AI Tools in Teaching and Learning English Academic Writing Skills

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ABSTRACT

Keywords: Technology; AI tools, academic writing skills

Recently, the application of innovative technological solutions has revolutionized various aspects of our lives, and education is no exception. This study investigated the use of AI-powered tools and their effects on teaching and learning English academic writing skills. The research was conducted with the participation of 5 teachers and 60 students from five academic writing classes in two language centers in Hanoi. Data from the research were mainly collected through tests and questionnaires. Interviews were used as a supporting tool. The research findings indicate that teachers and students have positive attitudes toward artificial intelligence (AI), and AI tools are beneficial to the participants at discourse, sentence, and word/phase levels. The application of AI-powered writing tools has a considerable contribution to the students in terms of cohesion and coherence, lexical resources, grammatical range, and accuracy. The study can be considered an informative source of reference for teachers and students who are teaching and learning academic writing, especially prospective candidates for standardized English tests.

Introduction

English has been receiving more focus in Vietnam than any other foreign language. It plays a significant part in the curriculums of public and private schools and in students' extra classes. In learning English as a second or foreign language, writing is considered a skill or competence that is hard to accomplish (Yagiz et al., 2009). Hence, writing is more than solely a tool for people to communicate; it is a complex process in which teaching effectiveness can only be achieved if teachers thoroughly understand this complexity (Cheung, 2016).

Many researchers and teachers in the field of language teaching share a common view that writing, in its nature, is the most difficult language skill to teach and learn compared to other language skills (Hyland, 2003). To most language learners, mastering a language skill is a painstaking journey, but the process is even bitter when it comes to writing (Byrne,1993). Therefore, the language teachers' job is definitely more difficult and challenging and requires

teachers' ability to control lessons, gradually update knowledge, and apply proper writing pedagogical approaches and/or techniques and real-life experiences (Kroll, 1990; Swales & Feak, 1994).

Thanks to the evolution of technology in recent times, teachers all over the world have applied advanced technological solutions to their teaching (Nguyen, 2024). The integration of artificial intelligence (AI) into educational settings has resulted in significant improvements in teaching and learning processes (Chen et al., 2020; Hwang et al., 2020; Phan, 2023), and writing is a particular area that has benefited impressively from the use of AI-powered tools (Chen & Wei, 2021; Moore et al., 2016; Thet & Htay, 2021). In contrast, some other studies have shown that AI writing tools did not help students improve their writing skills but brought big considerations related to students' plagiarism and laziness (Krajcik & Kim, 2020; Kornfeld & Roy, 2021).

In Vietnam, education has benefited greatly from the application of technology, especially during the Covid pandemic. Vietnamese educators and learners are willing to employ updated technology in their language teaching and learning. However, teachers and students are still hesitant to use AI as this technology is too new, "too intelligent," and seems uncontrollable. It is necessary to conduct studies on the application of AI in education, especially in language teaching and learning, in order to specify the influence of AI on education, define if there are both positive or negative effects of AI, and discover whether the positive aspects outweigh the negative ones, etc. This study, therefore, looks at the cases of teaching academic writing skills with the help of AI-powered tools in Vietnam. By introducing AI tools to teaching and learning academic writing, the researcher wishes to investigate if AI could help improve the student's academic writing skills to make proper judgments of AI's future in the field of language teaching and learning.

Literature review

Writing

Writing, one of the four language skills, has long been used by humans to express opinions, thoughts, attitudes, and feelings in written form. In the field of language teaching and learning, there are a number of definitions of writing or writing skills mentioned by different linguists all over the world.

According to Elbow (1981), writing is the representation of the language in textual mode through the utilization of a set of signs or symbols. In other words, writing is the process of using "*graphic symbols*," which involves "*encoding messages of some kind*" to translate an individual's thoughts into the language (Byrne, 1993, p. 1).

In contrast to receptive skills, Scholes & Nancy (1985) view writing and speaking skills as productive skills that are both ways of thinking and a means of communication. In addition, Nunan (2003) asserts that writing is a mental process of inventing ideas, thinking about how to articulate them, and organizing them into statements, sentences, or paragraphs that are clear for the readers to comprehend.

In this paper, the author supports the viewpoint that writing is a productive skill used to

communicate people's thoughts, opinions, feelings, etc., in written forms.

Academic writing

Academic writing refers to the type of writing used for academic purposes in colleges or universities. It is considered the principal means of communication between scholars, lecturers, and students in academic subjects and disciplines in higher education (Greene & Lidinsky, 2015; Johnson, 2016).

As standard written English, academic writing possesses some distinctive features that make it different from other types of writing. Academic writing is objective, concise, logical, clear, focused, and formal (Giltrow et al., 2014; Osmond, 2016; Starkey, 2015). In addition, academic writing is produced in particular contexts and serves certain tasks for identifiable purposes with specific audiences (Grabe & Kaplan, 1996; Starkey, 2015). These distinguishing features make academic writing typical in terms of formality, organization, word choices, sentence construction, and discourse patterns (Gottlieb & Ernst-Slavit, 2013). Ferris (2018) seems to agree with Gottlieb and Ernst-Slavit (2013) when he affirms that effective academic writing in professional settings involves an intricate range of skills and knowledge bases. The writer needs to have sufficient knowledge of the content, the context of writing, the purpose of the writing, and the audience, as well as an advanced grasp of both linguistic and extra-linguistic features, including Vocabulary, spelling, grammar, cohesive devices, and punctuation, capitalization, and formatting.

In summary, the academic writing style is distinctive in terms of formality, language norms, precision, and hedging. People were not born with academic writing skills, so these skills need to be trained in order to be well-master, especially in professional contexts.

Elements of academic writing

Although presented separately, elements of academic writing actually overlap and affect one another. In academic discourse, specialized and academic words are used in grammatical structures, which, in turn, form the organization of ideas and arguments supported by evidence and explanations or examples. According to Gottlieb & Ernst-Slavit (2013: p.3), elements of academic language are organized in three dimensions, including discourse, sentence, and word/phrase levels as shown in the Table 1.

In the setting of this research, with 90% of the participants studying academic writing for the TOEFL-iBT and IELTS tests, the student's current situations, the TOEFL writing rubrics, and the IELTS new writing band descriptors, the researcher decided to focus on the following components involving the three above dimensions of academic language including Coherence and cohesion, Grammar and Accuracy, and Vocabulary.

Table 1. Dimensions of academic language

Academic Language	General Areas of Coverage
Discourse level	- Text types - Genres - Voice/ perspective - Cohesion across sentences (e.g., through connectors) - Coherence of ideas - Organization of text or speech - Transitions of thoughts
Sentence level	- Types of sentences: simple, compound, complex, compound-complex - Types of clauses: independent, dependent - Syntax (forms and grammatical structures)
Word/Phrase level	- Vocabulary: general, specialized, technical academic words and collocations - Multiple meanings of words - Nominalizations - Idiomatic expressions

Adapted from Gottlieb & Ernst-Slavit (2013)

Coherence and cohesion

Coherence and cohesion are terms used in discourse analysis to elucidate the consistency of written discourses. In academic writing, the former term refers to the meaningfulness of sentences in a logical flow of ideas, while the latter denotes the utility of sentences in the connection of ideas at both sentence and paragraph levels (Louwerse & Graesser, 2005).

Obviously, coherence reflects the nature of academic writing that the texts produced are expected to be logical, understandable, and eligible to the readers. It, therefore, indicates continuity in meaning and context. In another aspect, cohesion focuses more on grammar with the use of discourse connectors, pronouns, conjunctions, lexical substitutions, referencing, etc., to maintain continuity in words or sentence structures (Singh & Lukkarila, 2017).

In the writing papers for IELTS or TOEFL-iBT tests, organization, or the logical arrangement of ideas, arguments, and information in an appropriate format, is a crucial criterion to indicate how academic a writing piece is as an organization means presenting ideas coherently and cohesively.

Grammar and Accuracy

Under the light of Canale and Swain's (1980) model of communicative competence, which considered grammatical competence a component of communicative competence, this paper argues that grammar and accuracy are parts of academic writing, without which no text can be considered a good piece of writing. Celce-Murcia (1991), in her study with non-native undergraduate students

in different universities in America, noticed that the high frequency of grammatical errors contributed much to the unacceptable level of the essays submitted to the faculties.

Baleghizadeh and Gordani (2012) acknowledge the role of grammar as indispensable in academic writing and stress that even native speakers sometimes write inaccurately in terms of grammar. Hence, learners of English should aim to gradually enhance their writing accuracy so as to make their work as decipherable and proficient as possible. This view is completely supported by Jonson (2016) when he argued that teachers should prepare their students to be familiar with grammatical rules and train them to use a wide and precise range of grammatical structures since grammar supports and maintains accuracy in writing.

This study takes grammar and accuracy as one perspective of academic writing with the belief that a good basic knowledge of English grammar would help the students avoid flaws, difficulties, and confusion while maintaining the accuracy and academic features of their writing.

Vocabulary

In Gottlieb & Ernst-Slavit's (2013) dimensions of academic language, Vocabulary is in the lowest line at word and phrase level. It, however, is never of the lowest importance. This is because academic writing has a higher level of Vocabulary in comparison to other types of writing. In academia, it is essential to equip students' competence to understand and use academic words correctly.

Osmond (2016) argues that knowledge of academic Vocabulary ensures that writers produce texts that are understandable, eligible, and centered around the topics they wish to deliver to educated readers of the field. This argument is supported by Bailey when he suggests that in order to "*read and write academic texts effectively, students need to be familiar with formal vocabulary widely used in this are*a" (2006, p.179). Therefore, the writers must be careful in choosing and using appropriate academic vocabulary items specific to a particular genre as they embody meaning in academic writing. Certainly, it should be noted that using "*big words*" is unnecessary, and informal words and uncommon abbreviations are inadvisable in academic writing (Chauhan, 2022). Too many high-level words can increase reading time and reduce the chances of truly comprehending the writer's opinions.

Technology in teaching and learning writing skills

With the rapid development of technology, education has changed much, not only in the methods teachers use to deliver their lessons but also in the ways students carry out their studies. Screens are substituting printed books and papers, while keyboards, mice, or touchpads are replacing pens and pencils with the help of technology (Batanero et al., 2021). In our modern times, technology and digital learning solutions bring more opportunities for learners to experience a more engaging and challenging teaching and learning process (Mullammaa, 2010).

AI tools or software applications that utilize artificial intelligence technology can be considered the most developed aspect of technology. Thanks to this advancement, language teaching and learning have been dramatically transformed. We now have virtual language tutors to guide students and chatbots, enabling learners to practice speaking, listening, and reading skills in

natural and interactive modes. In writing, AI tools provide learners with automated assistance, suggestions, and corrections through advanced algorithms and natural language processing (Brown et al., 2020; Geitgey, 2018; Heaven, 2020).

Research Question

The present study was designed to answer the following research question: *To what extent do AI tools help improve students' academic writing skills?*

Methods

Pedagogical Setting & Participants

This study was undertaken in two language centers in Hanoi. Two centers (coded as centers A and B) were selected randomly among 12 language centers that offered academic writing courses for students preparing for such proficiency tests as IELTS or TOEFL-iBT. Center A had two classes, and Center B had three classes in the first week of an IELTS preparation course. Therefore, all five classes were selected to participate in the research.

Five teachers and 60 students participated in the study. Participation in the study was voluntary and anonymous. They were guaranteed that the information collected was totally confidential, being used for just the research purpose, and would not be given to any third party.

The teachers (aged 22 to 28) all graduated from prestigious universities (one was from Hanoi University, another was from the Diplomatic Academy of Vietnam, and the others were from the University of Languages and International Studies, Vietnam National University). Those teachers were all qualified with IELTS Band 7.5 to 8.0 and possessed certificates of English language education. They had been teaching academic writing skills for at least 180 hours, especially writing classes for IELTS candidates. The teachers had no experience in using AI to support their teaching, but they eagerly agreed to apply AI as part of their student's learning process. In the pre-treatment interview, the teachers all agreed that teaching writing required time and effort. They sometimes could only show mistakes to the students instead of carefully providing them with language suggestions and formative feedback. They hoped that AI could be a virtual helpful assistant in their teaching.

The students from the five classes had the same English proficiency level (Band 4.0-4.5 IELTS) and the same studying purpose (aiming at Band 5.0-5.5 IELTS). They planned to take a 60-hour IELTS course addressing all four language skills, among which writing skills accounted for 20 hours. The writing lessons were delivered separately from the other skills and took two hours every week for ten weeks. Besides, the students had to spend at least two hours per day studying independently. The students' demographic information is shown in the table below.

Table 2. Student's age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 15	12	20.0	20.0	20.0
	16-18	15	25.0	25.0	45.0
	19-22	27	45.0	45.0	90.0
	23-30	6	10.0	10.0	100.0
	Total	60	100.0	100.0	

Table 3. Students' English learning experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4-7 years	24	40.0	40.0	40.0
	8-10 years	36	60.0	60.0	100.0
	Total	60	100.0	100.0	

Design of the Study

Action research is usually applied by people who wish to improve their performance or any group or organization that has the same aim. Because of its nature, action research has been widely used by language teachers all over the world to improve their teaching.

This study is an action research project as it was started because of the problems found in the classroom and aimed to change the situations (Kemmis & Mc Taggart, 1988). Traditionally, Lewin's model of action research (cited in Burns, 2000) involves a cyclic sequence including two major phases: diagnosis and therapeutic, with seven sub-stages in two cycles. Later, Nunan (2001) argued that an action research study includes initiation, preliminary investigation, hypotheses, intervention, evaluation, dissemination, and follow-up steps. To make it simple, Gay and Airasian (2003) proposed the four basic steps in an action research study as (i) identify the topic or issue to study; (ii) collect data related to the chosen topic or issue; (iii) analyze and interpret the collected data; and (iv) carry out action planning, which represents the application of the action research results. Creswell (2005) suggested 8 steps for carrying out an action research project, including determining if action research is the best design to use, identifying a problem to study, locating resources to help address the problem, identifying information to be needed, implementing the data collection, analyzing the data, develop a plan for action and implement the plan and reflect. This research adapted Creswell's (2005) model of action research and applied it in 12 weeks, as described in Table 4 below.

Data collection instruments and procedure

The research has been mainly conducted in the light of qualitative and quantitative methods. Data from the pre-test and post-test, questionnaires, and interviews have been collected and analyzed to find out answers to the research question.

In this study, a pre-test of writing an academic essay (a mock test of IELTS writing task 2) was delivered to students to find out their proficiency before the treatment. After a 10-week intervention with AI tools, a post-test, which is similar to the pre-test, was conducted to examine if there was an improvement in the students' writing competence. The test papers were marked

by two other teachers who were not in charge of teaching the tested class. IELTS writing task 2 Band descriptors version May 2023 were employed for the teachers to rate the essays. Since the research sought information to determine if there is an improvement in the student's academic writing skills, the overall writing score would not be rounded but kept in two decimal places so as to measure the students' improvement and changes exactly.

In regard to the survey, two questionnaires were designed to collect data from students. The pre-treatment questionnaire sought to find out the students' weaknesses in terms of academic writing. The post-treatment questionnaire investigated the benefits of using AI tools in teaching and learning writing skills to see if the weaknesses found in the pre-treatment questionnaire had been surmounted. The questionnaires used a Likert scale ranging from one to five, moving from strongly disagree to strongly agree respectively, and ended with open-ended questions at which the participants could add more information about their weaknesses and benefits of utilizing AI, give details or more explanations of what they have stated in the previous statements.

Interviews were conducted to get information from the teachers in charge of those classes so that details of some findings were clearly presented and explained. The results found are believed to support data collected from the tests and the questionnaires.

Although the research lasted 12 weeks, the intervention phase was 10 weeks because the first and the last weeks were left for preparing, collecting, and analyzing data.

Table 4. The procedure of the study

Time	Tasks
Week 1	- Identify the problems; - Working with the language centers, the teacher and the students; - Design the tests, questionnaires, and interview questions for the students; - Deliver the pre-tests and the pre-treatment questionnaires; - Analyze the data collected from the pre-tests and the pre-treatment questionnaires;
Week 2 - 11	- Review AI tools for writing and choose the most suitable ones; - Introduce and train AI tools to the participants; - Apply AI tools in academic writing; - Observe the class and support the participants in applying AI in their teaching and learning.
Week 12	- Deliver the post-tests and the post-treatment questionnaires to the students; - Interview teachers; - Analyze the data collected from the post-tests, the post-treatment questionnaires, and the interviews; - Draw conclusions and reflect.

It should be noted that the AI tools used in this study were Grammarly and Quillbot. During the ten weeks of conducting this action research project, free versions of Grammarly and Quillbot were introduced to the teachers and the students as main intervention instruments. Of the two tools, Grammarly uses machine learning algorithms to detect grammar, spelling, and punctuation errors and then provides suggestions for improving sentence structure and word

choice. The latter, Quillbot, provides grammar, spell-checking, a contextual thesaurus, and a readability analyzer. It also provides feedback on writing styles, such as sentence variation and the use of clichés. Additionally, teachers and students were encouraged to find and use other AI-powered tools that they find helpful in teaching and learning academic writing skills.

After each writing section, the students were asked to write an essay at home. They then uploaded their essays on either Grammarly or Quillbot websites, checked the suggestions, and decided how they should improve their work. The teachers would review the essays and ask students to notice systematic errors for the whole class. Teachers were also encouraged to use Grammarly or Quillbot to check their students' papers and make proper suggestions.

Findings and Discussion

The students' weaknesses in academic writing skills before the application of AI tools

As mentioned previously, the pre-treatment questionnaire has been delivered to find out the students' weaknesses in terms of academic writing. Based on the data collected, the research could find out the students' weaknesses and choose suitable AI tools to enhance the students' writing skills.

Table 5. Students' weaknesses at the discourse level

		Cohesion across sentences	Coherence of ideas	Organization of text
N	Valid	60	60	60
	Missing	0	0	0
Mean		4.05	4.05	4.25
Median		4.00	4.00	4.00
Mode		4	4	4
Std. Deviation		.746	.811	.541
Range		2	3	2
Minimum		3	2	3
Maximum		5	5	5

In the three above aspects, namely cohesion across sentences, coherence of ideas, and organization of text, the Means are from 4.05 to 4.25. It suggests that a majority of the students agree that these three traits are problematic to them and need treatment.

From the interview with the teachers, the researcher was informed that students could only use simple, cohesive devices, but some of them still made mistakes like using unparalleled linking words such as "firstly," then, "second," "third," etc. Furthermore, the organization and flow of ideas were not good as the students still struggled to generate ideas, and even when they could find ideas for writing, they still arranged them illogically.

Table 6. Students' weaknesses at the sentence level

		Types of sentences	Types of clauses	Syntax
N	Valid	60	60	60
	Missing	0	0	0
Mean		4.40	4.40	4.50
Median		4.00	4.00	4.50
Mode		4	4	4[a]
Std. Deviation		.494	.494	.504
Range		1	1	1
Minimum		4	4	4
Maximum		5	5	5

a. Multiple modes exist. The smallest value is shown

Table 6 reveals that at the sentence level, the Means of 4.40 to 4.50 indicate a high level of agreement among participants that they are not good at using a variety of types of sentences, clauses, forms, and grammatical structures.

When asked about their students' problems, the teachers disclosed that their students usually used short and simple sentences with just one Subject–verb structure. Compound and complex sentences with subordinate, coordinate, and relative clauses were rarely found in the students' essays.

Table 7. Students' weaknesses at word/phrase level

		Vocab size	Nominalization	Spelling
N	Valid	60	60	60
	Missing	0	0	0
Mean		4.25	4.45	4.00
Median		4.00	4.00	4.00
Mode		4	4	4
Std. Deviation		.437	.502	.781
Range		1	1	3
Minimum		4	4	2
Maximum		5	5	5

In Table 7, the Means from 4.00 to 4.45 indicate that a great number of the students agreed that they needed more knowledge of Vocabulary. This result was supported by the teachers' complaints that most students were not able to use Vocabulary in academic wordlists. They were just familiar with words of everyday life and common topics. Teachers also added that the students were used to writing with verbs rather than nouns or noun phrases. Additionally, they explained that students might make spelling mistakes with long words, especially four- or five-syllable ones.

The students' improvement in academic writing skills after the application of AI tools

After the treatment with AI tools, the post-treatment questionnaire was distributed to discover how students judged their improvement in academic writing skills. Table 8 below shows the students' opinions on their improvement in academic writing skills at discourse, sentence, and word/phrase levels.

Table 8. Student's improvement at discourse, sentence, and word/phrase levels

		Discourse level			Sentence level			Word/phrase level		
		Cohesion across sentences	Coherence of ideas	Organization of text	Types of sentences	Types of clauses	Syntax	Vocab size	Nominalization	Spelling
N	Valid	60	60	60	60	60	60	60	60	60
	Missing	0	0	0	0	0	0	0	0	0
Mean		3.73	4.03	4.22	3.47	3.27	3.87	4.15	4.05	3.70
Median		4.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00
Mode		4	4	4	4	3	4	4	4	4
SD		.482	.802	.555	.853	.821	.724	.360	.220	.462
Range		2	3	2	3	3	3	1	1	1
Minimum		3	2	3	2	2	2	4	4	3
Maximum		5	5	5	5	5	5	5	5	4

As seen from Table 8, the Means from 3.7 to 4.22 signify that many learners agreed that there was improvement in their academic writing skills at discourse, sentence, and word/phrase levels. Among the three levels, students made the most significant enhancement at the discourse level, with the top position belonging to an organization of text (Mean = 4.22) in front of coherence of ideas (Mean = 4.03) and cohesion across sentences (Mean = 3.73). The word/phrase level progress ran after the enrichment of vocabulary size (Mean = 4.15). Although advance at the sentence level has the lowest Means among the three levels (with all Means from 3.27 to 3.87, below 4), this still denotes that the improvement is statically meaningful.

The paired-sample t-test was used to determine whether the students' academic writing skills improved after the treatment with AI tools. The results show that there was a difference between the results of the pre-test and the post-test, and this difference is statically important.

Table 9. Student's improvement in academic writing skills

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Task response (Pre-test)	3.65	60	.606	.078
	Task response (Post-test)	4.62	60	.585	.076
Pair 2	Coherence & Cohesion (Pre-test)	3.47	60	.503	.065
	Coherence & Cohesion (Post-test)	5.07	60	.634	.082
Pair 3	Lexical resources (Pre-test)	3.33	60	.475	.061
	Lexical resources (Post-test)	4.88	60	.585	.076
Pair 4	Grammatical Range and accuracy (Pre-test)	3.33	60	.510	.066
	Grammatical Range and accuracy (Post-test)	4.63	60	.712	.092
Pair 5	Overall writing score (Pre-test)	3.4458	60	.32250	.04163
	Overall writing score (Post-test)	4.8000	60	.43860	.05662

Table 10. Paired-Samples T Test

Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Task Response	Post-test – Pre-test	.967	.317	.041	.885	1.049	23.612	59	.000
Coherence & Cohesion	Post-test – Pre-test	1.600	.588	.076	1.448	1.752	21.077	59	.000
Lexical resources	Post-test – Pre-test	1.550	.594	.077	1.396	1.704	20.197	59	.000
Grammatical range and accuracy	Post-test – Pre-test	1.300	.720	.093	1.114	1.486	13.982	59	.000
Overall Writing Score	Post-test – Pre-test	1.35417	.41500	.05358	1.24696	1.46137	25.275	59	.000

*** p <0.001

In Table 9 and Table 10, the Mean of the overall writing score of the post-test was 1.35 higher than that of the pre-test with t = 25.275; Df = 59 and Sig. = .000 <0.001. This result indicates that there is a good improvement in student's academic writing. The two tables also hint at the development of the students aligning to the four marking criteria in which students' writing is most increased in terms of "*coherence & cohesion*" with the Mean (post-test – pre-test) = 1.6. The next areas of improvement belong to *lexical resources* and *grammatical range and Accuracy* with Means = 1.55 and relatively 1.3. Students witnessed a lesser increase in Task response with Mean = 0.967.

The participating teachers agreed that it took longer time and effort to improve students' task response, grammatical range, and accuracy among the four marking criteria. Teacher A explained that:

> *"Students still leave some ideas incompletely addressed because they spend too much time trying to use a wide and complex range of structures. They, consequently, do not have enough time to think carefully and balance their writing."*

Teacher D added that:

> *"I still see the result as good news since at least there is an improvement in just 10 weeks of intervention. My students still make mistakes in using forms and structures. Most of them did not (or "could not," to be more exact) apply a sufficient range of sentences and clauses. They, however, make a significant attempt to use sound and complex structures even though they tend to be faulty. Definitely, I need more time to enlarge their grammatical knowledge.*

Interestingly, both teachers and students, in their in-depth interviews, agreed that the improvement in task response was not because of AI tools. The teachers deserved an acknowledgment of students' progress in this criterion.

The link between the frequency use of AI and the students' improvement

A one-way ANOVA test was used to determine if there was a connection between the frequency of practice with AI tools and the student's improvement in academic writing competence. In other words, a one-way ANOVA test was done to ensure that the above improvement made by the students was because of the AI tool utilization but not any other variables or factors.

Table 11. One-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.518	3	1.506	14.941	.000
Within Groups	5.644	56	.101		
Total	10.161	59			

Table 11 indicates a statically meaningful difference in writing test results between students with a dissimilar frequency of AI application with $F_{(3, 56)} = 14.941$, $p = 0.000 < 0.001$. Therefore, it can be concluded that AI tools mainly contributed to the students' improvement in academic writing skills. That is to say, the more students apply AI tools, the higher the writing score they achieve.

Discussion

The findings of this study clearly show that AI-powered tools positively impact students' academic writing. This supports Batanero et al.'s statement that technology, in general, and AI, has transformed language teaching and learning (Batanero et al., 2021).

Within just ten weeks, it is understandable that with the help of AI tools, the students progressed much in coherence, cohesion, and lexical resources, as building up knowledge of Vocabulary and connectors usually go first in the process of language acquisition (Green, 2013) and grammatical knowledge is bootstrapped from the acquirement of a small vocabulary (Pentimonti et al., 2015; Tomblin & Zhang, 2006). The study shares Chen and Wei's cases (2021) in finding out that the application of an AI-powered writing assistant

improved students' overall writing quality and helped them to organize their thoughts. However, in Chen and Wei's study, the AI writing assistant used also helped the students generate ideas. It does not contradict this study, as the explanation for this difference lies in using AI tools. In this research, the two AI tools, Grammarly and Quillbot, focused more on checking and giving suggestions in terms of language, not generating ideas like other tools like ChatGPT or Bing AI. In fact, being able to create a good piece of academic writing in terms of content reflects the writer's competence in generating ideas. Regarding writing in general and academic writing in particular, there are some ways to help learners find ideas, such as brainstorming (White & Arndt, 1991), using mind maps (Bailey, 2015), or selecting reliable resources to read carefully and jotting down all the ideas that come into our minds and can support the writer's arguments. (Johnson, 2016; Singh & Lukkarila, 2017; White & Arndt, 199). Furthermore, it is essential to note that in order to help the students write good academic texts, teachers need to equip their learners with appropriate cognitive schema, knowledge of topics, and Vocabulary related to the topics (Hyland, 2003).

Both the teachers and the students are right to hold the thought that the teachers help their students improve in the task response criterion. The teachers can train the students to address all parts of the essays completely instead of developing unbalanced paragraphs or finding insufficient time to write conclusions (Kilic, 2019). Once students master lexical resources, grammatical range, and accuracy, they will improve their task response.

Although the positive impact of AI tools in teaching and learning academic writing skills needs to be acknowledged, careful consideration of the other side of AI should be taken. Many students may see AI's advantages while ignoring its dark side. Teachers and researchers have raised a warning that AI can have some negative effects in the long term. For example, people will become technology-dependent by relying too much on AI. In addition, as AI can think and generate ideas as humans so, we, the real humans, will turn into a lazier version that may lose the ability to think creatively, logically, and thoughtfully (Kornfeld & Roy, 2021).

Conclusion

The study was conducted to investigate the effects of AI-powered tools on teaching and learning English academic writing skills. The findings show that there is a promising result in terms of improvement in coherence, cohesion, and lexical resources. Students also progress with regard to grammatical range and accuracy, even though the changes are a bit lower than the two aforementioned criteria. This paper, however, looks at the positive side of AI. It is expected that a more elaborate study on the other side of AI should be conducted in the near future.

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References

Bailey, S. (2011). *The essentials of academic writing for international students*. (3rd ed.). Routledge.

Baleghizadeh, S. & Gordani, Y. (2012). Academic Writing and Grammatical Accuracy: The Role of Corrective Feedback. Gist: Education and Learning Research Journal, 6, 159–176. https://doi.org/10.26817/16925777.19

Batanero, J. M. F, Rueda, M. M., Cerero, R. F. & Gravan, P. R. (2021). Impact of ICT on writing and reading skills: A systematic review (2010 – 2020). Language and Technology. 14 (2), 1-12. https://doi.org/10.35699/1983-3652.2021.34055.

Brown, T.B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., Neelakantan, A., Shyam, P., Sastry, G., Askell, A., Agarwal, S., Herbert-Voss, A., Krueger, G., Henighan, T., Child, R., Ramesh, A., Ziegler, D. M., Wu, J., Winter, C. & Amodei, D. (2005). *Language models are few-shot learners*. arXiv. Computer Science, Computation and Language.

Byrne, D. (1993). *Teaching writing skills*. Longman

Celce-Murcia, M. (1991). Grammar pedagogy in second and foreign language teaching. *TESOL quarterly*. 25 (3). 459-480.

Chauhan, P. (2022). Fundamentals of Academic Writing: A Literature Review. *Journal of NELTA*, 27(1-2), 161-180.

Chen, M. X., Lee, B. N., Bansal, G., Cao, Y., Zhang, S., Lu, J., & Wu, Y. (2019). Gmail smart compose: Real-time assisted writing. In *Proceedings of the 25th ACM SIGKDD international conference on knowledge discovery & data mining*. 2287–2295.

Chen, W., & Wei, H. (2021). Effect of an AI-powered writing assistant on writing quality and idea generation. *Journal of Educational Technology & Society*, 24(3), 84–97.

Cheung, Y. L. (2016). Teaching Writing. In W. A. Renandya, & H. P. Widodo (Eds.), *English language teaching today: Building a closer link between theory and practice*. Springer International.

Elbow, P. (1981). *Writing with power techniques for mastering the writing process*. Oxford University Press.

Feris, D. R. (2018). Writing in a second language. In Newton, J.M., Ferris, D.R., Goh, C. C. M., Grabe, W., Stoller, F. L. & Vandergriff, L. (Eds.), *Teaching English to second language learners in academic context: Reading, writing, listening, and speaking* (75-122). Routledge.

Geitgey, A. (2020, September 24). *Natural Language Processing is Fun! How computers understand Human Language. Medium*. Retrieved from https://medium.com/@ageitgey/natural-language-processing-is-fun-9a0bff37854e

Giltrow, J., Gooding, R., Burgoyne, D., & Sawatsky, M. (2014). *Academic writing: An Introduction (3ʳᵈ ed.)*. Broadview Press.

Gottlieb, M. & Ernst-Slavit, G. (2013). Academic language: A centerpiece for academic success in English language arts. In Gottlieb, M. & Ernst-Slavit, G. (Eds.), *Academic language in diverse classrooms*. 1. Corwin. 1-38.

Grabe, W., & Kaplan, R.B. (1996). *Theory and practice of writing*. Longman.

Green, L. (2013). *Why Language Learners Should Prioritize Declarative Memory.* Retrieved from https://blogs.transparent.com/language-news/2013/03/25/language-learning-with-the-declarative-method/?_ga=2.166217726.1163263781.1658082551-1868130991.1658082551

Greene, S., & Lidinsky, A. (2015). *From inquiry to academic writing: A practical guide. (3rd ed.)* St. Martin's.

Harmer, J. (2004). *How to teach writing*. Pearson Education Limited.

Heaven, W. D. (2020). Open AI's new language generator GPT-3 is shockingly good and completely mindless. *MIT Technology Review*. https://www.technologyreview.com/2020/07/20/1005454/openai-machine-learninglanguage-generator-gpt-3-nlp/

Hwang, G. J., Xie, H., Wah, B. W., & Gasevic, D. (2020). Vision, challenges, roles and research issues of Artificial Intelligence in Education. *Computers & Education: Artificial Intelligence.* 1, 100 - 110.

Hyland, K. (2003). *Second language writing*. Cambridge University Press.

Johnson, A. (2016). *Academic writing: Process and product*. Rowman & Littlefield Publishers

Kemmis, S & R. Mc Taggart. (ed.) 1988. The Action Research Planner. In Nunan, D. 2001 (ed.). *Research Methods in Language Learning.* Cambridge University Press.

Kilic, M. (2019). Vocabulary Knowledge as a Predictor of Performance in Writing and Speaking: A Case of Turkish EFL Learners. *PASAA. 57*(January – June 2019). 133-164

Kornfeld, L., & Roy, D. (2021). Educational implications of AI writing tools for academic writing. *British Journal of Educational Technology*, *52* (1), 248–262. https://doi.org/10.1111/bjet.12973.

Krajcik, Z., & Kim, K. (2020). To what extent do AI writing tools improve writing quality? A case study of master's level students. *Educational Sciences*, *10* (11), 3-21.

Kroll, B. (ed.). (1990). *Second language writing: Research insights for the classroom.* Cambridge University Press.

Lewin, K cited in Burns, R.B. 2000. Action Research. In Various Author (eds.), OTED 1083 & OTED 1085 *Qualitative Research Methods Readings*. Pearson Education Australia.

Louwerse, M. & A. Graesser (2005). Coherence in discourse. In Strazny, P. (ed.). *Encyclopedia of Linguistics*. Fitzroy Dearborn. 216–218

Moore, J. L., Rosinski, P., Peeples, T., Pigg, S., Rife, M. C., Brunk-Chavez, B., Lackey, D., Kesler Rumsey, S., Tasaka, R., Curran, P., & Grabill, J. T. (2016). Revisualizing

composition: How first-year writers use composing technologies. *Computers and Composition*. *39*. 1-13. https://doi.org/10.1016/j.compcom.2015.11.001.

Mullammaa, K. (2010). ICT in Language Learning: Benefits and Methodological Implications. *International Education Studies*, 3(1), 38-44.

Nguyen, T. C. (2024). University Teachers' Perceptions of Using ChatGPT in Language Teaching and Assessment. *Proceedings of the AsiaCALL International Conference*, 4, 116-128. ISSN: 2833-6836; ISBN: 979-8-9870112-4-9. DOI: https://doi.org/10.54855/paic.2349

Nunan, D. (2001). *Research Methods in Language Learning*. (2nd ed.). Cambridge University Press.

Nunan, D. (2003). *Practical English Language Teaching*. Mc Graw Hill.

Osmond, A. (2016). *Academic writing and grammar for students (2nd ed.)*. Sage.

Pentimonti, J., O'Connell, A., Justice, L. & Cain, K. (2015). The dimensionality of language ability in young children. *Child Development*. 86 (6), 1948-1965.

Phan, T. N. L. (2023). Students' Perceptions of the AI Technology Application in English Writing Classes. *Proceedings of the AsiaCALL International Conference*, 4, 45-62. ISSN:2833-6836, ISBN: 979-8-9870112-4-9. DOI: https://doi.org/10.54855/paic.2344

Punch, K. F. (2006). *Developing Effective Research Proposals (2nd ed.)*. SAGE

Scholes, R. & Nancy, R. C. (1985). *The Practice of Writing*. ST Martin Press

Singh, A.A. & Lukkarila, L. (2017). *Successful Academic Writing: A Complete Guide for Social and Behavioral Scientists.* The Guilford Press.

Starkey, D. (2015). *Academic writing now: A brief guide for busy students*. Broadview Press.

Swales, J. M., & Feak, C. B. (1994). *Academic writing for graduate students: A course for non-native speakers of English*. The University of Michigan Press.

Thet, H., & Htay, H. (2021). The Effectiveness of AI writing tools on developing EFL university students' academic writing skills. *Journal of NELTA*, 26 (1), 53–67. https://doi.org/10.3126/nelta.v26i1.37162.

Tomblin, J. B. & Zhang, X. (2006). The dimensionality of language ability in school-age children. *Journal of Speech, Language, and Hearing Research*. 49, 1193-1208.

White, R. & Arndt, V. (1991). *Process writing*. Longman.

Yagiz, O., Yigiter, K. & Genc, G. (2009). Academic writing in English: Approaches, processes and challenges in higher education. *IBU Repository*, accessed September 18, 2023, Retrieved from https://omeka.ibu.edu.ba/items/show/3381.

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