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From Algorithms to Articulation: The Role of Artificial Intelligence in Shaping Omani EFL Students' Writing Skills and attitudes

Alaa Ali Aladini*[1] and Ahoud Al Kuwaili[2]

[1] Education Department, Dhofar University, Oman.
[2] National University of Science and Technology, Oman.

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ABSTRACT

This research examines the role of artificial intelligence (AI) applications in improving English writing skills and shaping students' attitudes toward AI-assisted learning among Foundation Program students at Sur Vocational College in Oman. The research adopted a pre-experimental design using a one-group pre-test–post-test approach. The sample consisted of 37 third-level students 19 males and 18 females aged between 18 and 20. Data were collected using two instruments: a writing skills test designed to measure five dimensions of writing performance (fluency, flexibility, originality, elaboration, and word richness) and an attitude scale to assess students' perceptions of AI-assisted writing. The intervention lasted nine weeks, during which students used AI tools such as Grammarly and Quillbot to draft and revise their writing tasks. The findings revealed statistically significant improvements in students' writing skills across all measured dimensions, as indicated by the paired-sample t-test results. Moreover, the results showed positive shifts in students' attitudes toward AI-supported writing, including increased confidence, engagement, and motivation. These findings highlight the pedagogical potential of integrating AI tools into EFL writing instruction. The study recommends incorporating AI-assisted writing tools into language curricula while ensuring balanced pedagogical practices that promote both technological support and independent writing development.

Introduction

Writing is widely regarded as one of the most essential academic skills, not only serving as a medium for assessment but also as a channel for personal growth and intellectual expression. Through writing, learners organize their thoughts, develop arguments, and communicate ideas effectively, making it central to academic achievement (Pereira, Hadjielias, Christofi, & Vrontis, 2023). Despite its importance, writing is often a challenging skill for students to master (RahmtAllah, 2023; Khasawneh et al., 2024). Producing clear, well-structured texts requires balancing grammar, vocabulary, organization, and coherence—an effort that many learners find overwhelming (Neji, Boughattas, & Ziadi, 2023).

In recent years, AI tools have emerged as promising supports for overcoming such challenges. Artificial Intelligence, broadly defined as computer systems capable of simulating human cognitive functions such as reasoning, learning, and decision-making, has become one of the defining technologies of the 21st century (Al-Maktoumi, 2024; Aladini et al., 2025). Rapid advances in machine learning and natural language processing have made AI tools such as Grammarly and QuillBot widely

* Corresponding author.
E-mail address: aaladini@du.edu.om
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available to assist in writing tasks. Students' perceptions of AI integration play a key role in determining its success. Research shows that when learners trust AI and see it being used ethically, they are more motivated to engage with it (Pereira et al., 2023; Daskalaki et al., 2024). Conversely, concerns about depersonalization and privacy may hinder its adoption.

Problem Statement

In the Omani EFL context, writing has consistently emerged as a critical challenge, particularly for Foundation Program students who must develop basic academic skills. Based on their professional experiences, the researchers observed persistent struggles in accuracy, organization, and self-expression. Previous studies support these observations. For instance, Aladini et al. (2024) reported that AI applications helped Dhofar University students address writing challenges, while Al-Raimi et al. (2024) found that such tools fostered positive learner attitudes by offering immediate feedback. Similarly, Alharbi (2023) emphasized the potential of AI to enhance writing skills, and UNESCO (2023) noted its role in contributing to broader educational and social goals. These findings underscore the urgency of exploring how AI can be integrated into Oman's Foundation Programs to improve both performance and learner attitudes.

Research Questions

1. Are there statistically significant differences ($\alpha \leq 0.05$) between the pre- and post-test scores of the experimental group on the writing test?
2. Are there statistically significant differences ($\alpha \leq 0.05$) between the pre- and post-test scores of the experimental group on the attitude scale?

Literature Review

Artificial Intelligence: Origins and Role in Education

AI, a term first introduced by John McCarthy in 1956, refers to the development of machines capable of simulating human cognition (Shams, 2020; Scarfe et al., 2024). With the advancement of machine learning and deep learning, AI has become central to industries and education. Since the 1970s, AI has been used in educational contexts, initially through simple tutoring systems and later through personalized feedback mechanisms (Alharbi, 2023; Al-Raimi et al., 2024). More recently, AI has been applied in campus management and student support, streamlining administrative tasks and helping educators tailor instruction (RahmtAllah, 2023).

AI in Higher Education

Reports suggest that AI adoption in education grew by nearly 48% between 2018 and 2022. Its use spans three main dimensions: learner-facing (e.g., tutoring apps), teacher-facing (e.g., automated grading, plagiarism detection), and system-facing (e.g., dashboards for administrators) (Zawacki-Richter et al., 2019; Baker, 2019). However, issues of bias, ethics, and equitable access remain concerns that must be addressed.

AI in Education in Oman

Aligned with Oman's Vision 2040, the country is investing in AI to strengthen education and workforce readiness. Applications include adaptive learning platforms, learning management systems, and AI-driven assessment tools (Aladini et al., 2024). While these technologies show promise, infrastructure, teacher readiness, and ethical safeguards remain challenges to ensure equitable outcomes.

Writing and its Importance

Writing remains central to academic and professional success. It requires mastery of grammar, vocabulary, structure, and style, and also serves as a means of critical engagement with knowledge (Mao, 2024; Septiwan & Hafizh, 2021; Fatima et al., 2024; RahmtAllah, 2023). Scholars emphasize that effective writing deepens understanding, fosters logical reasoning, and strengthens communication skills (Graham et al., 2020; Deane & Sparks, 2021).

AI and Writing

AI-powered tools are reshaping the writing process by providing real-time feedback, grammar correction, paraphrasing, and stylistic

suggestions. Grammarly assists with accuracy and tone (Gajek, 2020), while QuillBot helps with paraphrasing and readability (Dewi et al., 2024). Both tools also support collaborative learning and reflective practice (Deane & Sparks, 2021).

Attitudes Toward AI

Public perceptions of AI vary across cultures and economic contexts. Dong (2023) reported skepticism in wealthier nations, while in other contexts AI adoption is seen as a pathway to greater productivity. Students' attitudes toward AI strongly influence engagement and academic success (Beig et al., 2023).

Previous Studies

Aladini (2023) examined how Artificial Intelligence (AI) applications influence academic writing and logical reasoning among EFL university students. The findings showed clear gains in both areas, with learners demonstrating stronger writing performance and improved reasoning skills. At the same time, the study raised an important caution: relying too heavily on AI may weaken students' ability to think critically and write independently.

In a mixed-methods case study, Thuy Anh (2023) explored the role of Grammarly in enhancing grammatical accuracy among fifth-grade English learners in Vietnam. Results indicated that Grammarly helped students achieve noticeable improvements in grammar. Nevertheless, qualitative feedback from participants pointed to concerns that frequent dependence on the tool could limit their ability to apply grammar rules on their own.

Similarly, Ventista and Brown (2023) investigated teacher and student perspectives on AI writing tools at a Canadian university, using focus groups and surveys with 75 participants. Their study revealed appreciation for the immediate feedback provided by these tools, but it also highlighted apprehensions that such support might diminish learners' critical thinking and independent writing skills. Duy et al. (2025) conducted a study in South Korea with 150 high school students to measure the influence of AI-assisted writing tools on writing proficiency. The results showed significant improvements in writing scores following the use of AI. However, a notable proportion of students—about 40%—reported feeling less confident in their writing abilities when the AI tools were not available. Also, Aladini, Bayat, and Abdellatif (2024) investigated the role of performance-based assessment in virtual and non-virtual EFL learning environments. Their findings revealed that technology-enhanced learning significantly improved students' academic resilience, motivation, and language learning outcomes. The study highlighted how digital tools can support learner autonomy and engagement in language learning contexts. And, Aladini, Ismail, Khasawneh, and Shakibaei (2025) examined the impact of AI-supported writing tasks on L2 writing outcomes and growth mindset among university students. The results demonstrated that AI-based writing environments significantly enhanced grammatical knowledge, writing quality, and learners' reflective thinking. In addition, Khasawneh, Aladini, Assi, and Ajanil (2025) explored portfolio assessment in AI-enhanced learning environments. Their findings indicated that AI-supported assessment contributed to improved emotional regulation, mindfulness, and positive attitudes toward language learning. Moreover, Aladini (2024) investigated the relationship between reflective thinking, learner autonomy, and emotional beliefs in computer-assisted language learning environments. The findings demonstrated that technology-supported learning environments encourage deeper engagement with language tasks and promote learner autonomy.

While previous studies have demonstrated the effectiveness of AI tools such as Grammarly and QuillBot in improving grammatical accuracy and writing performance (Thuy Anh, 2023; Ventista & Brown, 2023; Duy et al., 2025), most of these investigations were conducted in Asian or Western contexts and focused primarily on isolated aspects of writing development. In contrast, the present study examines AI-assisted writing in the Omani EFL context and evaluates both linguistic outcomes and students' attitudes toward AI-supported learning. By employing a structured nine-week intervention and

measuring five writing dimensions—fluency, flexibility, originality, elaboration, and word richness—this study contributes empirical evidence regarding the pedagogical effectiveness of AI tools in Foundation Program environments.

Despite the growing interest in artificial intelligence in language learning, limited empirical research has examined its impact on writing development within the Omani EFL context, particularly in foundation programs. Most existing studies focus either on technological affordances or students' perceptions rather than examining measurable improvements in writing performance alongside attitudinal change. Therefore, this study seeks to address this gap by investigating how AI-assisted writing tools influence both writing skills and learner attitudes among Omani foundation program students.

Method

This study investigates the role of artificial intelligence (AI) applications in enhancing English writing skills and shaping students' attitudes toward AI-assisted learning in the Foundation Program at Sur Vocational College in Oman. The study employed a pre-experimental design using a pre- and post-test approach with a sample of 37 students. This study employed a pre-experimental design with one experimental group to measure the impact of AI-assisted writing tools on writing skills and attitudes. A pilot study was conducted initially to test feasibility. The main study used a pre- and post-test design, including a writing skills test and an attitude scale to assess both technical performance and perceptions before and after the intervention.

Sample

The study sample comprised 37 Foundation Program students at Sur Vocational College, aged 18–20 (19 males and 18 females), all from level three. Participants were selected through purposeful sampling, and one intact class was randomly chosen as the experimental group. Students represented diverse regions of Oman, offering a range of linguistic and educational backgrounds.

Table (1).

Gender	Number of Students	Percentage
Male	19	51.35%
Female	18	48.65%
Total	**37**	**100%**

Instruments

The study utilized two main instruments for data collection: a Writing Skills Test and an Attitude Scale. To ensure the validity and reliability of the study, the researcher conducted a pilot study on 17 students.

Internal consistency validity:

To ensure the internal consistency validity, the researcher conducted a pilot sample of 17 students who were excluded from the study sample. The results were as follows:

Table (2): Independent Samples t-Test Results for Writing Skills.

Skill	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Fluency	37	15.28	2.29	-1.48	72	0.02
Originality	37	14.92	2.14	-0.25	72	0.03
Elaboration	37	14.8	1.86	-3.26	72	0.01
Flexibility	37	15.17	1.96	-0.38	72	0.04
Word Richness	37	15.25	2.33	0.01	72	0.02
Overall Writing Skills	37	75.86	9.42	-0.05	72	0.03

Table (1) reveals that there are significant differences at ($\alpha \leq 0.05$) in the assessed writing skills, which include Fluency, Originality, Elaboration, Flexibility, and Word Richness. This confirms the internal consistency validity of the test.

Assessing Test Reliability

The reliability of the test was determined through two approaches: Cronbach's Alpha and the Test-Retest Method. Both methods were used to ensure the test's consistency and stability in evaluating the intended skills.

Internal Consistency Using Cronbach's Alpha:

Cronbach's Alpha was applied to examine how well the test items align in measuring the same construct. The analysis yielded a value of 0.872, signifying a high degree of internal consistency across the 15 items. This indicates that the test items are cohesive and effectively measure the targeted abilities.

Table (3.1): Reliability Statistics.

Cronbach's Alpha	N of Items
.872	15

Test–Retest Stability with Pearson Correlation

To examine the stability of the test over time, it was administered to a pilot group of 17 students and then repeated with the same participants after a three-week interval. The results from both administrations were compared using the **Pearson correlation coefficient**, which yielded a value of **0.87**. This high coefficient indicates strong consistency and reliability of the test across the two administrations, confirming that the instrument is stable for use in the study.

Test Discrimination and Difficulty Values

In addition to stability, the quality of the writing test items was evaluated through **difficulty and discrimination indices**. The difficulty index reflects the proportion of students who answered an item correctly, with values ranging from 0 to 1. The discrimination index, on the other hand, measures how effectively an item distinguishes between high- and low-achieving students, with scores typically ranging from -1 to 1. According to Metsämuuronen (2018), acceptable difficulty values fall between **0.20 and 0.80**, while discrimination values should be positive and preferably above **0.20**.

iv. Pilot Results: Difficulty and Discrimination

Table (3.2) below presents the difficulty and discrimination indices for seven writing-related items derived from the pilot study with 17 students. These values provide insight into how well each item functioned in assessing students' writing skills and ensure that the final version of the test is both fair and effective.

Table (3.2): Difficulty and Discrimination Indices of Writing Test Items.

Item	Difficulty	Discrimination
Fluency	0.65	0.72**
Originality	0.55	0.68**
Elaboration	0.60	0.70**
Flexibility	0.50	0.65**
Word Richness	0.45	0.60**

** Correlation is significant at the 0.01 level (two-tailed).

Attitude Scale

To measure students' perceptions of artificial intelligence (AI) applications, the researcher designed a structured attitude scale developed through a series of systematic steps. The first step was to clearly define the purpose of the instrument, which centered on gauging how students view the use of AI in their learning. Following this, items were carefully drafted to align with the research objectives, ensuring that

each statement directly addressed relevant aspects of students' attitudes toward AI.

An initial draft of the scale, consisting of a set number of items, was then submitted to a panel of subject-matter experts. Their feedback was used to refine the content, improve clarity, and confirm the appropriateness of the items for the study's context. Once revisions were completed, the finalized version of the scale was ready for use.

The instrument adopted a five-point Likert format, ranging from *Strongly Agree (5)* to *Strongly Disagree (1)*. Responses were analyzed using arithmetic means, which were interpreted on three levels: low (1.00–2.33), moderate (2.34–3.67), and high (3.68–5.00). This structured development and scoring process ensured that the tool provided both reliable and meaningful insights into students' attitudes, allowing their perspectives to be measured in a clear and quantifiable way.

Table (3.3): Likert Scale Responses and Scores.

Response	Description	Score
Strongly Agree	High agreement	5
Agree	Moderate agreement	4
Neutral	Neither agree nor disagree	3
Disagree	Moderate disagreement	2
Strongly Disagree	High disagreement	1

Table (4): Interpretation of Arithmetic Mean.

Range of Arithmetic Mean	Level of Agreement
1.00 – 2.33	Low
2.34 – 3.67	Moderate
3.68 – 5.00	High

To assess the construct validity of the attitude scale, the researcher computed the correlation coefficients between each item and the overall score. The coefficients ranged from 0.42 to 0.89, reflecting a strong relationship across the items. A detailed summary of these results is displayed in Table below.

Table (5): Correlation Coefficients between the Items and the Total Score for the Attitude Scale.

Item #	Item Statement	R with Total Score
1	I believe that AI applications can enhance my writing skills	.49**
2	AI apps contribute to my confidence in writing in an academic manner.	.72**
3	With the support of AI apps, I gain confidence in easily composing various types of written content.	.58**
4	AI apps boost my confidence in avoiding spelling mistakes in my writing.	.45**
5	I gain confidence in using advanced vocabulary suitable for the writing context through AI apps.	.83**
6	I can confidently apply punctuation marks in my writing with the help of AI apps.	.64**
7	I can identify more scientific concepts in written texts through the use of AI apps.	.42*
8	I can develop my learning style through the utilization of AI apps.	.89**
9	With the support of AI apps, I gain confidence in easily composing various types of written content.	.67**
10	AI apps boost my confidence in avoiding spelling mistakes in my writing.	.50**
11	I gain confidence in using advanced vocabulary suitable for the writing context through AI apps.	.71**
12	Organizing my thoughts and ideas is facilitated through the use of AI apps.	.53**
13	My engagement in written texts is increased when I use AI apps.	.74**
14	I can confidently write on a specific topic directly and concisely with the support of AI apps.	.76**
15	The reliance on AI apps becomes a valuable aspect of gaining confidence in a writing lesson for me.	.63**
16	Exploring various AI writing tools has expanded my knowledge and skills in crafting more engaging and coherent content.	.56**
17	Interacting with AI writing tools enhances me understanding of grammar and language nuances, improving my writing skills.	.47**
18	Through the use of AI apps, such as QuillBot, I acquire skills in efficiently summarizing and condensing information in writing.	.68**
19	My use of AI apps like Grammarly has provided me with a platform to experiment with different writing tones and genres.	.84**
20	Grammarly and QuillBot help me organize my thoughts and ideas while writing.	.69**
21	QuillBot encourage me to think critically and creatively during the writing process.	.77**
22	I trust the feedback provided by Grammarly and QuillBot for improving my writing.	.62**
23	I enjoy the interactive features of Grammarly and QuillBot in the writing process.	.73**
24	Interacting with AI writing tools enhances my understanding of grammar and language nuances, improving my writing skills.	.55**
25	QuillBot contributes to my skill development by assisting in paraphrasing and improving the fluency of my writing.	.66**
26	Elaboration in writing is enhanced for me through the use of AI apps.	.49**
27	AI apps help me respond efficiently to questions on written texts.	.78**
28	The integration of various AI writing tools into my writing process has broadened my skill set and made me more versatile.	.82**
29	Experimenting with different AI writing tools allows me to adapt my writing style to various audiences and communication contexts.	.59**
30	Elaboration in writing is enhanced for me through the use of AI apps.	.75**
31	Creative responses to different questions in writing activities are encouraged by AI apps.	.57**
32	AI applications inspire me to analyze and refine my writing strategies thoughtfully.	.61**
33	I appreciate the dynamic tools offered by AI applications that make the writing process more engaging.	.65**

*Correlation is significant at the (0.05) level.
**Correlation is significant at the (0.01) level.*
The results show the internal consistency validity of the questionnaire.

Reliability of the Attitude Scale

To ensure that the study's instrument was both stable and dependable, the researcher applied the test–retest method. The attitude questionnaire was first administered to a pilot group of 17 students who were not part of the main study sample. Two weeks later, the same questionnaire was given to this group again, and the results from both administrations were compared. The Pearson correlation coefficient between the two sets of scores was 0.88, indicating a high level of stability over time. In addition to this, the internal consistency of the

scale was examined using Cronbach's alpha, which produced a coefficient of 0.86. Both values suggest that the tool demonstrates strong reliability, confirming that the questionnaire is consistent and well-suited for measuring students' attitudes within the context of this research.

Table (6.1): Reliability Statistics.

Cronbach's Alpha	N of Items
.861	**33**

The study procedures:

The study was carried out over a period of nine weeks at Sur Vocational College with third-level students as the participants. Its main aim was to examine how AI-powered writing tools, namely **Grammarly** and **QuillBot**, could improve students' writing abilities. These two applications were selected because of their accessibility and ease of use, features that make them suitable even for learners with varied language proficiency levels. Grammarly functions as a comprehensive tool for grammar and spell-checking, offering instant corrections and suggestions that allow students to refine their texts in real time. QuillBot, in contrast, serves as a paraphrasing and restructuring tool, assisting learners in improving sentence organization, clarity, and style. Together, they address complementary aspects of writing—accuracy, vocabulary use, coherence, and readability—making them highly effective for supporting the development of academic writing.

The instructional intervention lasted nine weeks and involved structured writing activities supported by AI tools, particularly Grammarly and QuillBot. Students completed multiple writing tasks, revised their drafts using AI feedback, and received instructor guidance.

The intervention was structured into **three phases**: preparation, implementation, and evaluation, each building on the previous stage.

Week 1: Orientation and Initial Assessments

• At the outset, students were introduced to the objectives and procedures of the study. They were familiarized with Grammarly and QuillBot and their intended role in strengthening writing skills.

• To establish a baseline, students completed a writing test without access to AI tools. Alongside this, they completed an attitude scale designed to measure their initial perceptions of writing and technology-assisted learning.

Weeks 2–3: Familiarization with AI Tools

• Students underwent guided training sessions where they explored the main features of both tools. Tutorials emphasized grammar correction, vocabulary enrichment, and improving the logical flow of text.

• Practical demonstrations illustrated how AI-generated suggestions could refine drafts, and students were then given opportunities to experiment with these tools under instructor supervision.

• Guided practice activities involved revising sample texts, applying AI feedback, and reflecting on how it shaped their writing.

Weeks 4–8: Writing and AI Integration

• Each week, learners worked on a new writing task, typically based on familiar and relevant themes such as personal experiences or social challenges.

• A **three-step writing process** was adopted: (1) drafting without AI, (2) revising with Grammarly and QuillBot to address grammar, clarity, and vocabulary issues, and (3) submitting the improved draft for instructor feedback.

• Teachers reviewed the assignments to evaluate how effectively students used AI feedback. Both individual and group feedback sessions followed, providing targeted advice to consolidate progress and address persistent issues.

Week 9: Final Assessments and Reflection

• At the conclusion of the program, the writing test was administered again, this time allowing

the use of AI tools. Results were compared with the pre-test to measure progress.

• The attitude scale was re-administered to capture shifts in students' perceptions of writing and AI-assisted learning.

• Reflection sessions were held, during which students openly shared their experiences, challenges, and perceived improvements. A short qualitative survey also collected additional feedback, enriching the quantitative results with students' voices.

Data Analysis

This section outlines the statistical procedures and findings related to the study's research questions.

1) Are there any statistical differences at ($\alpha \leq 0.05$) in the average scores of the writing test for the experimental group between the pre- and post-applications?

To address this question, paired-sample t-tests were conducted to compare pre- and post-test scores across the five measured writing skills: Fluency, Flexibility, Originality, Elaboration, and Word Richness. For each skill, the mean and standard deviation were calculated for both phases of assessment. The results showed statistically significant improvements across all five skills, with α-values below 0.05. The corresponding *t*-values confirmed meaningful gains in performance, demonstrating that students' writing abilities improved considerably following the intervention.

This analysis highlights not only the statistical significance of the changes but also the practical value of using AI tools like Grammarly and QuillBot as part of structured writing instruction. The findings suggest that such integration provides tangible benefits, equipping students with the ability to write more effectively, confidently, and creatively.

Table (8): Paired-Samples t-Test Results for Pre-Test and Post-Test Scores Across Writing Skills.

Skill	Test	N	Mean	Std. Deviation	t	Sig. (2-tailed)	Significance
Fluency	Pre-Test	37	18.45	3.75	5.32	0.000	Sig
	Post-Test	37	22.78	3.12			
Flexibility	Pre-Test	37	19.20	4.12	4.98	0.001	Sig
	Post-Test	37	23.50	3.85			
Originality	Pre-Test	37	17.85	3.68	4.87	0.002	Sig
	Post-Test	37	21.95	3.45			
Elaboration	Pre-Test	37	20.10	4.01	5.15	0.000	Sig
	Post-Test	37	24.50	3.90			
Word Richness	Pre-Test	37	19.75	3.85	5.05	0.001	Sig
	Post-Test	37	24.00	3.70			

The analysis revealed clear and significant improvements across all five measured writing skills—Fluency, Flexibility, Originality, Elaboration, and Word Richness—following the use of AI tools. In terms of **Fluency**, the mean score rose from 18.45 in the pre-test to 22.78 in the post-test, supported by a significant t-value of 5.32 (Sig. = 0.000), indicating that students became more cohesive and fluid in their writing. **Flexibility** also showed notable growth, with scores increasing from 19.20 to 23.50 (T = 4.98, Sig. = 0.001), reflecting students' improved ability to adapt their tone and style according to purpose and audience. Similarly, **Originality** demonstrated a strong improvement, rising from 17.85 to 21.95 (T = 4.87, Sig. = 0.002), pointing to enhanced creativity in generating ideas and structuring texts. For **Elaboration**, scores advanced from 20.10 to 24.50 (T = 5.15, Sig. = 0.000), showing students' growing capacity to expand and explain ideas in depth. Finally, **Word Richness** improved substantially, with the mean increasing from 19.75 to 24.00 (T = 5.05, Sig. = 0.001), which illustrates a more diverse and precise use of vocabulary. Taken together, these findings confirm the effectiveness of AI applications in strengthening students' writing skills in measurable and

meaningful ways. Effect size calculations, using $\eta^2 = t^2 / (t^2 + df)$, confirmed that these changes were not only statistically significant but also practically meaningful, with large effect sizes recorded for Fluency ($\eta^2 = 0.440$), Flexibility ($\eta^2 = 0.408$), Originality ($\eta^2 = 0.397$), Elaboration ($\eta^2 = 0.424$), and Word Richness ($\eta^2 = 0.415$). These robust outcomes demonstrate that AI-powered tools such as Grammarly and QuillBot had a tangible impact on students' performance, underscoring both the statistical and real-world significance of integrating AI into educational contexts. As Bhandari (2023) explained, effect sizes highlight the magnitude of change and its practical relevance, and in this study, the consistently large effect sizes across all five skills reinforce the transformative role of AI in developing essential writing abilities for learners.

1) Are there any statistical differences at ($\alpha \leq 0.05$) in the average scores of the attitude scale for the experimental group between the pre and post applications?

To answer this question, the study employed a paired-sample t-test to analyze the pre- and post-application scores of the experimental group on the attitude scale. The results revealed statistically significant differences at the $\alpha \leq 0.05$ level in the average scores, demonstrating that the use of AI applications positively influenced students' attitudes toward writing. The paired-sample t-test confirmed substantial improvements in mean scores for various attitude measures, further supported by reduced standard deviations and low p-values, as shown in the detailed findings.

Table (9): Paired-sample t-test analyzing students' attitudes.

Scale	BEFORE - Mean Score	BEFOR E - Std. Dev.	AFTER - Mean Score	AFTER - Std. Dev.	Stat. Sig. (2-taile)
I believe that AI applications can enhance my writing skills.	3.14	0.69	3.81	0.56	.004
AI apps contribute to my confidence in writing in an academic manner.	2.53	0.51	3.63	0.3	.005
With the support of AI apps, I gain confidence in easily composing various types of written content.	2.78	0.57	3.88	0.52	.000
AI apps boost my confidence in avoiding spelling mistakes in my writing.	2.72	0.65	3.84	0.5	.002
I gain confidence in using advanced vocabulary suitable for the writing context through AI apps.	3.24	0.59	3.79	0.46	.000
I can confidently apply punctuation marks in my writing with the help of AI apps.	3.18	0.66	4.45	0.38	.004
I can identify more scientific concepts in written texts through the use of AI apps.	3.39	0.57	4.39	0.49	.004
I can develop my learning style through the utilization of AI apps.	2.59	0.61	3.88	0.33	.001
With the support of AI apps, I gain confidence in easily composing various types of written content.	2.92	0.41	4.19	0.43	.002
AI apps boost my confidence in avoiding spelling mistakes in my writing.	2.53	0.47	3.96	0.44	.003
I gain confidence in using advanced vocabulary suitable for the writing context through AI apps.	2.72	0.49	4.42	0.59	.001
Organizing my thoughts and ideas is facilitated through the use of AI apps.	3.01	0.42	4.01	0.56	.004
My engagement in written texts is increased when I use AI apps.	2.53	0.47	3.84	0.38	.002
I can confidently write on a specific topic directly and concisely with the support of AI apps.	2.7	0.43	3.82	0.45	.001
The reliance on AI apps becomes a valuable aspect of gaining confidence in a writing lesson for me.	3.15	0.48	4.11	0.35	.003
Exploring various AI writing tools has expanded my knowledge and skills in crafting more engaging and coherent content.	3.04	0.59	3.84	0.57	.004
Interacting with AI writing tools enhances my understanding of grammar and language nuances, improving my writing skills.	2.72	0.51	4.13	0.56	.001
Through the use of AI apps, such as QuillBot, I acquire skills in efficiently summarizing and condensing information in writing.	3.09	0.51	4.41	0.39	.002
My use of AI apps like Grammarly has provided me with a platform to experiment with different writing tones and genres.	3.31	0.46	3.96	0.49	.005
Grammarly and QuillBot help me organize my thoughts and ideas while writing.	2.51	0.48	3.8	0.48	.003
QuillBot encourages me to think critically and creatively during the writing process.	3.31	0.68	4.5	0.35	.002
I trust the feedback provided by Grammarly and QuillBot for improving my writing.	3.2	0.59	4.06	0.53	.003
I enjoy the interactive features of Grammarly and QuillBot in the writing process.	2.84	0.58	3.68	0.46	.001
Interacting with AI writing tools enhances my understanding of grammar and language nuances, improving my writing skills.	2.66	0.45	3.64	0.53	.001
QuillBot contributes to my skill development by assisting in paraphrasing and improving the fluency of my writing.	3.46	0.62	3.7	0.46	.002

Table (9): Paired-sample t-test analyzing students' attitudes.

Scale	BEFORE - Mean Score	BEFOR E - Std. Dev.	AFTER - Mean Score	AFTER - Std. Dev.	Stat. Sig. (2-taile)
Elaboration in writing is enhanced for me through the use of AI apps.	2.84	0.45	4.16	0.3	.003
AI apps help me respond efficiently to questions on written texts.	2.59	0.51	4.31	0.4	.001
The integration of various AI writing tools into my writing process has broadened my skill set and made me more versatile.	2.6	0.7	3.98	0.31	.001
Experimenting with different AI writing tools allows me to adapt my writing style to various audiences and communication contexts.	3.35	0.59	3.66	0.58	.000
Elaboration in writing is enhanced for me through the use of AI apps.	3.1	0.57	3.94	0.56	.003
Creative responses to different questions in writing activities are encouraged by AI apps.	3.31	0.61	4.5	0.55	.001
AI applications inspire me to analyze and refine my writing strategies thoughtfully.	3.23	0.65	4.08	0.39	.005
I appreciate the dynamic tools offered by AI applications that make the writing process more engaging.	3.04	0.63	4.47	0.32	.004

The table presents the outcomes of a paired-sample t-test examining how students' perceptions of using AI tools in writing evolved over the course of the study. The items reflect different aspects of attitudes—ranging from confidence to skill development and engagement with writing tasks.
The results show a marked increase in students' confidence when relying on AI applications to support their writing. For example, the statement *"AI apps boost my confidence in avoiding spelling mistakes"* recorded a rise in mean scores from 2.72 to 3.84, with a highly significant p-value (0.002). Similarly, students reported feeling more assured in using advanced vocabulary, where the average score increased from 3.24 to 3.79 ($p = 0.000$). These findings indicate that AI tools helped learners overcome common linguistic challenges, making them feel more capable in their writing.
AI support also contributed to measurable improvements in students' ability to refine their writing skills. The mean score for the item on writing concisely about a specific topic increased from 2.70 to 3.82 ($p = 0.001$). Likewise, students perceived themselves as more able to organize their thoughts clearly and logically, with mean scores improving from 3.01 to 4.01 ($p = 0.004$). These results suggest that AI applications not only assist with mechanics but also foster higher-level writing competencies such as coherence and organization.
A key outcome was the rise in students' engagement with writing tasks. The statement *"My engagement in written texts is increased when I use AI apps"* showed growth from a mean score of 2.53 to 3.84 ($p = 0.002$). This indicates that AI tools made the writing process more interactive and less daunting, helping students approach writing with greater interest and motivation.
Across all statements, mean scores increased consistently, and the fact that all p-values fell below the 0.05 threshold confirms the statistical significance of these shifts. Taken together, the results highlight the overall positive influence of AI applications in boosting students' confidence, sharpening their writing skills, and fostering deeper engagement with the writing process.

Discussion

Differences in Writing Test Scores ($\alpha \leq 0.05$)

To examine whether there were significant changes in students' writing performance, the researcher applied a paired-sample t-test to compare pre- and post-test results. The analysis revealed marked improvements across all five targeted skills: fluency, flexibility, originality,

elaboration, and word richness. These gains confirm that AI-supported instruction had a clear and positive impact on students' writing development.

The improvement in fluency highlights students' growing ability to write more smoothly and with better overall clarity. Enhanced flexibility points to their capacity to adjust writing styles and tones depending on purpose and audience—an essential competency for academic and professional success. The growth in originality demonstrates greater creativity and innovative thinking in their written expression. Similarly, higher elaboration scores show that students became more capable of expanding on ideas, offering explanations, and presenting detailed reasoning. Finally, the increase in word richness indicates stronger vocabulary knowledge and more precise word choice.

These results underscore the value of incorporating AI tools into writing instruction. Not only did students become more confident and capable writers, but they also showed readiness to approach complex writing tasks with less hesitation. In the long run, such gains can significantly enhance both academic outcomes and professional communication skills. The large effect sizes recorded in this study strengthen the practical significance of these findings, showing that AI integration has transformative potential.

The improvements align with previous research. Thuy Anh (2023) reported that Grammarly boosted grammatical accuracy and overall writing performance, while Zhang et al. (2024) observed that semester-long AI interventions improved writing accuracy by 30%. Similarly, Aladini et al. (2024) emphasized that AI tools fostered fluency and originality—findings that parallel the present study's outcomes across all five skill domains.

Differences in Attitude Scores ($\alpha \leq 0.05$)

The researcher also used a paired-sample t-test to analyze students' attitudes toward AI applications before and after the program. The results showed significant positive shifts, with students reporting greater confidence, stronger engagement, and increased trust in AI tools.

These attitude changes were reflected in students' self-reported ability to minimize spelling errors, employ more advanced vocabulary, and structure their writing effectively. Beyond technical improvements, students felt more self-assured and capable, which highlights the motivational value of AI-assisted learning. The increased engagement suggests that AI tools helped make the writing process more interactive and enjoyable, creating a more dynamic learning environment.

Importantly, these findings extend beyond writing skills. A more positive outlook on AI in education can encourage students to explore digital tools in other areas, fostering adaptability and digital literacy—both of which are essential in today's knowledge-based economy. Students began to see AI not as a threat to their independence but as a supportive resource, helping to mitigate fears of overreliance. By shaping positive perceptions, the program empowered learners to approach AI with confidence, viewing it as an ally rather than a replacement.

This outcome is consistent with Aladini (2023), who found that AI applications improved not only writing skills but also students' overall perception of writing tasks. In that study, writing became more engaging and less intimidating, much like in the current research. Together, these findings highlight the dual impact of AI: enhancing technical skills while also nurturing positive learner attitudes.

Conclusion

The study demonstrated clear progress in students' writing abilities across five critical areas: fluency, flexibility, originality, elaboration, and vocabulary richness. These advancements indicate that AI tools can serve as effective supports, enabling learners to organize ideas more logically, tailor writing to specific contexts, and express themselves with greater creativity and accuracy.

Equally significant were the attitudinal changes. Students reported heightened confidence, stronger engagement, and a greater willingness to trust AI-assisted learning. These positive perceptions were shaped by the structured nine-week program, which gradually familiarized

students with AI tools through iterative practice and reflective tasks. This approach not only improved skills but also helped foster a supportive and motivating learning environment.

Taken together, the findings suggest that when AI tools are integrated thoughtfully, they can substantially enrich writing instruction. However, the study also underscores the need to balance technology use with opportunities for independent writing, ensuring that students remain active participants in the learning process. Future research should investigate ways to further personalize AI applications to meet diverse learner needs while addressing challenges such as overreliance and ethical concerns surrounding data privacy (RahmtAllah, 2023; Fatima et al., 2024).

المراجع الاجنبية

[1] Aladini, A., Bayat, S., & Abdellatif, M. S. (2024). Performance-based assessment in virtual versus non-virtual classes: Impacts on academic resilience, motivation, teacher support, and personal best goals. *Asian-Pacific Journal of Second and Foreign Language Education, 9*(1). https://doi.org/10.1186/s40862-023-00230-4

[2] Aladini, A., Ismail, S., Khasawneh, M., & Shakibaei, G. (2025). Self-directed writing development across computer/AI-based tasks: Unraveling the traces on L2 writing outcomes, growth mindfulness, and grammatical knowledge. *Computers in Human Behavior Reports, 17*, 100566. https://doi.org/10.1016/j.chbr.2024.100566

[3] Alharbi, W. (2023). AI in the foreign language classroom: A pedagogical overview of automated writing assistance tools. *Education Research International, 2023*, 1–9. https://doi.org/10.1155/2023/4253331

[4] Al-Maktoumi, H. A. S. (2024). The impact of artificial intelligence on the future of English language teaching and learning at Omani universities. *Journal of Propulsion Technology, 45*(3), 112–119.

[5] Al-Raimi, M., Mudhsh, B. A., Al-Yafae, Y., & Al-Maashani, S. (2024). Utilizing artificial intelligence tools for improving writing skills: Exploring Omani EFL learners' perspectives. *Forum for Linguistic Studies, 6*(2), 1177. https://doi.org/10.59400/fls.v6i2.1177

[6] Ali, J., Shamsan, M. A., Hezam, T., & Mohammed, A. A. Q. (2023). Impact of ChatGPT on learning motivation: Teachers and students' voices. *Journal of English Studies in Arabia Felix, 2*(1), 41–49. https://doi.org/10.56540/jesaf.v2i1.51

[7] Baker, R. S. (2021). Artificial intelligence in education: Bringing it all together. In *OECD digital education outlook 2021: Pushing the frontiers with AI, blockchain and robots* (pp. 43–72). OECD Publishing. https://doi.org/10.1787/f54ea644-en

[8] Beig, S., & Qasim, S. (2023a). Attitude towards artificial intelligence: Change in educational era. *International Journal of Creative Research Thoughts, 11*, b718–b721. https://doi.org/10.1729/Journal.35825

[9] Beig, S., & Qasim, S. (2023b). Assessing students' attitude towards artificial intelligence with respect to gender and use of computer and mobile devices. *International Journal for Multidisciplinary Research, 5*, 1–7. https://doi.org/10.36948/ijfmr.2023.v05i03.4130

[10] Dewi, U. (2023). Grammarly as automated writing evaluation: Its effectiveness from EFL students' perceptions. *Lingua Cultura, 16*(2), 121–128. https://doi.org/10.21512/lc.v16i2.8315

[11] Dewi, U., Hasanah, N., Julaika, S., & Sambas, E. C. M. (2024). Using QuillBot paraphraser in EFL writing: The effectiveness from students' perceptions. *English Education Journal for Teaching and Learning, 12*(1), 28–41.

[12] Dong, Y. (2023). Revolutionizing academic English writing through AI-powered pedagogy: Practical exploration of teaching process and assessment. *Journal of Higher Education Research, 4*(2), 52–57.

[13] Duy, N. B. P., Phuong, T. N. M., Chau, V. N. M., Nhi, N. V. H., Khuyen, V. T. M., & Giang, N. T. P. (2025). AI-assisted learning: An empirical study on student application behavior. *Multidisciplinary Science Journal, 7*, e2025275. https://doi.org/10.31893/multiscience.2025275

[14] Fatima, N., Afzaal, H. M., Hussain, Z., & Sajid, M. K. M. (2024). Language and emotion: A study of emotional expression in multilinguals. *Journal of Applied Linguistics and TESOL, 7*(4), 932–946.

[15] Gajek, S., Schneider, M., & Böhlke, T. (2020). On the micromechanics of deep material networks. *Journal of the Mechanics and Physics of Solids, 145*, 104169. https://doi.org/10.1016/j.jmps.2020.104169

[16] Graham, S., Cao, Y., Kim, Y. S. G., et al. (2024). Effective writing instruction for students in grades 6 to 12: A best evidence meta-analysis. *Reading and Writing*. https://doi.org/10.1007/s11145-024-10539-2

[17] Khasawneh, M., Aladini, A., Assi, S., & Ajanil, B. (2025). Portfolio assessment in AI-enhanced learning environments: A pathway to emotion regulation, mindfulness, and language learning attitudes. *Language Testing in Asia*. https://doi.org/10.1186/s40468-025-00345-0

[18] Mao, Z., Lee, I., & Li, S. (2024). Written corrective feedback in second language writing: A synthesis of naturalistic classroom studies. *Language Teaching*, 1–29. https://doi.org/10.1017/S0261444823000393

[19] Neji, W., Boughattas, N., & Ziadi, F. (2023). Exploring new AI-based technologies to enhance students' motivation. *Issues in Informing Science & Information Technology, 20*, 15–28.

[20] Pereira, V., Hadjielias, E., Christofi, M., & Vrontis, D. (2023). A systematic literature review on the impact of artificial intelligence on workplace outcomes: A multi-process perspective. *Human Resource Management Review, 33*(1), 100857. https://doi.org/10.1016/j.hrmr.2022.100857

[21] RahmtAllah, E. A. (2023). The use of online automated writing checkers among EFL learners. *Studies in English Language Teaching, 11*(1), 24–35.

[22] Scarfe, P., Watcham, K., Clarke, A., & Roesch, E. (2024). A real-world test of artificial intelligence infiltration of a university examinations system: A "Turing Test" case study. *PLoS ONE, 19*(6), e0305354. https://doi.org/10.1371/journal.pone.0305354

[23] Septiwan, R., & Al Hafizh, M. (2021). An analysis of coherence in writing essay written by students at Universitas Negeri Padang. *Advances in Social Science, Education and Humanities Research, 599*, 134–141. https://doi.org/10.2991/assehr.k.211292.022

[24] Shin, N., Choi, E., & Chang, S. (2024). Students' attitudes towards an AI-based interview for university admissions: Scale development and intervention effects. *Education and Information Technologies, 29*, 20055–20076. https://doi.org/10.1007/s10639-024-12649-4

[25] Sparks, J. R., & Deane, P. (2021). Assessing source evaluation skills of middle school students using learning progressions. *Educational Assessment, 26*(4), 213–240. https://doi.org/10.1080/10627197.2021.1966299

[26] Thuy Anh, H. T. (2023). *Exploring the impact of Grammarly on grammatical accuracy in second language writing of fifth-grade students in Vietnam: A mixed-methods case study* (Master's thesis).

[27] UNESCO. (2023). *ChatGPT and artificial intelligence in higher education: Quick start guide*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000385146

[28] Ventista, O. M., & Brown, C. (2023). Teachers' professional learning and its impact on students' learning outcomes: Findings from a systematic review. *Social Sciences & Humanities Open, 8*, 100565. https://doi.org/10.1016/j.ssaho.2023.100565

[29] Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? *International Journal of Educational Technology in Higher Education, 16*, 39. https://doi.org/10.1186/s41239-019-0171-0

[30] Zhang, X., Diaz, A., Chen, Z., Wu, Q., Qian, K., Voss, E., & Yu, Z. (2024). DECOR: Improving coherence in L2 English writing with a novel benchmark for incoherence detection, reasoning, and rewriting. *arXiv Preprint*. https://doi.org/10.48550/arXiv.2406.19650

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من الخوارزميات إلى التعبير اللغوي: دور الذكاء الاصطناعي في تنمية مهارات الكتابة وتشكيل اتجاهات طلبة اللغة الإنجليزية كلغة أجنبية في سلطنة عُمان

علاء علي العديني[1]* وعهود الكويلي[2]

[1] قسم التربية، جامعة ظفار، سلطنة عُمان.
[2] الجامعة الوطنية للعلوم والتكنولوجيا، سلطنة عُمان.

الملخص

تهدف هذه الدراسة إلى استكشاف دور تطبيقات الذكاء الاصطناعي في تنمية مهارات الكتابة باللغة الإنجليزية وتشكيل اتجاهات الطلبة نحو التعلم المدعوم بالذكاء الاصطناعي لدى طلبة البرنامج التأسيسي في كلية صور المهنية بسلطنة عُمان. اعتمدت الدراسة المنهج شبه التجريبي باستخدام تصميم الاختبار القبلي والبعدي لمجموعة واحدة. تكونت عينة الدراسة من 37 طالبًا وطالبة من المستوى الثالث (19 ذكرًا و18 أنثى) تتراوح أعمارهم بين 18 و20 عامًا. ولجمع البيانات، استخدمت الدراسة أداتين رئيستين: اختبار مهارات الكتابة الذي يقيس خمسة أبعاد أساسية للأداء الكتابي (الطلاقة، المرونة، الأصالة، التفصيل، وغنى المفردات)، بالإضافة إلى مقياس الاتجاهات لقياس تصورات الطلبة نحو استخدام الذكاء الاصطناعي في الكتابة. استمر تطبيق البرنامج التدخلي لمدة تسعة أسابيع، استخدم خلالها الطلبة أدوات الذكاء الاصطناعي مثل Grammarly وQuillBot في كتابة النصوص ومراجعتها. أظهرت النتائج وجود تحسنات ذات دلالة إحصائية في جميع مهارات الكتابة المقاسة، وذلك وفق نتائج اختبار (t) للعينات المرتبطة. كما كشفت النتائج عن تحسن ملحوظ في اتجاهات الطلبة نحو الكتابة المدعومة بالذكاء الاصطناعي، حيث أبدى الطلبة مستويات أعلى من الثقة والمشاركة والتحفيز. وتؤكد هذه النتائج الأهمية التربوية لدمج أدوات الذكاء الاصطناعي في تدريس مهارات الكتابة باللغة الإنجليزية. وتوصي الدراسة بدمج تطبيقات الكتابة المدعومة بالذكاء الاصطناعي في مناهج تعليم اللغة، مع الحفاظ على ممارسات تعليمية متوازنة تعزز استقلالية المتعلم وتنمية مهارات الكتابة بصورة فعّالة.

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* Corresponding author.
E-mail address: aaladini@du.edu.om
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