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Perception of Generative Artificial Intelligence Technologies in Academic Writing among Postgraduate Students in South-South, Nigeria

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Abstract
This study examines the perception of generative artificial intelligence technologies in academic writing among postgraduate students in South-South, Nigeria. To actualize the objectives of the study, three research questions and hypotheses were formulated. The study adopted the descriptive survey research design. The population of this study comprised 30,489 postgraduate students in South-South, Nigeria. A sample size of 300 of the study population was drawn for the study. Simple random sampling technique was used to determine the sample size. The researcher developed instrument titled, "Perception of Generative Artificial Intelligence Technologies in Academic Writing Questionnaire (PGAITAWQ)" consisting of 30 items were developed and was used for data collection for the study. The questionnaire was structured on a four-point likert scale. Mean and standard deviation were used to answer the research questions and test the research hypotheses respectively. Findings of the study revealed that generative artificial intelligence technologies in academic writing were perceived positively by postgraduate students in South-South, Nigeria. Based on the findings of the study, it was recommended among others that postgraduate students should attend workshops organised by educational bodies on the ethical utilization of generative artificial intelligence technologies in academic writing.

Keywords: Generative Artificial Intelligence, Perception, Academic Writing.

Introduction

Generative Artificial Intelligence (GenAI) is quickly changing many facets of academia and academic writing is no exception for ethicial and efficient use, it is necessary to comprehend both the advantages and the constraints. However, it is crucial to understand both the benefits and limitations to ensure ethical and effective use. GenAI is a subset of AI that produces original content, such as human generated content, including text, images, music, and code. GenAI encompasses a group of machine learning algorithms designed to generate new data samples that mimic existing datasets. One of the foundational techniques in GenAI is the Variational Autoencoder (VAE), which is a type of neural network that learns to encode and decode data in a way that maintains its essential features (Kingma & Welling, 2023). Amidst the promises of GenAI integration, educators and policymakers must navigate a myriad of ethical and practical considerations concerns regarding data privacy, algorithmic bias, and the ethical use of AI loom large, necessitating robust frameworks and guidelines for responsible AI implementation in educational settings (Chan, 2023). GenAI tools ability to handle complex prompts and produce human-like output has led to research and interest into the integration of GenAI in various fields such as healthcare, education, media, and tourism.

In spite of its impressive ability, generative AI has been marred by ethical controversies. In particular, as generative AI models are trained on massive amounts of data available on the internet, there has been an ongoing debate regarding the ownership of this data (Vincent, 2022). Furthermore, as these tools continue to evolve, so does the challenge of identifying what is created by humans and what is created by an algorithm. However, GenAI tools (technologies) like ChatGPT, Google Bard(Gemini) and Microsoft Bing will only be contextualised in this research work.

ChatGPT (Chat Generative Pre-trained Transformer) has caused a surge of interest in the use of GenAI in higher education since its release in November 2022 (Hu, 2023). ChatGPT provides a straightforward textual interface as a natural language processing and question-answering system that allows users to quickly create simple and direct prompts, ask questions, and request the generation of different text types. It has a large and complex dataset that gives it the ability to learn and predict the next word in a sentence in an incredible way. ChatGPT retrieves information from various internet sources. It covers a wide range of subjects and can generate different information types such as essays, outlines, abstracts, reports etc (Shiri, 2023). The use of chatGPT raises concerns regarding assignments. Students may also become overly dependent on it which could result in a decline in original thought, self-directed learning, critical thinking abilities, and writing skills (Sun & Hoelscher, 2023).

Google Bard (Gemini) is Google's GenAI model that was built by the Google DeepMind AI research library. The Gemini model powered Google's Bard GenAI tool that launched in March 2023. Google rebranded Bard as Gemini in February 2024, several months after launching Gemini Advanced based on its new Ultra 1.0 large language model (LLM) foundation. Bard is an AI chatbot available as a free service from Google to a (rapidly growing) limited number of users. The former was achieved by filtering candidate responses. using a LaMDA classifier and data annotated by crowdworkers, the latter by enabling the model to consult external sourced, such as an information retrieval system, a language translator, and a calculator. Bard interacts with an external information retrieval system to improve the accuracy of facts provided to the user (Manyika, 2023: Collins & Ghahramani, 2023: Thappilan et al., 2022).

Bing AI is a GPT-powered AI developed by Microsoft. It is usually referres to as Bing chat and is available for free, as long as one has created a free Microsoft account. Initially, Bing was Microsoft's search engine like Google. After Google released their AI designated as Bard, Microsoft wasted no time and announced the Bing AI. Microsoft claims it has developed an advanced web-browsing experienc using conversational AI just like chatGPT or Google Bard (Eliacik, 2023: Mehdi, 2023). Additionally, this AI has been integrated with Microsoft internet browser Edge (formerly Internet Explorer) so that everyone with an internet connection and Microsoft Edge installed can access this AI right from the browser. Among other reasons why Bing AI is more convenient than other popular AIs are; it has more features and options, it uses GPT-4 while other AIs still use GPT-3.5, it can analyze or interpret images such as charts and tables.

Accessing students' perception involves identifying the processes through which individuals acquire information, interpret, organize or make sense of their environment(Tolentino, Cruz & Ablaza, 2022). Perception is an individual interpretation of something (Amir, Fediyanto, Rudyanto, Nur, & Tortop, 2020).Perception is the brain's capacity to transform incoming stimuli into the sense (Sugihartono, 2007). Perception is the experience of things, events, and connections that is gained through the continual gathering and interpretation of information (Rakhmat, 2000). Perception is a cognitive process that helps students to interpret and comprehend their environment (Kinicki & Kreitner, 2003). Perception is the process by which individuals choose, arrange, interpret, and retrieve information from their environment and then act upon it(Schermerhorn, Hunt, & Osborn, 2005). Perception is the process of organizing, recognizing and understanding the environmentwhich comprise of signs, symbols and objects. Factors that affect students' perceptions are perceived objects, sensory devices, nerves and centers of nerve structures and attention. Students' perceptions give positive impact on the quality of interaction and communication in teaching and learning activities (Yanti & Balikpapan, 2021). Students' perception of online learning can provide an understanding of the success of learners in their online learning (Harahap & Ratmanida, 2021). Perception is often conveyed in the form of ideas or action based on experience.

Academic writing is a formal understandable written expression of one's own evidence-based perspectives (University of Leeds, 2019) on a given topic, question or subject. Additionally, it is focused, impersonal, open-minded, objective, precise, clear, engaging, thorough and consistent with convention within its specific discipline (Hyland & Jiang, 2017, Lachowicz, 2018, Lowe & Willey, 2018 and Lin-Siegler, 2017).

Gender refers to the socially constructed roles, behviours and identities of male, female and gender-diverse people (Coen, Banister, 2012). It influences how people perceive themselves and each other, how they behave and interact and the distribution of power and resources in society. Gender is usually incorrectly conceptualized as a binary (male/female) factor. It is against this introduction that the researcher, therefore, seeks to examine the perception of generative artificial technologies in academic writing among postgraduate students in South-South, Nigeria.

Statement of the Problem

Students in higher institutions typically have been using a range of generative artificial intelligence tools in academic writing and have different thinking patterns. Students outsource their academic work in different ways and they spend less time to read and get to the key points as quickly as possible as well as the understanding of what they are searching for. (Polakova & Klimova, 2019). Academic writing have been one of the problems of students in higher institutions in Nigeria considering the current trend of generative artificial intelligence technologies tools. Most students see academic writing as being a tedious work thereby making them search for alternative ways that will make their academic work simple, driving them to the use of generative artificial intelligence tools in ther academic work such as assignment, seminar, project and so on by prompting and getting results and end up not

taking their time to read through the feedback gotten to ensure their ability to defend the work when need arises. It is against this background that the researcher was prompted to investigate students perception on the use of generative artificial intelligence tools in academic writing.

Purpose of the Study

The purpose of the study is to examine the perception of GenAI technologies in academic writing among postgraduate students in South-South, Nigeria. The study specifically aimed at the following objectives;

1. To determine the perception of chatGPT utilization in academic writing among postgraduate students in South-South Nigeria.
2. To determine the perception of Google Bard (Gemini) utilization in academic writing among postgraduate students in South-South Nigeria.
3. To determine the perception of Microsoft Bing utilization in academic writing among postgraduate students in South-South Nigeria.

Research Questions

The following research questions guided this study;

1. What is the perception of chatGPT utilization in academic writing among postgraduate students in South-South Nigeria?
2. What is the perception of Google Bard (Gemini) utilization in academic writing among postgraduate students in South-South Nigeria?
3. What is the perception of Microsoft Bing utilization in academic writing among postgraduate students in South-South Nigeria?

Research Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant difference in the mean response of male and female postgraduate students on the perception of chatGPT utilization in academic writing.
2. There is no significant difference in the mean response of male and female postgraduate students on the perception of Google Bard (Gemini) utilization in academic writing.
3. There is no significant difference in the mean response of male and female postgraduate students on the perception of Microsoft Bing utilization in academic writing.

Methodology

Design of the study

The descriptive survey research design was used for the study. Nassaji (2015) stated that descriptive research is the research design in which data is a collected in a qualitative manner and analyzed using quantitative procedures.

Area of the study

The study was conducted in south-south geo-political zone of Nigeria which is made up of six states, namely; Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers State located within latitude 6.2059^0N and longitude 6.6959^0E of the Greenwich meridian. There are six Federal Universities within the south-south that offer postgraduate courses namely; University of Uyo, Uyo; Federal University, Otuoke; University of Calabar, Calabar; University of Benin, Benin; Federal University of Petroleum Resources, Effurum and University of Port Harcourt, Port Harcourt. The south-south geo-political zone has a lot of natural resources such as arable lands, solid materials, oil and gas.

Population of the study

The population of the study consisted of all the postgraduate students in Federal Universities in south-south, Nigeria.

Sample size and sampling techniques

The sample of the study was determined using Taro Yamne with the combination of sample random sampling of postgraduate students in Federal Universities in south-south, Nigeria.

Instrumentation

The researcher developed instrument titled "Perception of Generative Artificial Intelligence Technologies in Academic Writing Questionnaire (PGAITAWQ)". This questionnaire was used for collection of data for the study which consisted of 30 items on perception of generative artificial intelligence technologies in academic writing.

Validation of the Instrument

The instrument was face validated by three experts from the Department of Computer and Robotics Education in the University of Uyo. The correction was effected before the final version of the instrument was sent out for data collection.

Reliability of the Instrument

The reliability coefficient of 0.85 was obtained using Cronbach's Coefficent Alpha method for the reliability of the instrument.

Method of Data Collection

The researcher enlisted the services of six briefed research assistance in administering the instrument to the respondent via google forms.

Method of Data Analysis

Mean and standard deviation was used to answer the research questions while Independent T-test was used to test the Research hypotheses at 0.05 level of significance.

Decision Rule

The mean and standard deviation was used to answer the research question;

3.50	-	4.00	Strongly Agree (SA)
2.50	-	3.49	Agree (A)
1.50	-	2.49	Strongly Disagree (SD)
0.00	-	1.49	Disagree (D)

For the research question, the mean response of 2.5 and above was regarded as positive perception while below 2.5 was regarded as negative perception. For the research hypotheses, when the p-value is less than 0.05 level of significance, the null hypotheses was rejected. When the p-value is greater than the 0.05 level of significance, the null hypotheses was accepted.

Result

Research Question 1

What is the perception of chatGPT utilization in academic writing among postgraduate students in South-South Nigeria?

Table 1: Mean analysis of the perception of chatGPT utilization in academic writing among postgraduate students

S/N	Items	SA	A	D	SD	Mean
1.	I have heard of chatGPT.	152	103	31	14	3.29
2.	I understand how chatGPT works.	90	47	133	30	2.13
3.	I have concerns about the ethical implications of using chatGPT in my academic writing.	98	101	61	42	2.51
4.	I find chatGPT helpful in generating better research findings.	102	133	41	24	2.73
5.	I trust chatGPT has affected my approach to academic writing.	112	93	71	24	2.84
6.	I have used chatGPT.	100	135	48	17	2.62
7.	I trust that chatGPT will reduce the amount of time I spend on carrying out research.	150	100	36	14	3.10
8.	I trust that chatGPT is a very useful tool for academic writing.	97	100	60	43	2.58
9.	I trust chatGPT to be user-friendly.	130	123	32	15	2.98
10.	I trust chatGPT provides relevant information.	155	105	30	10	3.30

Table 1 shows that majority of the respondents trust chatGPT provides relevant information with (x = 3.30), followed by heard of chatGPT (x = 3.29). Respondents trust that chatGPT will reduce the amount of time I spend on carrying out research with (x = 3.10), trusting chatGPT to be user-friendly with (x = 2.98), trusted chatGPT has affected my approach to academic writing with (x = 2.84) and (x = 2.73) for find chatGPT helpful in generating better research findings. On the other hand, understanding how chatGPT works

has the lowest mean with (x = 2.13). As seen from the analysis in Table 1, postgraduate students generally have positive perceptions of chatGPT utilization in academic writing.

Research Question 2

What is the perception of Google Bard (Gemini) utilization in academic writing among postgraduate students in South-South Nigeria?

Table 2: Mean analysis of the perception of Google Bard(Gemini) utilization in academic writing among postgraduate students

S/N	Items	SA	A	D	SD	Mean
1.	I have heard of Bard.	152	100	37	10	3.13
2.	I believe Bard has positively impacted my research productivity.	89	48	100	63	2.09
3.	I find Bard to be user-friendly.	95	102	62	43	2.59
4.	I trust the suggestions provided by Bard.	102	131	42	25	2.88
5.	I feel Bard has enhanced the overall quality of my academic writing.	110	95	69	26	2.96
6.	I trust the quality of text generated by Bard is high.	101	133	49	19	2.69
7.	I trust Bard is a useful tool for generating text for academic writing.	150	100	36	14	3.28
8.	I trust Bard provides relevant information.	99	102	40	63	2.61
9.	I feel Bard has affected my approach to academic writing.	119	133	32	16	3.08
10.	I have concerns about the use of Bard in academic writing.	150	110	26	14	3.10

Table 2 shows that majority of the respondents trust Bard is a useful tool for generating text for academic writing with (x = 3.28), followed by heard of Bard (x = 3.13). Respondents have concerns about the use of Bard in academic writing with (x = 3.10), feel Bard has affected my approach to academic writing with (x = 3.08), feel Bard has enhanced the overall quality of my academic writing with (x = 2.96) and (x = 2.88) for trusting the suggestions provided by Bard. On the other hand, believing Bard has positively impacted my research productivity has the lowest mean with (x = 2.09). As seen from the analysis in Table 2, postgraduate students generally have positive perceptions of Bard utilization in academic writing.

Research Question 3

What is the perception of Microsoft Bing utilization in academic writing among postgraduate students in South-South Nigeria?

Table 3: Mean analysis of the perception of Microsoft Bing utilization in academic writing among postgraduate students

S/N	Items	SA	A	D	SD	Mean
1.	I am familiar with Bing interface.	151	102	30	17	3.21
2.	I have concerns about the ethical implications of using Bing in my academic writing.	91	46	131	32	2.18
3.	I trust Bing has facilitated the integration of diverse research perspectives.	99	100	60	43	2.56
4.	I trust Bing have reduced the time required for carrying out research.	101	133	42	24	2.72
5.	I trust Bing has improved the overall structure of my academic writing.	109	96	69	26	2.98
6.	I think Bing will replace human writers.	101	133	47	21	2.68
7.	I feel more confident in conducting research using Bing.	150	100	34	16	3.26
8.	I trust Bing has affected my ability to develop critical thinking skills.	99	102	38	65	2.59
9.	I trust Bing has contributed to increasing the impact of my academic writing.	119	133	30	18	3.06
10.	I trust Bing has simplified the process of academic writing.	150	110	24	16	3.08

Table 3 shows that majority of the respondents feel more confident in conducting research using Bing with (x = 3.26), followed by familiar with Bing interface (x = 3.21). Respondents trust Bing has simplified the process of academic writing with (x = 3.08), trust Bing has contributed to increasing the impact of my academic writing with (x = 3.06), trust Bing has improved the overall structure of my academic writing with (x = 2.98) and (x = 2.72) for trusting Bing have reduced the time required for carrying out research. On the other hand, have concerns about the ethical implications of using Bing in my academic writing has the lowest mean with (x = 2.18). As seen from the analysis in Table 3, postgraduate students generally have positive perceptions of Bing utilization in academic writing.

Fig 1: Mean analysis of the perception of generative AI tools in academic writing among postgraduate students.

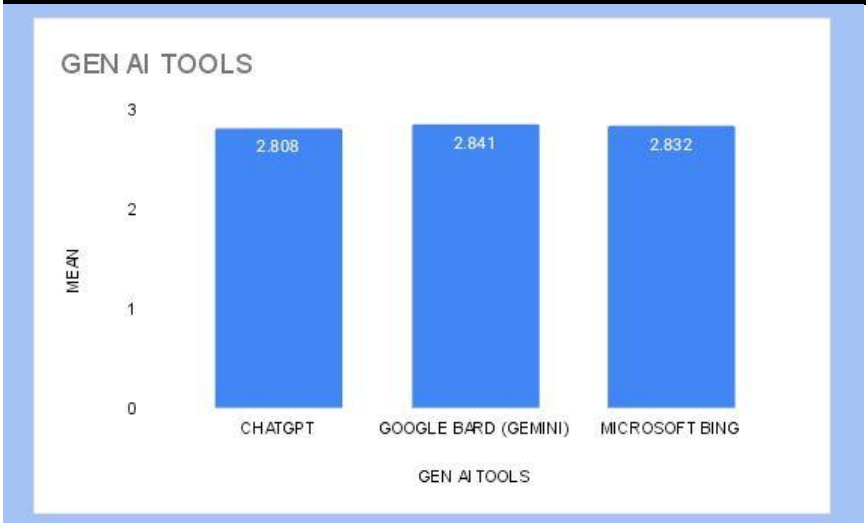

Fig 1 presents the chart of mean analysis of the perception of Generative AI tools in academic writing among postgraduate students.. The mean analysis of the Generative AI tools (chatGPT, Google Bard (Gemini), and Microsoft Bing) were 2.808, 2.841 and 2.832 respectively.

Research Hypothesis 1

There is no significant difference in the mean response of male and female postgraduate students on the perception of chatGPT utilization in academic writing.

Table 4: t-test analysis of mean response of male and female postgraduate students on the perception of chatGPT utilization in academic writing

Variable	N	Mean	SD	df	t-value	p-value	Decision
Female	192	2.66	0.26				
				298	2.82	0.66	NS
Male	108	2.72	0.25				

NS = Not significant

Table 4 presents the t-test of male and female postgraduate students on the perception of chatGPT utilization in academic writing. The mean responses of the male students were 2.72 and 2.66 for the female students. The t-value was 2.82 and the p-value was 0.66. The p-value is greater than the 0.05 level of significance. This indicates that there is statistically no significant difference in the mean response of male and female postgraduate students on the perception of chatGPT utilization in academic writing, ($t = 2.82$, $df = 298$, $p = 0.66$). Hence, Hypothesis 1 was upheld. Therefore, there is no significant difference in the mean response of male and female postgraduate students on the perception of chatGPT utilization in academic writing.

Research Hypothesis 2

There is no significant difference in the mean response of male and female postgraduate students on the perception of Google Bard (Gemini) utilization in academic writing.

Table 5: t-test analysis of mean response of male and female postgraduate students on the perception of Bard utilization in academic writing

Variable	N	Mean	SD	df	t-value	p-value	Decision
Female	192	2.78	0.30				
				298	2.35	0.62	NS
Male	108	2.76	0.29				

NS = Not significant

Table 5 presents the t-test of male and female postgraduate students on the perception of Bard utilization in academic writing. The mean responses of the male students were 2.76 and 2.78 for the female students. The t-value was 2.35 and the p-value was 0.62. The p-value is greater than the 0.05 level of significance. This indicates that there is statistically no significant difference in the mean response of male and female postgraduate students on the perception of Bard utilization in academic writing, (t = 2.35, df = 298, p = 0.62). Hence, Hypothesis 2 was upheld. Therefore, there is no significant difference in the mean response of male and female postgraduate students on the perception of Bard utilization in academic writing.

Research Hypothesis 3

There is no significant difference in the mean response of male and female postgraduate students on the perception of Microsoft Bing utilization in academic writing.

Table 6: t-test analysis of mean response of male and female postgraduate students on the perception of Bing utilization in academic writing

Variable	N	Mean	SD	df	t-value	p-value	Decision
Female	192	2.56	0.29				
				298	2.01	0.71	NS
Male	108	2.52	0.27				

NS = Not significant

Table 6 presents the t-test of male and female postgraduate students on the perception of Bing utilization in academic writing. The mean responses of the male students were 2.52 and 2.56 for the female students. The t-value was 2.01 and the p-value was 0.71. The p-value is greater than the 0.05 level of significance. This indicates that there is statistically no significant difference in the mean response of male and female postgraduate students on the perception of Bing utilization in academic writing, (t = 2.01, df = 298, p = 0.71). Hence, Hypothesis 3 was upheld. Therefore, there is no significant difference in the mean response of male and female postgraduate students on the perception of Bing utilization in academic writing.

Fig 2: Mean response of male and female postgraduate students on the perception of generative AI tools in academic writing

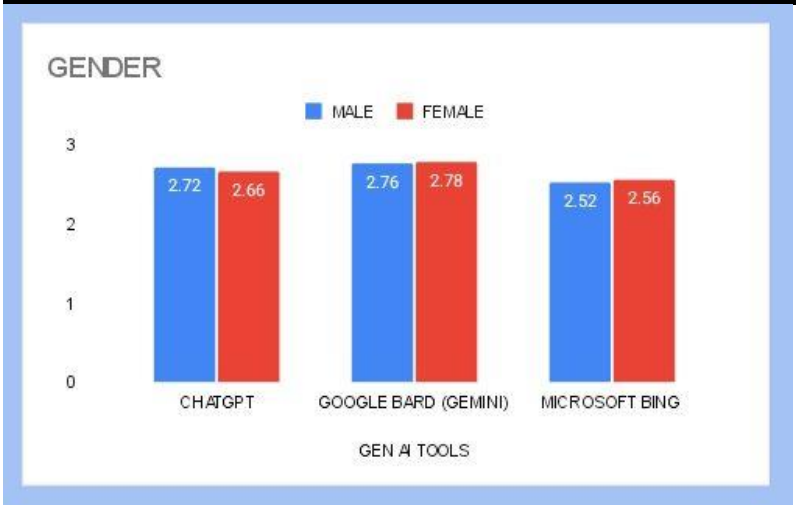

Fig 2 presents the chart of mean response of male and female postgraduate students on the perception of generative AI tools in academic writing. The mean responses of the male students were 2.72, 2.76 and 2.52 while for the female students were 2.66, 2.78 and 2.56 respectively.

Discussion of Findings

The results of testing hypothesis 1 revealed no significant difference in the mean response of male and female postgraduate students on the perception of chatGPT utilization in academic writing. Also data analysis on research question 1 revealed that postgraduate students generally have positive perceptions of chatGPT utilization in academic writing. Findings of the study are consistent with the research by Sun & Holes her (2023) who buttresses this finding when stated that students may also become overly dependent on it which could result in a decline in original thought, self-directed learning, critical thinking abilities, and writing skills.

The results of testing hypothesis 2 revealed no significant difference in the mean response of male and female postgraduate students on the perception of Google Bard (Gemini) utilization in academic writing. Also data analysis on research question 1 revealed that postgraduate students generally have positive perceptions of Google Bard (Gemini) utilization in academic writing. In support of this findings is Manyika (2023) who found that Bard interacts with an external information retrieval system to improve the accuracy of facts provided to the user.

The results of testing hypothesis 3 revealed no significant difference in the mean response of male and female postgraduate students on the perception of Microsoft Bing utilization in academic writing. Also data analysis on research question 1 revealed that postgraduate students generally have positive perceptions of Microsoft Bing utilization in academic writing. Findings of the study are consistent with the research by Eliacik(2023) who buttresses this finding that Microsoft developed an advanced web-browsing experience using conversational AI just like chatGPT or Google Bard which is Bing.

Conclusion

As revealed from the findings of this study, the researcher drew these conclusions: No difference exists in postgraduate students perception of generative artificial intelligence technologies in academic writing. There is no significant difference between postgraduate students perception of generative artificial intelligence technologies utilization in academic writing in South-South, Nigeria.

Recommendations

Based on the findings and conclusion reached, the following recommendations are made:

1. Postgraduate students should attend workshops organized by educational bodies on the ethical utilization of generative artificial intelligence technologies in academic writing.
2. Postgraduate students should develop interest towards academic writing.

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