al. (2019) declare that writing anxiety often appears to have been a challenge to students to complete written tasks, like term papers, assignment and theses.

Moderate in the level of students' academic writing anxiety can possibly be attributed to numerous factors. Such factors include writers' not under the pressure of testing situation of mid-term or final term evaluation (Wahyuni, et al., 2019). Atytac-Demircivi (2020) affirmed that academic writing anxiety is believed to be the cause of low students' writing skills.

Generative artificial intelligence tools are emerging tools designed to generate error free textual communication. The tools has the potential of solving some challenges or anxiety associated with academic writing. Some of the potentials of generative artificial intelligence tools include ideas development, spelling correction, grammar correction, vocabulary check, paraphrasing, rephrasing and content development, organization and outline of ideas among others. Dezedzic (2004) asserted that the recent breakthrough in the development and the adoption of artificial intelligences techniques supports the effort of making web more intelligent and to provide great services to web users.

Olafare (2023) viewed artificial intelligence as a branch of computer science that has the capacity to design and develop tools that exhibit features of human intelligence. The author further asserted that the major challenge of artificial intelligence in education is under-discussion despite its numerous values to the development of every sectors. Generative artificial intelligence plays a critical role in the digitalization of our immediate society. Parts of the benefits of this human-mimic intelligence involves automate tasks, and enormous data processing (Cooper, 2023).

Yang (2022) submitted that there are increasing number of curricula and resources for all categories of students to learn and study effectively. Lodge et al. (2023) opined that generative artificial intelligence based tools use caught the tertiary education unaware. The authors suggested that the generative artificial intelligence is more efficient in guessing rather than giving the original or accurate responses. To avoid ethical issues in their usage that may becloud the tertiary education researches output, the critical areas needed to work on are: sense making, assessment integrity, assessment design, learning and teaching with AI, and ethics and AI.

Literature Review, Formulation of Hypotheses and Development of Research Questions

Huerta et al. (2017) worked on graduate students writing anxiety, self-efficacy and emotional intelligence. The study engaged 174 respondents who were enrolled in the POWER studios or class through electronic mail invitation and the link of online survey (Qualtrics) that included 85 items that took about fifteen minutes to complete. Daly and Miler's (1975) writing anxiety scale was used to collect information on students' writing anxiety. The results of the study revealed that writing anxiety mean score fell below the scale's theoretical midpoint.

Ajmal and Irfan (2020) worked on effects of process-genre approach on writing anxiety. The study was quasi-experimental study that engaged experimental and control class size of 40 pre-university students. The pre-intervention test reports of the two groups indicated that the respondents mean score was below the required mean score.

Rohmah and Muslim (2020) searched on writing anxiety in academic practice. The study was qualitative study that sampled five (5) bachelor's degree students that enrolled in English education. The study uses semi-structured interview and document analysis. The findings of the study revealed that four factors that involves perceptions on their English writing habit, emergence of anxiety in facing academic task, fear of negative evaluation from writing instructor and feelings when there is no academic writing task are major causes of academic writing anxiety. Based on the reviewed literatures, the following research questions and hypotheses were developed and formulated:

Research Question

RQ1. What is the level of respondents' academic writing anxiety?

Hypotheses

HO₁. Awareness of generative artificial intelligence tools significantly influences academic anxiety significantly:

HO₂. Adoption of generative artificial intelligence tools influences academic anxiety significantly.

Method

This research study used a multivariate statistical technique to analyze this correlational research investigation. Students pursuing master's degrees, Ph.D. candidates who have completed or are currently completing their thesis proposals, academic lecturers, and science education undergraduate students writing their final-year scientific education academic projects made up the population for this study. The analysis utilized 189 responses, compared to the planned sample size of 500, which was obtained in three weeks. A general criterion for sample size selection is encouraged by multivariate methods like structural equation modeling. The constructs' items were uploaded on multiple choice grid of Google form app., and the link was shared on WhatsApp groups of the responders.

The demographic breakdown of the respondents is shown in table 1. 54 respondents, or 28.6% of the total size were female, compared to 135 respondents, or 71.4%, who were male. 87 undergraduate students, who make up 46.0% of the total respondents, 34 master's degree holders, who make up 18.0%, 21 Ph.D. candidates, who make up 11.1%, and 47 lecturers, who make up 24.9% of the total respondents, are the categories of respondents.

Table 1: *Demographic Profile of the Respondents*

Gender	N	%
Female	54	28.6

	Male	135	71.4
	Total	189	100
Categories of the Respondents			
	Undergraduate	87	46.0
	Master's Degree Students	34	18.0
	Ph.D. Students and Candidates	21	11.1
	Faculties/Lecturers	47	24.9
	Total	189	100

Measures of Construct

This study explores the influence of generative AI tools' accessibility, adoption and on academic writing anxiety. The table 1 below provides a detailed explanation of the constructs' meaning, items' description and source. The components consist of 17 items, each of which was assessed on a 5-point Likert scale of strongly agree, agree, not preferred to answer, disagree and strongly disagree.

Table 2: *Construct meaning, items code, description and source of the items' table*

Construct	Construct Meaning	Item Code	Item description	Source
Accessibility of generative artificial intelligence	The degree to which one may have access to the subset of artificial intelligence tools that can come up with concepts, write language, and use paraphrasing and rephrasing	ACC1	I have an account with generative artificial intelligence tools	Self-Designed
		ACC2	I can access the generative artificial intelligence tools in my computer and smart phone	
		ACC3	My institution makes generative artificial intelligence tools accessible in my campus	
		ACC4	Internet and power supply doesn't affect my access to	

			generative intelligence tool	artificial	
Adoption of generative artificial intelligence tools	The extent to which one uses the group of artificial intelligence tools that can produce ideas, content, and textual communication	AD1	I have adopted the usage of generative artificial intelligence tools for educational purposes	Self-Designed	
		AD2	Generative artificial intelligence tools has improve my academic writing skills		
		AD3	Generative artificial intelligence tools has improve my content creation and technological knowledge		
		AD4	Adoption of generative artificial intelligence has make my research/academic work error free		
		AD5	I am considering integrating generative artificial intelligence to my teaching and learning		
		AD6	I belief generative artificial intelligence if well managed can aid student's interest, motivation, curiosity and learning outcome		
		AD7	I will recommend generative artificial intelligence for future generation		
		AD8	Generative artificial intelligence tools reduces my phobia and anxiety on academic work		
Academic Anxiety	Writing	The degree of nervousness, unease or negative feeling of academic writer's when writing academic paper	ANX1	Writing an academic paper has my heart racing.	
			ANX2	Whenever I start working on a project or an article, my mind becomes blank.	Self-Designed
			ANX3	When writing under deadline or pressure, I quake.	

ANX4	I typically look for opportunities to write a project or an essay.
ANX5	When my project or piece is being evaluated, I worry and feel anxious.

Measurement Model Result (Discriminant and Convergent results)

Table 3: *Fornell Larcker discriminant correlations of the constructs*

Construct	Academic writing anxiety	Accessibility of generative artificial intelligence	Adoption of generative artificial intelligence tools
Academic Writing Anxiety	0.697		
Accessibility of generative artificial intelligence tools	0.601	0.597	
Adoption of generative artificial intelligence tools	0.775	0.494	0.697

Table 4: Convergent Validity of the first order constructs' measure

Construct	Cronbach Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Academic writing anxiety	0.786	0.848	0.486
Accessibility of generative artificial intelligence tools	0.572	0.689	0.356
Adoption of generative artificial intelligence tools	0.847	0.881	0.486

Findings

Table 5: *Mean and standard deviation table to answer research question*

Construct	Items' Code	Items' Description	Mean	Standard Deviation
Academic Writing Anxiety	ANX1	Writing an academic paper has my heart racing.	3.259	0.700
	ANX2	Whenever I start working on a project or an article, my mind becomes blank	3.503	0.878
	ANX3	When writing under deadline or pressure, I quake.	3.701	0.989

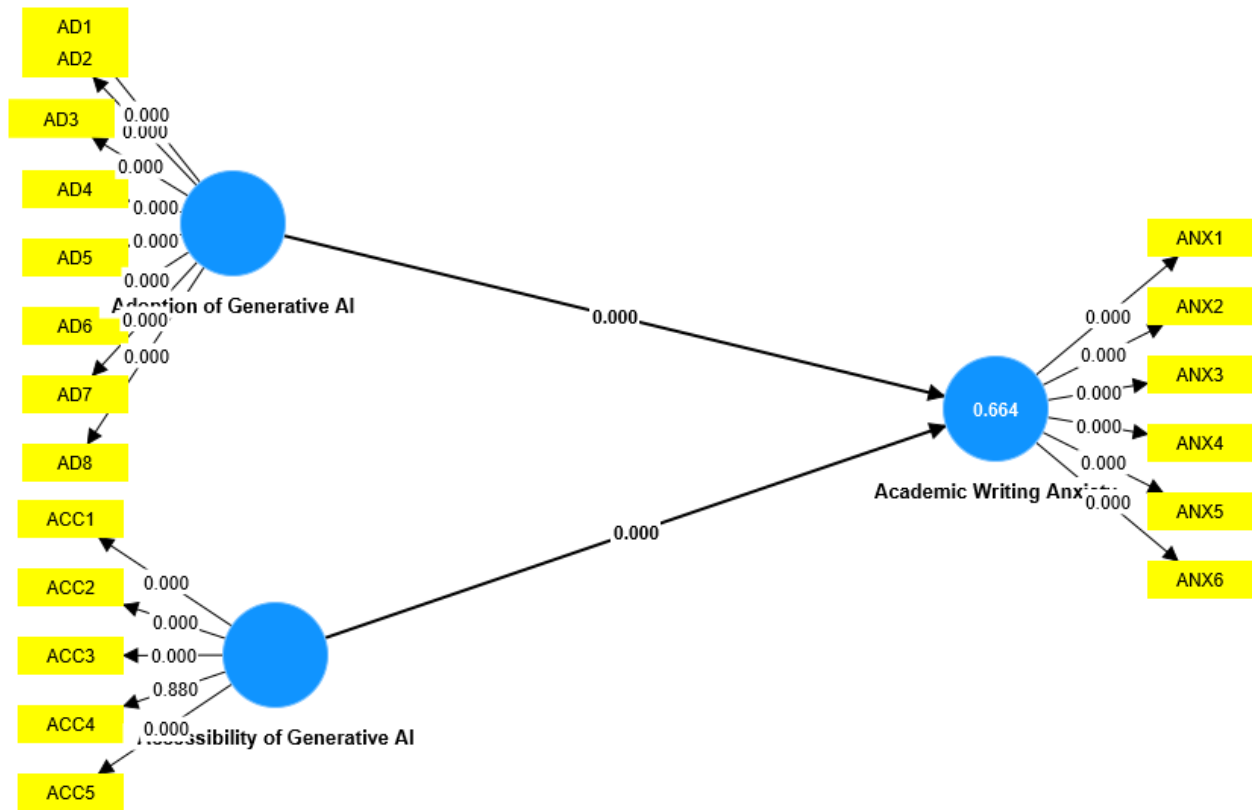
ANX4	I typically look for opportunities to write a project or an essay.	3.434	0.857
ANX5	When my project or piece is being evaluated, I worry and feel anxious	3.325	0.829

The outcome in table 5 explains the respondents' level of anxiety regarding academic writing. The research question is answered in the table, and it was discovered that the respondents' levels of academic writing anxiety were moderate and average.

Table 6: *Relationship result of first order latent variables (Accessibility and Adoption of generative intelligence tools) and academic writing anxiety.*

Path Relationship	Path Coefficient	Coefficient Mean	Remark	t-value	p-value	Remark
Accessibility of generative artificial intelligence tools-> Academic writing anxiety	0.289	0.294	Weak/Positive	5.061	0.000	H1 Retained
Adoption of generative artificial intelligence tools -> Academic writing anxiety	0.632	0.634	Substantial /Positive	12.209	0.000	H2 Retained

Table 6 above explains the link between respondents' accessibility to and adoption of generative artificial intelligence tools and academic writing anxiety. The relationship between the accessibility of generative AI tools and academic writing anxiety was favorable, weak, and significant. The relationship between the adoption of generative AI tools and academic writing anxiety was positive, large, and significant.



Discussion, Conclusion and Recommendation

The teaching-learning process, academic writing, and data analysis are just a few of the areas of life that generative artificial intelligence tools are transforming. In our digital age, fewer people than anticipated are aware of this most recent advancement. The ethical use of the generative AI tools will prevail and enhance the writers' academic writing and reduces the academic writing anxiety, nonetheless, with persistent sensitization and focused effort. The inference drawn from the findings showed that accessibility and adoption of generative artificial intelligence tools are significantly influenced and related to academic writing anxiety. The researchers came to the conclusion that the academic writer should take into account using generative artificial intelligence tools based on the results that were available.

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