

The Impact of AI-Assisted Learning Tools on Students' Academic Writing Performance

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ABSTRACT: This study explores how students' perceptions of AI-supported learning tools are related to their academic writing outcomes, and how responsible and ethical use of AI can directly predict these outcomes. The research design used was quantitative correlational research design. A sample of 204 undergraduate and postgraduate students from public and private universities in Pakistan was selected for collecting data using a structured questionnaire which was rated on a five-point Likert scale. The instrument assessed three constructs: AI-Assisted Writing Perceptions (AIWPS), Academic Writing Performance (AWPS), and Ethical and Responsible AI Writing Use (ERAIWUS). Pearson correlation and multiple regression of statistical analysis were performed. The findings showed that students' perceptions of the AI-assisted writing tools were positively correlated with the academic writing performance ($r = .800$, $p < .001$). There was also a strong positive correlation between ethical and responsible use of AI and academic writing performance ($r = .503$, $p < .001$). Multiple regression analysis was performed to determine if both variables explained a significant portion of the variance in academic writing performance. Both variables were found to be significant and together accounted for 64.9% of the academic writing performance variance ($R^2 = .649$, $F(2, 201) = 185.82$, $p < .001$). The study findings suggest that AI-powered learning tools can be successfully used to support students' academic writing abilities in an ethical and responsible way. The results underscore the need to foster responsible use of AI in the educational context to enhance the potential value of AI technologies and preserve academic integrity.

KEYWORDS: Artificial Intelligence (AI), AI-Assisted Writing Tools, Academic Writing Performance, Ethical AI Use, Responsible AI Practices, Higher Education, Pakistan

Introduction

The use of AI (artificial intelligence) in education has been a game-changer and a formidable force that has revolutionized the way academic writing is done. Students are now being helped by AI-based tools like ChatGPT, Grammarly, and automated writing evaluation (AWE) systems in generating ideas, correcting grammar, structuring sentences, paraphrasing, and revising their structures. The benefits of these tools are evident in an academic environment that has high expectations of academic writing, such as higher education, where students are expected to write regularly but may lack the capacity to write a research paper or a research project. In post-secondary institutions, the expectations for student writing are more demanding and complex (e.g. a research paper or research

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projects) and are often challenging for students to meet. These tools have great advantages in terms of accessibility, timely feedback, and assistance in writing (Krause et al., 2025; Zou & Huang, 2023). With the introduction of AI-integrated tools into students' academic journey, the study of the correlation between using these tools and students' writing has been a hot topic for academic research.

AI has great potential to assist with academic writing, but also brings its own challenges. While the benefits of AI tools for grammar, coherence, and vocabulary usage have been confirmed (Kim et al., 2024; Li et al., 2024), ethical concerns regarding cheating, dependence, and misuse have become prominent in recent times (Chkarka & Fatmi, 2025; Han, 2025). But without critical analysis, students might end up plagiarizing and compromising the originality and authenticity of their academic work with AI. Teachers and administrators will have to navigate the trade-offs between the benefits of using AI for writing and ensuring students' intellectual independence and integrity in learning.

Current studies have focused mainly on the benefits of using AI in specific aspects of writing, such as grammar, or on how AI helps to complete tasks quicker or more efficiently (Mekheimer, 2025; Tsai et al., 2024). Less focus has been placed on the relationship between students' overall perceptions of AI-supported writing tools and overall academic writing productivity, as well as the students' moral stance on the use of AI directly impacting academic writing. Research in the field of the use of AI in educational institutions has not been defined in South Asia, particularly in Pakistan, where AI has not been implemented well in educational institutions and digital literacy among students is very unequal (Daoudi, 2025; Shahzad et al., 2025).

To address this, the current study looks at students' perceptions of the support of AI tools in academic writing and their relationship to students' academic writing performance, and the direct predictive impact of ethical and responsible use of AI in academic writing. The aim of the study is to provide empirical evidence for the education, curriculum and policy community to inform their efforts related to the responsible integration of AI in higher education. The findings add to the existing body of research on the application of AI in education, offering practical lessons for developing frameworks to integrate AI into the educational landscape, thereby enhancing teaching and learning while ensuring academic integrity.

Research Objectives

The following objectives were the intent of the study:

- ▶ To explore students' attitudes towards AI tools for writing in higher education.
- ▶ To explore the link between students' perceptions of the AI-supported writing tools and students' academic writing performance.
- ▶ To explore the direct predictive relationship between ethical and responsible use of AI writing tools in the academic context and academic writing performance.
- ▶ To examine the interaction between the writing perceptions of AI and ethical use of AI on academic writing performance.

Research Hypotheses

Based on the theoretical framework and an examination of empirical literature, the following research hypotheses were developed:

H₁: There is a strong positive relation between students' perceptions of AI writing tools and their academic writing performance.

H₂: There is a strong positive correlation between the use of ethical and responsible AI writing and academic writing performance.

H₃: Both AI-assisted writing perceptions and ethical and responsible AI writing jointly and significantly predict academic writing performance

Problem Statement

As artificial intelligence tools continue to evolve and become more prevalent across the educational landscape, students are using these tools throughout their academic writing processes from ideation to drafting, revising, and editing. This integration brings some benefits in terms of efficiency but also poses deep ethical and impact questions as to whether and how the use of AI affects students' written academic output. While some empirical research has touched on this topic, those studies have not explicitly studied the link between students' perceptions and their ethical orientations towards using AI tools, nor the combined effect of these on students' academic writing performance, specifically in non-Western settings. This study aims to fill this gap and offers quantitative evidence from a Pakistani university context.

Significance of the Study

This study has a few contributions to the existing literature. First, it provides empirical information regarding the correlation between the perceptions of these AI tools, their ethical utilization, and academic writing in an environment where it is underrepresented in the international literature. Second, it demonstrates that the perceptions of these AI tools affect the ethical use of the tools and/or academic writing. Second, the study takes an operationalization approach and introduces an ethical and responsible use of AI as an additional variable to be included in the measurement of writing performance, which goes beyond technical aspects into ethical and behavioral aspects of engagement with AI. Third, the study results give realistic guidance for educators and institutions seeking to create an AI literacy training and ethical utilization policy that can enhance the academic advantages and guard academic integrity.

Literature Review

AI technologies have been introduced into higher education, and a large volume of research articles have appeared on the subject. There is a wealth of research papers on AI technologies in higher education, and the numbers are increasing. The effect of AI tools on students' motivation, writing, language development, and academic performance has been investigated. Concurrently, a new literature has started to challenge the moral aspects of the use of AI in academia. The most important theoretical and empirical contributions that inform the work for the current study are outlined in the following subsections.

AI-Assisted Writing Perceptions

Student perceptions of AI tools in writing are the students' opinions, feelings and experiences about the tools and technologies, such as ChatGPT, Grammarly or automated writing evaluations, used to support writing. Researchers have suggested that the most salient factor in the decision to adopt and continue using a technology is PUE, based on Davis' (1989) technology acceptance model. The greater the students' sense of usefulness and friendliness, the more likely they are to use AI writing tools in a systematic manner in their academic writing (Al-Emran et al., 2025; Ngo et al., 2024; Zhu et al., 2025).

At the practical level, there are countless claims of the benefits of AI writing tools. The students articulate that AI tools have helped them brainstorm ideas, add more words to their vocabulary, paraphrase, enhance their grammar and direct their ideas to help them structure academic arguments (Abdullah, 2025; Kim et al., 2024; Li et al., 2024). The use of AI writing tools has been linked to positive writing experiences, such as enhanced writing confidence, decreased anxiety, and improved writing self-efficacy (Huang & Mizumoto, 2024; Yang et al., 2025). The findings suggest that attitudes towards the AI tools might be related to involvement in academic textual tasks, which in turn may influence performance.

The dependent variables in this study are the perceptions of writing with AI and are conceptualized as perceived usefulness, satisfaction with using AI to write, ease of use, and motivational engagement.

Academic Writing Performance

AI-assisted learning academic writing performance is academic writing performance that focuses on the students' written output in terms of linguistic accuracy, organizational coherence, argument development, vocabulary precision, revision practices, and overall writing proficiency based on the students' performance (Mekheimer, 2025; Nguyen et al., 2024). Current research has gone beyond crude grade-level assessment to develop a more complex notion of writing that takes into account the surface characteristics of writing, as well as the underlying thought processes involved in writing.

This has been demonstrated in many experimental and quasi-experimental research studies to improve many aspects of writing. Students who have used AI feedback tools have made fewer grammatical errors, stronger arguments, and had more coherent paragraph structures than students who have revised without AI feedback (Li et al., 2024; Zhao, 2025a). Iterative writing revision using AI has been correlated to the enhancement of writing fluency, critical argumentation, and reflective reading (Aaron et al., 2025; Chang et al., 2025; Tsai et al., 2024). The findings support the hypothesis, as they indicate that there is a positive relationship between the perception of the AI tools and academic writing performance.

Responsive and Ethical AI Writing Usage

Researchers are increasingly investigating ethical concerns with the use of AI in academic writing. Ethical and responsible AI writing practices involve students' knowledge of the norms of academic integrity, their understanding of how they can become dependent on AI-generated content, their ability to critically consider and selectively use AI-generated content inputs, and their interest in preserving the originality and authenticity of their voice and writing in their academic endeavors (Barrot, 2025; Chkarka & Fatmi, 2025; Zhang et al., 2024).

Issues discussed in the literature today about the use of AI in academic writing encompass plagiarism, unclear and multiple authorship, missing citations, and the generation of routine and formulaic academic texts with little analytical content or imagination (Alawamleh et al., 2026; Gustilo et al., 2024). Academic stress was also found to correlate positively with the belief in using AI without critical thinking, and social norms and internalized ethical values were found to moderate the relationship (Giray et al., 2025; Qu & Wang, 2025). But if a student uses AI as a tool to think through, they are likely to be more morally engaged, more able to think critically, and more successful in writing (Nguyen et al., 2024; Han, 2025).

In this current research, ethical and responsible AI writing use is defined as an independent predictor of academic writing performance, which is the behavioral and attitudinal aspect of students' AI use.

Theoretical Framework, Technology Acceptance Model

The study is based on the Technology Acceptance Model (TAM) proposed by Davis (1989), which specifies perceived usefulness and perceived ease of use as the main factors affecting people's acceptance and use of information technologies. TAM has been extensively used in educational contexts to shed light on students' usage of digital learning tools such as AI writing tools (Anik et al., 2025; Ngo et al., 2024). Student perception of the usefulness and user-friendliness of AI writing tools should motivate them to use the tools more often, which could lead to better academic writing outcomes in the framework of the TAM model.

TAM, however, doesn't have an explicit focus on the ethical aspects of technology usage. Since the consequences of technology adoption are not only shaped by the perceived affordances but also by the ethical and responsible utilization of the technology by its users (Chkarka & Fatmi, 2025; Han, 2025), this study is designed to add the construct of ethical and responsible use as a unique and complementary variable to academic writing performance.

Methodology

Research Design

A quantitative correlational research design was used. This design was selected as it could be used to investigate the relationship or cause of the relationship between two numerical variables without changing the experimental conditions. The research approach is positivist, and the research method is deductive, where the aim is to test the hypothesis, which is derived from theory, with the empirical data that has been collected. It was a cross-sectional design with all data collected at one time.

Population and Sample

The subjects of the study were the undergraduate and postgraduate students from higher education Institutions in Pakistan. A convenience sampling strategy was employed, as time and access constraints prevented us from conducting a random sampling approach. A total of 204 students from different public and private universities and different degree programs reported back adequately for the statistical analyses to be carried out.

Instrumentation

Data were obtained from the structured questionnaire developed by the researcher, which consisted of three scales. A 5-point Likert scale was used to score all items (1 = Strongly Disagree, 5 = Strongly Agree). Three scales were constructed: (a) the AI-Assisted Writing Perception Scale (AIWPS) consisting of 13 items to measure perceived usefulness, ease of use, satisfaction, and motivational engagement with AI writing tools (Abdullah, 2025; Kim et al., 2024; Ngo et al., 2024); (b) the Academic Writing Performance Scale (AWPS) consisting of 14 items to measure linguistic accuracy, organizational coherence, vocabulary use, revision behavior, and overall writing proficiency (Mekheimer, 2025; Nguyen et al., 2024; Tsai et al., 2024; Zhao, 2025b); and (c) the Ethical and Responsible AI Writing Use Scale (ERAIWUS) consisting of 10 items that assess awareness of academic integrity risks, dependency management, originality preservation, and ethical decision making in using AI writing tools (Abdullah, 2025; Barrot, 2025). To ensure content validity, the panel of experts was consulted, and to ensure internal consistency, reliability analysis was conducted.

The internal consistency of the Scale was verified by calculating the Cronbach's alpha coefficient for each of the three scales. All scales had satisfactory to good reliability, with the majority of scores being above the accepted value of $\alpha = .70$, as indicated in Table 1.

Table 1
Reliability Statistics for Study Scales

Scale	No. of Items	Cronbach’s Alpha
AI-Assisted Writing Perceptions (AIWPS)	13	.890
Academic Writing Performance (AWPS)	14	.898
Ethical and Responsible AI Writing Use (ERAIWUS)	10	.772

Note. All values exceed the accepted threshold of $\alpha = .70$.

Data Collection

Students from the participating universities answered the questionnaire online. Participation was 100% voluntary and anonymous. All participants gave informed consent before the data were collected. To make the items clear and suitable for the main test, a pilot test was carried out.

Data Analysis and Findings

Descriptive and inferential statistics were used to analyze all data. Demographic and scale-level features of the sample were described using descriptive statistics. Cronbach's alpha was used to test the internal consistency of each scale. Bivariate relationships of the study variables were examined with Pearson correlation, and multiple regression was used to examine the combined effect of the study variables: AIWPS and ERAIWUS on AWPS. A p-value of 0.05 was chosen as the cut-off for statistical significance. The results of the statistical analyses performed to answer the research objectives and test the hypotheses are presented in this section. Data are described and presented by type of analysis (demographic characteristics, reliability, descriptive statistics, Pearson correlation analysis, and multiple regression analysis).

Demographic Characteristics

204 people responded to the study. The majority were female ($n = 138$, 67.6%), with male respondents comprising 30.4% ($n = 62$) and 2.0% ($n = 4$) preferring not to disclose gender. The largest age group was 20–25 years (43.1%), followed by 26–30 years (36.3%), 31–35 years (10.3%), 36–40 years (6.9%), and above 40 years (3.4%). Table 2 shows that the majority of the respondents were studying undergraduate (30.9%) and MPhil (27.9%) courses, etc.

Table 2

Demographic Profile of Respondents (N = 204)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	138	67.6
	Male	62	30.4
	Prefer not to say	4	2.0
Age (years)	20–25	88	43.1
	26–30	74	36.3
	31–35	21	10.3
	36–40	14	6.9
	Above 40	7	3.4
Degree Program	BS/Undergraduate	63	30.9
	MPhil	57	27.9
	Subject-Specific Programs	71	34.8
	MS/MSc	5	2.5
	LLB	5	2.5
	PhD	3	1.5
Total		204	100.0

Descriptive Statistics

Descriptive statistics for the three composite variables are reported in Table 3. Participants reported high mean scores on all three scales, indicating generally positive perceptions of AI-assisted writing tools, favorable academic writing outcomes, and a moderate-to-high level of ethical AI use awareness.

Table 3*Descriptive Statistics of Study Variables (N = 204)*

Variable	M	SD	Per-Item M
AI-Assisted Writing Perceptions (AIWPS)	51.08	7.71	3.93
Academic Writing Performance (AWPS)	54.49	8.22	3.89
Ethical and Responsible AI Writing Use (ERAIWUS)	38.17	5.28	3.82

Inferential Statistics

H₁: There is a strong positive relation between students' perceptions of AI writing tools and their academic writing performance.

Table 4*Pearson Correlation Matrix for Study Variables*

Variable	1. AIWPS	2. AWPS	3. ERAIWUS
1. AIWPS	—	.800**	.526**
2. AWPS	.800**	—	.503**
3. ERAIWUS	.526**	.503**	—

Note. ** $p < .01$ (two-tailed). N = 204.

Pearson correlation analysis was conducted to examine the bivariate relationship between AI-Assisted Writing Perceptions (AIWPS) and Academic Writing Performance (AWPS). The analysis showed a strong positive correlation between AIWPS and AWPS ($r = .800$, $p < .001$), supporting H₁.

H₂: There is a strong positive correlation between the use of ethical and responsible AI writing and academic writing performance.

As shown in Table 4, a moderate positive correlation was found between AWPS and ERAIWUS ($r = .503$, $p < .001$), which was consistent with H₂. AIWPS was also highly correlated with ERAIWUS ($r = .526$, $p < .001$).

H₃: Both AI-assisted writing perceptions and ethical and responsible AI writing jointly and significantly predict academic writing performance

Table 5*Simple Regression: AIWPS as Predictor of Academic Writing Performance*

Predictor	B	SE B	β	t	p	R ²
Constant	10.893	2.328	—	4.679	.000	
AIWPS	0.853	0.045	.800	18.937	.000	.640

Note. $F(1, 202) = 358.60$, $p < .001$. Dependent variable: Academic Writing Performance (AWPS).

Multiple regression analysis was used to investigate the simultaneous prediction of academic writing performance by AIWPS and ERAIWUS. To determine the independent predictive contribution of AIWPS, a simple regression was first run. As shown in Table 5, AIWPS alone explained 64.0% of the variance in academic writing performance ($R^2 = .640$), with a highly significant standardized regression coefficient ($\beta = .800$, $t = 18.937$, $p < .001$). The addition

of ERAIWUS in the multiple regression model (Table 6) produced a model that jointly explained 64.9% of the variance ($R^2 = .649$, $\text{Adj-}R^2 = .646$, $F(2, 201) = 185.82$, $p < .001$). AIWPS remained the dominant predictor ($\beta = .740$, $t = 15.064$, $p < .001$), while ERAIWUS contributed a statistically significant independent increment ($\beta = .114$, $t = 2.311$, $p = .022$). These results support H_3 .

Table 6

Multiple Regression: AIWPS and ERAIWUS as Joint Predictors of Academic Writing Performance

Predictor	B	SE B	β	t	p	R^2	Adj- R^2
Constant	7.398	2.756	—	2.685	.008		
AIWPS	0.790	0.052	.740	15.064	.000	.649	.646
ERAIWUS	0.177	0.077	.114	2.311	.022		

Note. $F(2, 201) = 185.82$, $p < .001$. $\Delta R^2 = .009$ for ERAIWUS; $F(1, 201) = 5.339$, $p = .022$. Dependent variable: AWPS.

As shown in Table 5, AIWPS alone explained 64.0% of the variance in academic writing performance ($R^2 = .640$), with a highly significant standardized regression coefficient ($\beta = .800$, $t = 18.937$, $p < .001$). The addition of ERAIWUS in the multiple regression model (Table 6) produced a model that jointly explained 64.9% of the variance ($R^2 = .649$, $\text{Adj-}R^2 = .646$, $F(2, 201) = 185.82$, $p < .001$). AIWPS remained the dominant predictor ($\beta = .740$, $t = 15.064$, $p < .001$), while ERAIWUS contributed a statistically significant independent increment ($\beta = .114$, $t = 2.311$, $p = .022$). These results support H_3 .

Discussion

The study strongly validated all three research hypotheses and provided useful insights on the effects of the use of writing tools supported by AI systems and the ethics of using AI on academic writing performance of higher education students in Pakistan. The relation between students' perceptions of the usefulness, satisfaction, and motivational engagement of the AI-assisted writing tools and their academic writing performance is quite strong and positive, and the simple regression model has a high percentage of explained variance, suggesting that students who perceive these tools as useful, satisfying and motivationally engaging are significantly more likely to perform well with academic writing. It agrees with the Technology Acceptance Model (TAM) (Davis, 1989) that states that perceived usefulness is significant towards technology's acceptance and implementation in practice. Students have improved their use of AI tools as a genuine writing aid, and they are now using them as such more often and with greater intent, thereby improving the quality of their writing (Kim et al., 2024; Li et al., 2024; Yang et al., 2025). The findings are parallel with the results by Shahzad et al., who determined that there was a positive correlation between students' engagement with generative AI and their academic performance outcomes, and the results by Abdullah (2025), who found that students' perceived usefulness of generative AI writing tools significantly predicted their writing confidence and quality.

The findings of large positive correlations between the ethical and responsible AI writing use and academic writing performance offer novel and theory-building empirical evidence. Students who are responsible for academic honesty risk using AI tools; students who are able to evaluate AI-generated content and use it in a critical manner are producing higher quality academic writing; and students who can consistently show their own voice and reasoning in their academic writing are best positioned to produce high-quality academic writing. The outcome is in line with the constructivist learning theory, which implies that learning occurs meaningfully when the educational process is not passive, but active with the involvement of the learners (Nguyen et al., 2024; Zhang et al., 2024).

Using AI as a tool to assist students in their learning rather than supplanting their own thinking should increase the likelihood of students reaching a deeper level of conceptual understanding and critical thinking, both of which are important in effective academic writing (Han, 2025; Mekheimer, 2025).

Theoretically and practically, the most important contribution of the study is the multiple regression analysis. The results in the current study are consistent with the findings that the combination of both constructs, AIWPS and ERAIWUS, accounted for the variance in academic writing performance, with ERAIWUS having a statistically significant independent contribution, indicating that ethical AI usage is not just a normative issue, but it is also a measurable and empirically meaningful predictor of academic writing performance. The findings reveal the shortfalls of technical-only solutions to student-AI interaction and not ethical/behavioral. The findings of the present study align with the findings of Aaron et al. (2025) and Chkarka & Fatmi (2025), who found that the use of AI to enhance writing is most beneficial when students use the tools in an ethical and competent way.

These findings offer the notion that perceptions of positive AI-tool adoption and responsible AI use are both complementary and reinforcing and affect academic writing success. The best integration of AI in education will probably be through a comprehensive approach that addresses technical and ethical issues related to the use of AI. Combined efforts to make a difference and have a lasting impact on students' academic writing outcomes are likely to be seen when technical and ethical issues of using AI are tackled together.

Conclusion

The findings of this research clearly indicate that each of the students' perceptions of the AI-assisted writing tools and ethical and responsible use of AI is significant and independent of one another in academic writing performance. A high positive correlation and students' perception of AI-assisted writing tools and their academic writing performance, along with explained variance from the combined model, ensures that the technological and ethical aspects of AI engagement in academic writing are relevant to the real world and are meaningful contributors to academic writing performance. This dominance of AI-tool perceptions highlights the importance of examining subjective student perceptions of their experience with AI tools when understanding their impacts on writing products, and the high level of independent contribution of ethical AI use further points towards the need to consider the quality and integrity of the students' engagement with AI tools, as well as their impact.

Overall, the study concludes that AI tools in the context of academic learning may be beneficial to the students' academic writing proficiency, particularly when students utilize them with ethical awareness, critical thinking, and integrity. The findings highlight the need to establish and implement AI literacy programs in schools nationwide in Pakistan and other similar areas to enable students to effectively and ethically leverage AI writing tools and to develop their understanding of their capabilities. In today's technologically driven age, these are vital aspects of a 21st-century school education.

Future Implications

Future studies should consider some of the drawbacks of the current study. Longitudinal designs are necessary to determine whether the association between the perceptions of the AI tools, ethical AI use and writing performance remain the same across time or changes as students gain familiarity with the use of AI tools. Second, the number of causal inferences that could be made from experimental and quasi-experimental designs would be more than with the correlation designs that exist. Third, a more representative sample of the universities in Pakistan should be included beyond the current sample to be able to compare the cultural and institutional settings.

In a practical sense, HEIs will need to allocate the resources needed to create structured educational courses on AI literacy, which take technical and ethical considerations of AI use in academic writing into account. Professional learning opportunities for teachers to explore how to incorporate information about responsible use of AI into writing. Policymakers need to establish clear, transparent, and fair institutional policies on the use of AI to assist students with academic work and differentiate between productive use of AI to support learning and cheating. The researchers call for the development and piloting of a universal framework of instruments to assess ethical use of AI in an academic context to enable systematic comparison of studies.

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Appendix

Questionnaire Regarding the Impact of AI-Assisted Learning Tools on Students' Academic Writing Performance

Dear Participants,

I am an MPhil scholar from the Department of Education. This questionnaire is designed to collect data about the use of AI-assisted learning tools and their impact on university students' academic writing performance. Your participation is highly valued, and your responses will significantly contribute to my research. Your information will remain **confidential** and will be used **only for research purposes**.

Thank you for your time and cooperation.

Student Name: _____ **Demographics:** _____ **Gender:** Male _____ Female _____

Age: 18–22 _____ 23–26 _____ 27–30 _____ Above 30 _____

Name of Institution: _____ **Degree Program:** _____

Instructions:

Please read each statement carefully and tick the response that best represents your opinion. **Scale:** 1 = SDA (Strongly Disagree) 2 = DA (Disagree) 3 = N (Neutral) 4 = A (Agree) 5 = SA (Strongly Agree)

Questionnaire: Impact of AI-Assisted Learning Tools on Students' Academic Writing Performance

SECTION 1: AI-Assisted Writing Perception Scale (AIWPS)

Sr. No	Statements	1 SDA	2 DA	3 N	4 A	5 SA
1	AI tools make my academic writing tasks easier.					
2	AI improves the clarity and coherence of my writing.					
3	AI helps me generate new ideas before writing.					
4	I feel more confident when writing with AI support.					
5	Using AI saves me time during writing tasks.					
6	I am satisfied with the assistance AI provides.					
7	AI helps me overcome writer's block.					
8	AI improves my ability to paraphrase information.					
9	AI makes academic writing less stressful for me.					
10	AI provides feedback that improves my drafts.					
11	Overall, AI tools are useful for academic writing.					
12	I feel motivated to write better when using AI.					
13	AI increases the quality of my final written work.					
14	I intend to continue using AI tools for writing in the future.					

SECTION 2: Academic Writing Performance Scale (AWPS)

Sr. No	Statements	1 SDA	2 DA	3 N	4 A	5 SA
15	AI helps me produce more grammatically accurate writing.					
16	AI improves the organization of my essays.					
17	AI helps me make my arguments more logical.					
18	My writing is more coherent when I use AI.					

19	AI improves my summarization skills.
20	AI assists me in revising my drafts more effectively.
21	I can identify writing weaknesses more easily when using AI.
22	AI increases the fluency and readability of my sentences.
23	My vocabulary use improves when I use AI tools.
24	AI-assisted feedback improves my writing structure.
25	I revise my drafts more frequently when I use AI.
26	My overall writing proficiency has improved due to AI tools.
27	AI helps me produce higher-quality academic writing.
28	Using AI leads to better final writing performance.

SECTION 3: Ethical & Responsible AI Writing Use Scale (ERAIWUS)

Sr. No	Statements	1 SDA	2 DA	3 N	4 A	5 SA
29	I understand the rules for ethically using AI in academic writing.					
30	I avoid copying AI-generated text directly into my assignments.					
31	I sometimes feel dependent on AI tools for writing.					
32	AI use can risk reducing the originality of my writing.					
33	I know how to use AI responsibly for academic purposes.					
34	I am aware of possible academic integrity violations caused by misuse of AI.					
35	AI detection tools make me more careful with AI usage.					
36	I check and revise AI outputs to ensure originality.					
37	I know when AI assistance becomes excessive or unethical.					
38	I rely on my own knowledge rather than letting AI do all the writing.					
39	I feel confident distinguishing between ethical and unethical AI use.					
40	AI sometimes encourages students to depend too much on technology.					