AI WRITING CORRECTION TOOLS:
TEACHERS AND STUDENTS' PERCEPTION

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Abstract
This study investigates the similarities and differences of perceptions of teachers and students, examines the issue of academic integrity, and explores the potential for incorporating AI writing correction tools into language teaching and learning. Eighteen lecturers and thirty-nine graduate students were asked to respond to a closed- and open-ended questionnaire to answer the research questions. The sample was collected from the TESOL program at St. Andrews University's International Education Institute. The questionnaire was analysed using Qualtrix to see the patterns from the Likert scale, and thematic analysis was utilized to anticipate the identified themes from the open-ended questionnaire. The findings show that teachers and students have various opinions about using AI writing correction tools in a classroom setting, with some similarities and differences. Interestingly, the majority of teachers and students did not regard the use of AI writing correction tools as a violation of academic integrity. Furthermore, there was a conflicting view among teachers about integrating AI writing correction tools in the classroom. Meanwhile, most students agreed that AI writing could be integrated into teaching and learning.

Keywords: *AI writing correction tools, academic integrity, teaching and learning*

INTRODUCTION

Automated writing evaluation (AWE) feedback, more commonly known as computer-generated feedback, has grabbed increasing attention in writing research in recent years with advances in sophisticated language processing technologies that have made holistic scores and corrective feedback instantly available (Zhang, 2020). AWE is the combination of natural language processing (NLP) and rule-based engines that assist users in identifying problems in language (grammar and sentence structures) and mechanics (such as punctuation, capitalization, and abbreviations) (Adams & Chuah, 2023). One of the popular examples of AWE is Grammarly. AWE can also take the form of an intelligent paraphrase tool like QuillBot (Adams & Chuah,

2023). Today many students use AI writing tools, particularly for the purpose of composing academic writing (Wang et al., 2013; Yoon & Hirvela, 2004; Huot, 1996; Tuzi, 2004; Warschauer & Ware, 2006). Writing is perceived as challenging to master due to its arduous and complex process (Levy & Ransdell, 1995). The academic writing procedures and skills are becoming particularly difficult for non-native English speakers and international students (Campbell, 2019). Cohesive devices such as substitution, lexical cohesion, transition, and deixis are also considered the most difficult aspect of discourse in students' academic texts (Al-Haq & Ahmed, 1994). The advent of AI writing tools offering human-like writing (Alharbi, 2023) is a promising solution to support students' academic writing.

Despite students' widespread use of these tools, there is still a dispute concerning AWE's effectiveness. AI writing tools such as Grammarly and QuillBot have shortcomings, often making educators doubt their effectiveness. Grammarly, for example, has problems with grammar accuracy and tone suggestions (Ambarwati, 2021). Despite the shortcomings, Sahu et al. (2020) found that Grammarly is the best correction tool compared to the other similar AWE applications, with the highest accuracy achieving 99%. These contradictory findings have, until now, created doubt about the AI-powered writing tools' effectiveness. In addition to the issue of effectiveness, teachers raise concerns about academic integrity, particularly regarding plagiarism or cheating. AI-powered writing tools transcend beyond vocabulary and grammar to deliver 'human-like' assistance, which worries teachers about students' writing (Alharbi, 2023). Students rarely acknowledge these technologies in their writing, which raises academic integrity concerns because they are not graded purely on their writing ability. However, due to its widespread use, the traditional notion of academic integrity is being challenged (Fyfe, 2022). Finally, the two reasons above, AWE effectiveness and academic integrity, have become barriers to integrating AI writing tools into the classroom. Very limited research has

investigated this topic, particularly in balancing teachers' and students' perspectives, because their perceptions may affect AWE's effectiveness in supporting writing learning and have direct links to learning outcomes (Chen & Cheng, 2008). The AWE shortcomings instead can be utilized to create the opportunity for learning, allowing students to criticize the tool's accuracy, which leads to critical thinking (Grimes & Warschauer, 2010). Koltovskaia (2020) discovered that noting (the error) prompted students to apply cognitive and metacognitive methods. Similarly, O'Neill and Russell (2019) found that Grammarly supplied great grammatical help in various learning contexts. More research, however, is needed to harness AI writing tools' effectiveness to improve language classrooms.

Against this backdrop, this study compares teachers' and students' perspectives on AI writing correction tools. While other literature still focuses on separate issues of perceptions, academic integrity, and the amalgamation of AI writing tools into language classrooms (Ambarwati, 2021; Sahu et al., 2020; Fu et al., 2022; Zhang, 2020; Li, 2021; Fyfe, 2022; Alharbi, 2023; Koltovskaia, 2020; O'Neill & Russell, 2019), this study aims to fill the gap by embracing the three issues to shed light on the future of AI-powered writing tools in education and become a means of consideration of its implementation. This study also examined academic integrity, often overlooked and misunderstood by teachers and students. Therefore, the following research questions are formulated:

1. How do teachers' and students' perceptions of AI writing correction tools differ?

2. Are there perceived issues with academic integrity?

3. Can AI writing correction tools be integrated into teaching and learning?

LITERATURE REVIEW

AI-powered writing assistance and the advancement of computer-assisted language learning are inextricably linked (CALL). Before 1980, CALL was more commonly referred to as CAI (Computer Assisted Instruction) and was first developed in the 1950s for reasons other than language education (Davies & Higgins, 1982 cited in Tafazoli & Golshan, 2015). CALL wasn't utilized to teach English as a Second Language until 1976 (Saettler, 1990; cited in Chapelle, 2001). There are generally three types of CALL waves: behaviorist, communicative, and integrative (Warschauer & Healey, 1998). The phrase "computer" as a tool arose during the communicative CALL era and served to produce communicative tasks involving oral and written tasks with grammar and spelling checks as well as text reconstruction (Tafazoli & Golshan, 2015). Additionally, research demonstrates that the CALL trend has helped students write in English by providing them with practical resources like computer-based exercises and word processors like Microsoft Word and Google Docs, which include rudimentary grammar and spelling checkers (Ambrose & Palpanathan, 2018). According to a study by Jin and Deifell (2013), using online dictionaries could improve students' writing by helping them pay more attention to the context-sensitive meaning, word choice, and grammar of phrases and sentences. The term "intelligent computer assisted language learning" (ICALL) then came into use in the 1990s and introduced some innovations on the incorporation of artificial intelligence in CALL to support learners' writing, such as expert system (EX), intelligent tutoring system (ITS), natural language processing (NLP), natural language generation (NLG), and machine translation (MT) (Gamper & Knapp, 2002). To help students write well, all of these capabilities offer translation, grammar checking, and mistake feedback (Gamper & Knapp, 2002).

Although there have been attempts to integrate them, AI-powered writing tools currently exist in many professional settings outside of education and are primarily kept apart from language classrooms (Alharbi,

2023b). The AI-based sentence, phrase autocompletion, alternative phrasing suggestion, and even sentence and text-generation functions were the most significant advancements in writing that AI has made (Dale & Viethen, 2021). In essence, the objective behind AI-based tools is to improve the learning of effective writing through a variety of affordances that are built into each tool, without displacing the writer's role in the process (Crompton & Song, 2021; Khan et al., 2020; Lu, 2019 cited in Adams & Chuah, 2022). The literature demonstrates that the AI-powered writing tools used to automatically analyse research writing can be broadly categorised into four parts: rule-based, corpus-based detection, natural language processing (NLP), and deep learning, or neural network (Adams & Chuah, 2022). However, the rule-based and natural language processing (NLP) AI-powered writing tools like Grammarly and QuillBolt will only be contextualised in this dissertation. While NLP is the capacity of a computer programme to detect the sentiment or tone in writing, the rule-based tool is a grammar checking system frequently used to suggest and check typical sentence patterns and academic phrases in research publications (Adams & Chuah, 2022). More specifically, NLP processes real-world information in an effort to comprehend spoken and written human language, sometimes known as natural language (Panesar, 2020).

With more than 20 million users worldwide, Grammarly is an AI-powered writing tool that combines an AWE (automatic writing evaluation), AES (automated essay scoring), and AWCF (automated written corrective feedback) application (Nazari et al., 2021). Popular web browsers like Chrome, Safari, and Firefox make Grammarly accessible online. It is compatible with Mac, Windows, Android, and iOS devices and is offered in both a free and premium edition (Grammarly, 2023). Its interface has recently been updated so that it may now be used as a desktop application, a web application, a browser extension, and a Microsoft Word extension (Grammarly, 2023). Grammarly is accessible and contextually aware, unlike

other spell checkers (Dizon & Gayed, 2021). It detects grammar, spelling, sentence construction, and plagiarism (Fitria, 2021). It corrects prepositional errors, irregular verb conjugations, noun misuse, and misused words in fundamental grammar (Fitria, 2021). The latest version of Grammarly checks tone, consistency, clarity and readability, formality, and engagement to improve writing (Barrot, 2022).

Grammarly keeps innovating. Barrot (2022) found four predominances in this application: a writing assistant that automatically checks the document as users type, allowing them to spot and correct errors in an instant; an alternative for selecting the English variation (i.e., American, British, Canadian, and Australian English); a performance analysis report that compares a text to others, its word count, and readability; and a set goals feature that allows the tool to customise. These advanced capabilities make Grammarly stand out in its ease of language checking (Syafi'i, 2020). Its accuracy is comparable to similar apps. Grammarly considers context when reporting errors or suggestions (Fitria, 2021). Thi and Nikolov (2022) found that Grammarly's corrective feedback was highly accurate (44.1%) in detecting a wide range of errors, including verb tense, verbform, article, pronoun, run-on, sentence structure, preposition, conjunction, and modifier errors. However, users should use this application wisely. Sahu et al. (2020) found Grammarly to be the best accurate of four apps, although it still struggles with semantics and sophisticated sentence structure. Grammarly also includes reasons for its suggestions, as mentioned, which lets users decide whether adjustments are needed so they don't mindlessly accept all of Grammarly's edits (Adams & Chuah, 2022), which I believe leads to its flexibility.

Despite its useful features, Grammarly has several drawbacks. In his research, Barrot (2022) discovered that Grammarly had an accuracy problem. He mentioned:

''It sometimes suggests enhancements that may render the statement inaccurate. For example, it threw false positives when it corrects proper nouns such as *Dayz Hotel* and technical/uncommon words such as *generalizability* and *ebook*. In the case of plagiarism detection, it tends to highlight some common phrases as potentially plagiarized items. Some examples are '*Therefore, it is important to observe the following. . .*' and '*I agree with what you said about the issue*'. These unnecessary corrections require further filtering from the users'' (p. 767).

Likewise, students who are proficient in English are more likely to question the AWE because they believe that the feedback is unreliable, takes longer to process, and should only be used in certain circumstances. They also believe that the subscription fee is not justified (Karlina Ambarwati, 2021; Koltovskaia, 2020).

Another AI language tool is QuillBot, a well-known "intelligent" paraphrase tool that also includes a summarizer, grammar checker, translator, plagiarism detector, and even a citation generator (QuillBot, 2023). Popular web browsers including Chrome, Firefox, and Bing all offer access to QuillBot online, which is currently built as a browser extension for Microsoft Word. It is primarily a well-liked, reliable paraphrase tool with a variety of features. Furthermore, the synonym percentage enables users to manage the suggested outputs so that not every word is replaced arbitrarily and the original meaning is preserved (Adams & Chuah, 2022). Additionally, QuillBot has the ability to expand and shorten text without changing its meaning, which allows users to focus on fluency or more creative language use. Given this, QuillBot is a convenient, rapid, and adaptable tool for paraphrasing. Regarding its constraints, only a subscription model is available to access the QuillBot affordances listed above. Also, it only offers English paraphrasing services, thus users who want to paraphrase in any other languages are unable to utilise this web tool (Rakhmanina & Serasi, 2022)**.** However, there is limited research on the strengths and limitations of QuillBot.

METHOD

Ethical Considerations

Ethical approval to conduct the study was granted to the authors from University of St Andrews International Education Institute Ethics Committee.

Research Design

A descriptive qualitative design was employed in this research. This was employed to provide accounts of perceptions and (Sandelowski, 2010), especially in fields where little is known about the subject being researched (Doyle et.al, 2020). It allows researchers to focus on understanding the individual human experience in its unique context (Doyle et.al, 2020). This is particularly effective to contrast and compare teachers and students' perspectives on the use of AI writing tools in language classroom. Also, the researchers can flexibly choose different types of inquiry, allowing them to appreciate and explore different realities and subjective experiences in relation to phenomena (Long et al., 2018), and therefore both open-ended and closed-ended questionnaire were utilized.

Sampling Strategy

The participants were recruited through an advertisement published on the PG TESOL information page of the university's Moodle platform. Participants were TESOL PG students and lecturers at St. Andrews University's International Education Institute. Furthermore, convenience sampling was employed. The study includes target group members who meet practical conditions such as accessibility, geographic closeness, availability, and willingness to participate (Dörnyei, 2010). Since they participated in the same study programme, participants are the most accessible and closest to the researcher. Second, international students lacking English proficiency must submit written assignments for assessment (National Committee of Inquiry into Higher Education, 1997). Campbell (2019) noted that non-native

English speakers and international students find academic writing difficult. Given the scenario, participants were more likely to use AI writing correction tools for constructing academic writing.

### Data Collection and Analysis

In this research, a single online questionnaire was employed to collect data. There were eight closed-ended questionnaires and three open-ended questionnaires. The closed-ended questionnaire is a Likert scale, with the first two questions expressed as 'yes' or 'no' questions. The questions were designed to assess participants' familiarity with the AI writing aid inherent in Microsoft Office and their understanding of specific AI writing programs such as Grammarly. The sixth remaining questions were manifested in five categories "agree," "strongly agree," "undecided," "disagree," and "strongly disagree." They addressed research problems, including perception, academic integrity, critical thinking, and AI writing correction tools in language teaching and learning. Furthermore, open-ended questions investigated the motivations for using AI writing correction tools, how they assist teaching and learning, and the feasibility of incorporating AI writing correction tools (such as Grammarly or QuillBot) into teaching and learning.

The closed-ended questionnaire was analyzed using the Qualtrix application required in UK higher education institutes. It aimed to see the pattern of perception and make claims about the research questions. Furthermore, the open-ended questionnaire was analyzed using thematic analysis by Braun and Clarke (2006). Multiple readings of the responses were performed "to build up categories and understanding" (O'Leary, 2017, p. 608), and themes were identified whenever it was possible.

FINDINGS

In this section, questions 1 and 2 are represented in graph 1 and 2, while questions 5 to 8 are represented in table 1. Finally, the result of questions 9 to 11 is represented in table 2.
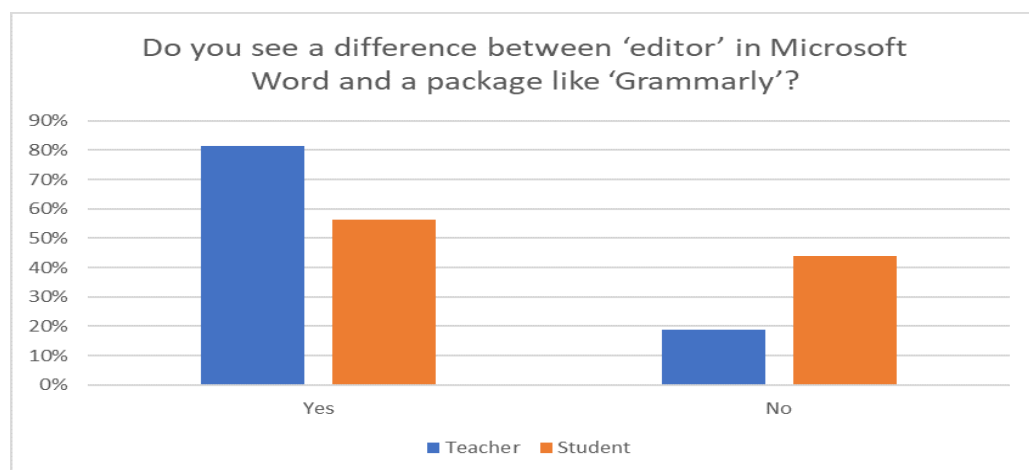
Awareness of AI Writing Tools built in Microsoft Office
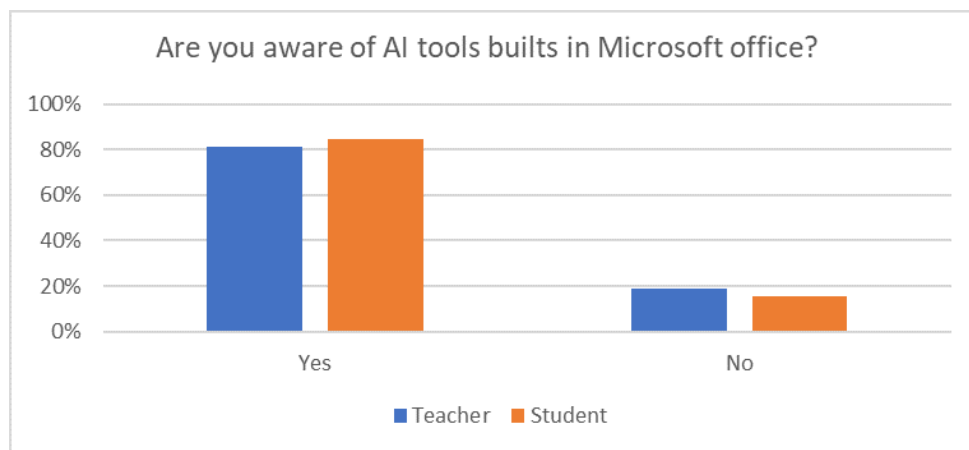
Graph 1. *Awareness of AI tools built in Microsoft Office*

Graph 1 shows that the majority of teachers and students were aware of AI tools built into Microsoft Office, with 81% of teachers and 84% of students reporting knowledge of such tools.

Awareness of the Difference between Ms. Office editor & Grammarly

Graph 2. *Awareness of the difference between Ms. Word 'editor' and a package like 'Grammarly'*

Unlike graph 1, graph 2 indicates that teachers were more likely to recognize the differences between 'editor' in Microsoft Word and packages like 'Grammarly', with 81% noting distinctions between the "editor" in Microsoft Word and software like "Grammarly." In contrast, a high percentage of students did not know about it with only 56% of them demonstrated an understanding of the different AI tools available.

Table 1. *Likert scale presentation*

No.	Questions	Teachers' response					Students' response				
		SD	D	U	SA	A	SD	D	U	SA	A
1.	Teachers and students should be encouraged to use AI writing correction tools (e.g. Grammarly and QuillBot).	25%	25%	19%	6%	25%	6%	22%	25%	13%	34%
2.	Teachers and students should be encouraged to learn the skills needed to use AI writing correction tools (e.g. Grammarly and QuillBot).	25%	31%	13%	13%	19%	25%	31%	13%	13%	19%
3.	AI writing correction tools could increase critical thinking.	38%	19%	31%	0%	13%	19%	38%	13%	6%	25%
4.	Using AI writing correction tools can be considered cheating.	44%	31%	13%	0%	13%	25%	50%	9%	0%	16%
5.	Using AI writing correction tools can be considered plagiarism.	44%	31%	6%	6%	13%	31%	56%	6%	0%	6%
6.	AI writing correction tools (e.g. Grammarly and QuillBot) can be integrated into teaching and learning.	31%	13%	0%	6%	50%	3%	9%	6%	19%	63%

SD: strongly disagree, D: disagree, U: undecided, SA: strongly agree, A: agree.

Teachers and students should be encouraged to use AI writing correction tools (e.g. Grammarly and QuillBot)

According to the table, the teachers could be categorized to refuse to use AI writing correction tools with 25% strongly disagree and 25% disagree. Only 6% teacher chose to strongly agree, 25% agree and 19% was undecided. Meanwhile, 34% of students were agree and 13% strongly agree to use AI writing correction tools with only 6% students strongly disagree and 22 % disagree.

Teachers and students should be encouraged to learn the skills needed to use AI writing correction tools (e.g. Grammarly and QuillBot)

Under this point, the majority of teachers disagreed with the statement, with 31.25% simply disagreeing and a further 25% strongly disagreeing. Only a small minority of teachers (12.50%) expressed support for the idea that teachers should learn this skill.

On the other hand, students appeared to have a much more positive view of the need to learn how to use AI writing correction tools. Approximately 50% of the students surveyed expressed agreement with the statement, with a further 22% strongly agreeing. In contrast, only a very small proportion of students (3%) chose to strongly disagree with the idea of teachers and students learning this skill.

AI writing correction tools could increase critical thinking

One surprising finding of the research is that most teachers did not believe that AI writing correction tools can help increase critical thinking skills among students. A majority of teachers either disagreed or strongly disagreed with the statement, with 38% expressing strong disagreement and a further 19% disagreeing. In addition, 31% of the teachers surveyed were undecided on the issue, suggesting a lack of clarity around the potential

benefits of AI writing correction tools in terms of increasing critical thinking. Only a small minority of teachers (13%) agreed with the statement.

On the other hand, students showed a more mixed view on the issue. While 19% of the students strongly disagreed with the idea that AI writing correction tools could enhance critical thinking skills, a significant proportion of students (38%) expressed agreement with the statement, with a further 25% stating that they agreed and 6% strongly agreeing. A relatively high percentage of students (13%) were also undecided on the issue, indicating that there may be some confusion among students about how exactly AI writing correction tools can help develop critical thinking skills.

Using AI writing correction tools can be considered cheating

According to the data presented, it appears that there was a significant divide among teachers regarding the use of AI writing correction tools as a form of cheating, with a majority of 44% strongly disagree with this notion and 31% simply disagree. However, there is still a notable proportion of teachers, at 13%, who remain undecided on this issue, while only 13% actually agree that using such tools constitutes cheating.

When looking at the data from the students' perspective, it can be observed that there is a similar distribution of opinions, with 25% strongly disagreeing that AI writing correction tools are a form of cheating, and 50% disagreeing that they are. Meanwhile, 16% of students fall in the agree category. Interestingly, neither teachers nor students showed any indication of strongly agreeing with the statement, with both groups receiving a score of 0% for this option.

Using AI writing correction tools can be considered plagiarism

Under this point, the majority of teachers did not view the use of AI writing tools as plagiarism, with 44% strongly disagreeing with this notion and 31% simply disagreeing. However, there was still a notable proportion of

teachers who remain undecided on this issue, at 6%, while only 13% agreed that using such tools can be considered plagiarism, and even fewer, at 6%, strongly agree.

Looking at the student's perspective, there was a similar distribution of opinions. A majority of 56% disagreed that using AI writing tools can be considered plagiarism, and 31% strongly disagree with this idea. On the other hand, only 6% of students agreed that using AI writing tools can be considered plagiarism, and no student strongly agrees with this statement.

AI writing correction tools (e.g. Grammarly and QuillBot) can be integrated into teaching and learning.

Here a clear division of teachers into two groups could be observed-those who were in favour of integrating AI writing tools into teaching and learning, and those who were against it. Interestingly, there were no teachers who are undecided on this issue.

Based on the provided data, it appeared that teachers hold two opposing viewpoints regarding the integration of AI writing tools into teaching and learning. While 50% of teachers agreed with this idea and 6.25% strongly agreed, there was a considerable proportion of teachers, at 31.25%, who strongly disagreed with the integration of these tools and 12.50% simply disagree.

On the other hand, students were generally more supportive of the idea. Based on the data, a significant majority of students were in favour of integrating AI writing tools into teaching and learning. A total of 63% of students agreed with this idea, while 19% strongly agreed with it, indicating a high level of support. On the other hand, only a small proportion of students, 3%, strongly disagreed with this notion, while 9% simply disagreed with it. Additionally, 6% of students were still undecided on this issue.

Table 2. *Themes presentation*

No.	Questions	Teachers' response	Perce	Students' response	Perce

			ntage		ntage
1.	Why do teachers and students use external site like AI writing correction tools (e.g. Grammarly and QuillBot)?	Integration of technology in academia	12%	Pressure to conform and adapt to societal expectations	18%
		Student confidence and reliance on tools	12%	Lack of confidence and self-assessment	21%
		Efficiency and time-saving	23%	Time-saving and meeting deadlines	24%
		Plagiarism prevention and paraphrasing	23%	Enhanced writing quality and fluency	18%
		Error detection and correction	34%	Improved grammar and error detection	21%
2.	How should teachers and students integrate AI writing correction tools in teaching and learning?	Minimal or no integration due to ease of use	33%	Use AI tools critically after self-correction	3%
		Using tools for plagiarism awareness	13%	Treat AI writing tools as personal tutors	3%
		Establishing clear guidelines and expectations	13%	Normalising the use of AI writing tools	3%
		Focusing on teaching essential writing skills	13%	Raise awareness and encourage exploration of others…	3%
		Encouraging critical analysis of tool output	13%	Verify the reliability and validity of AI writing tools	3%
		Teacher supervision and guidance	13%	Use AI writing tools as an aid but not rely on them	14%
				Use AI writing tools as a source of information	3%
				Learn from common mistake and self-improvement	11%
				Maintain original ideas and critical thinking	7%
				Use as a supplementary tool for revision	33%
				Not sure	11%
				Other	3%
3.	How do AI writing correction tools help students in teaching and learning	Improve the flow and coherence of the texts	13%	Limited learning opportunities and potential …	11%
		Raise awareness of unintended plagiarism and..	13%	Improve awareness of error tendencies and linguistics…	5%
		Support for neurodiverse students in coping …	13%	Enhance proofreading and reduce language barriers…	5%
		AI writing tools may undermine the learning of …	13%	Save time and provide alternative perspectives	11%
		Promote critical and active use for language	13%	Learn from error correction and identify common…	11%
		Increase students'	25%	Increase analytical	5%

awareness of grammatical		thinking and awareness of ...	
Enhance self-expression and communication	13%	Brainstorming and stimulating ideas	11%
		Support non-native English speakers	5%
		Receive immediate feedback on errors and mistakes	5%
		Identify errors and weaknesses in writing	11%
		Improve awareness of grammar and vocabulary	11%
		Accumulate correct expressions and authentic...	11%

Why do teachers and students use external site like AI writing correction tools (e.g. Grammarly and Quillbot)?

There were five themes emerged from teachers' perspective about the reason behind the use of AI writing tools in academia. The most prominent theme, accounting for 33% of the responses, was error detection and correction while the least one was student confidence and reliance on tools, and integration of technology in academia, each account for 11% of the responses. On the other hand, the most prominent theme on students' perspective was time-saving and meeting deadlines, which accounted for 24% of the responses. Finally, enhanced writing quality and fluency, and pressure to conform and adapt to societal expectations, each made up 17% of the responses were the least percentage.

How should teachers and students integrate AI writing correction tools in teaching and learning?

In discussing the integration of AI writing correction tools like Grammarly and Quillbot into teaching and learning, six themes emerged with varying emphasis. These themes provided insight into how teachers should approach the incorporation of these tools in the classroom.

The most significant theme, accounting for 38% of the responses, suggests that minimal or no integration is required due to the user-friendly nature of these tools. The remaining themes, each representing 13% of the responses, offer diverse perspectives on integrating AI writing correction tools: emphasizing the importance of teacher supervision and guidance; theme promoting critical analysis of tool output; focusing on teaching essential writing skills;   establishing clear guidelines and expectations; and utilizing tools for plagiarism awareness and proofreading support is an essential consideration.

On the students' account, a significant theme, accounting for 32% of the responses, was using AI writing tools as a supplementary resource for revision and proofreading. Maintaining original ideas and critical thinking was another theme, with 7% of the responses. Learning from common mistakes and self-improvement was also essential, as suggested by 11% of the responses. Students should identify and learn from their mistakes, using AI writing tools to enhance their understanding and correct errors. Another 11% of the responses indicated uncertainty about how to integrate AI writing tools.

Some smaller themes, at 4% of the responses, also some at varying degrees: using AI writing tools as a source of inspiration or idea generation, stimulating ideas and inspiring creativity in students; emphasizes using AI writing tools as an aid but not relying on them excessively; verifying the reliability and validity of AI tools is also crucial, representing 4% of the responses.   raising awareness and encouraging exploration of other; normalizing the use of AI writing tools is another theme; treating AI writing tools as personal tutors; and using AI tools critically after self-correction.

How do AI writing correction tools (e.g., Grammarly and Quillbot) help students in teaching and learning?

Under this theme, both teachers and students agreed that AI writing tools positively benefited students. 25% of teachers asserted that it increased students' awareness of grammatical mistakes and opportunities for improvement. Meanwhile, under the students' account, several themes emerged with varying levels of emphasis. Some themes were more prominent, each accounting for 11% of the responses. These included accumulating correct expressions and authentic language use; improving awareness of grammar and vocabulary mistakes; identifying errors and weaknesses in writing; stimulating ideas and brainstorming; learning from error correction and identifying common mistakes; concerning the potential limitations and inaccuracies of AI writing tools; and saving time while providing alternative perspectives.

DISCUSSION

Research Question 1: How Do Teachers and Students' Perception Differ About AI Writing Correction Tools?

Teachers and students had different reasons for adopting AI Writing correction tools, but they shared some. First, teachers (33%) and students (21%) recognized the importance of AI writing correction tools in detecting and repairing writing errors. This consensus emphasizes these technologies' core purpose and importance in improving written communication. As suggested in several studies, this becomes the primary reason for utilizing AI writing correction tools (Fahmi & Cahyono, 2021; Thi & Nikolov, 2021; Li, 2021; Link et al., 2022). Second, according to both groups, AI writing correction tools save time, with teachers at 22% and students at 24%. The findings imply that teachers and students value AI writing correction tools as technology that simplifies their work. Likewise, Wijayanti et al. (2021) discovered that teachers think AWE tools like Grammarly are helpful and

easy to use. Grammarly helps teachers provide students with effective feedback (Yousofi, 2022). Grammarly also saves students time constructing academic writing (Chou et al., 2016; Cotos, 2014; Nova, 2018). Thirdly, teachers emphasized student confidence and tool dependence (11%), addressing students' dependence on tools due to a lack of confidence or time restrictions. Also, 21% of students expressed self-doubt. Both perspectives recognize the role of AI writing correction tools in supporting students' confidence and self-assessment. AI writing correction solutions are needed since non-native English speakers and international students struggle with academic writing (Campbell, 2019). Grammarly's grammar-checking and writing-revision tools boost students' confidence (Pratama, 2021). Students can also improve their writing's grammar, punctuation, spelling, linguistic style, and confidence (Pratama, 2021; O'Neill & Russell, 2019).

Nevertheless, teachers and students have contradictory perspectives on several viewpoints. First, teachers emphasized AI writing correction tools' role in identifying plagiarism and paraphrasing (22%), but students did not. Second, teachers emphasized using AI writing correction tools (11%), whereas students did not. It demonstrates that they considered technology crucial for educational advancements. Thirdly, students discuss the pressure to meet societal expectations, such as producing high-quality work quickly or using correct language (17%). This theme was not present in the teachers' perspective. High-quality writing is essential in higher education. Assessment is the main goal; students must write essays and take written exams to demonstrate their knowledge (Britain & Dearing, 1997). Lecturers emphasize language use, writing structure, and topic (Coffin et al., 2005). Given English as a lingua franca and the difficulty of writing, international students who do not speak English may encounter difficulties (R. Tang, 2012). Students may also strengthen their writing skills in disciplinary communities that employ English (Coffin et al., 2005; R. Tang, 2012). To sum up, to gain international prominence and institutional recognition, non-native English-speaking

students are struggled to publish in English (Adnan, 2009; ElMalik & Nesi, 2008). Fourthly, while most teachers (81%) and students (84%) were aware of AI tools built into Microsoft Office, teachers demonstrated a deeper understanding of the differences between the AI writing tools. Specifically, 81% of teachers could distinguish between Microsoft Word's 'Editor' and other tools like 'Grammarly.' On the other hand, students showed a lower level of understanding, with only 56% recognizing the differences between these AI tools. This contradicts the idea that teachers are less tech-savvy (Ezziane, 2007; Whitaker & Coste, 2002). This gap between teachers' and students' experience with AI writing correction tools emphasizes the need for more instruction and explanation on the tools' functionality (Nawaz & Kundi, 2010; Whitaker & Coste, 2002). Students may use AI writing correction tools that enhance their writing and academic performance if they understand them better. Also, knowing the tools can help teachers teach better.

Research question 2: Are there perceived issues with academic integrity?

This study demonstrated that educators and learners did not view AI writing tools as cheating or plagiarism. This study distinguishes cheating and plagiarism. Unauthorized exam aid is cheating (Harp & Taietz, 1965), while *plagiarism* is using someone else's ideas (The University of St Andrews' GAP, 2023). Regarding cheating, the findings suggest that teachers and students generally did not perceive the use of AI writing correction tools as a form of cheating. However, some still agreed that it was cheating or remained undecided, indicating the variety of opinions on this topic. Similarly, the findings suggest that teachers and students generally did not consider using AI writing correction tools as plagiarism. However, some teachers and students did agree that it can be considered plagiarism, and a small percentage of teachers remain undecided. This variation in opinions might be due to different understandings of what constitutes academic integrity or cheating, or plagiarism.

Lack of consensus among teachers, confusion about the definition of ethics and integrity, and societal factors may all contribute to this incongruity (Paik et al., 2019; Gulliver & Tyson, 2014). Furthermore, Gottardello and Karabag (2022) found in their research that teachers' perceptions of their responsibilities to uphold academic integrity in higher education appear to be influenced by culture. In contrast to the masculine societies of India, South Africa, Italy, and Ireland, which are less concerned with preserving the integrity, Swedish feminine cultures tend to help others and do good for the society in which they firmly encourage academic integrity (G. Hofstede, 1980; G. H. Hofstede & Hofstede, 2001). The findings can explain the reasons behind the variety of perceptions among teachers and students on academic integrity. As participants come from different backgrounds, their perceptions of academic integrity, in this case, also appear different. The other reason for these differences might also be their teacher role. Some educators are concerned about students' potential to rely too heavily on AI-generated content rather than developing their ideas and writing skills (Alharbi, 2023).

Research Question 3: Can AI writing correction tools be integrated into teaching and learning?

a. Its Feasibility

The findings suggest that while there was a significant divide among teachers regarding the integration of AI writing correction tools into teaching and learning, students generally were more supportive of the idea. This difference in perspective might be due to teachers' concerns about the potential impact of AI writing tools on critical thinking skills (Alharbi, 2023), academic integrity, or the quality of students' writing. Regarding critical thinking, this study found that teachers and students perceived AI writing correction tools to improve critical thinking differently. 57% of teachers disagreed or strongly disagreed that these tools improve students' critical thinking. Students were more divided, but many agreed that AI writing

correction tools might improve critical thinking. Similarly, according to Liu et al. (2023), peer support and the AWE technique reduced writing anxiety and improved students' writing, learning excitement, and critical thinking. In particular, AWE's indirect feedback provides grammatical errors to help students think critically and repair mistakes (H. C. Liao, 2016). Wang & Goodman (2012) also found that the AWE system allows students to consult online resources quickly and easily for language usage and concept development, fostering learner responsibility and L2 writers' autonomy and critical thinking.

b. *How AI writing correction tools should be integrated in teaching and learning*

Several themes emerged from teachers' and students' perspectives, addressing the possible implementation of AI writing correction tools into teaching and learning. In general, both perspectives emphasize the importance of using AI writing correction tools thoughtfully and responsibly, focusing on critical thinking, self-improvement, and maintaining original ideas. Both teachers and students suggested using these tools as supplementary resources and aids while avoiding excessive reliance on them. It is suggested that both parties were aware of the basic function of AI writing correction tools, which is to assist people in constructing their writing without decreasing students' ability to produce their ideas (originality) (Adams & Chuah, 2022). AI-based tools' affordances enhance writing learning without replacing the writer's role (Crompton & Song, 2021; Khan et al., 2020; Lu, 2019), cited in (Adams & Chuah, 2022). While teachers emphasized supervision, clear guidelines, and teaching essential writing skills, students emphasized normalizing AI writing tools, using them as personal tutors, and using them for inspiration. According to Link et al. (2014), teachers should master the features of AI writing correction tools independently or seek training before utilizing them in class because unfamiliarity with the technology can hinder their effective application.

To adapt AI writing correction tools into classroom practice, several things should be considered. First, teachers must be creative. Because AWE is not introduced into the classroom in a social vacuum where writing can be done alone or together, it can incorporate multiple interactional patterns and social goals (Stevenson, 2016). Teachers could also consult their colleagues to use the AWE tool creatively. A study found that asking and observing colleagues can help them manage classroom issues and learn about creative AWE writing assignments (Z. Li et al., 2014). Second, teachers should have AI writing training. It is essential since unfamiliarity with the AWE tool hindered its full functionality (Z. Li et al., 2014). Thirdly, teachers need to know the strengths and weaknesses of AI writing correction tools to maximize their benefits. This is to open the possibility of exploring its maximum benefit. AWE's strengths make it a scaffolding tool that could assist teachers in providing various forms of rapid feedback and directing their comments toward concepts and organizational elements (Cotos, 2014; H.-C. Liao, 2016; Warschauer & Grimes, 2008). Fourthly, institutional support is a must. AWE should be used in conjunction with other components of the more extensive instructional activity system, such as scheduling, curriculum, and professional development, to improve writing results, and districts and schools should be aware of this (Wilson et al., 2021).

CONCLUSION

This study is contributing to the emerging field of AI-powered writing tools due to a number of reasons. Firstly, it combines both teachers and students' perspectives by investigating their similarities and differences in perceiving AI writing correction tools for the sake of its integration into classroom instructions. Many studies only investigate either students or teachers' perception separately (Fu et al., 2022; Karlina Ambarwati, 2021; Koltovskaia, 2020; Z. Li, 2021; Wilson et al., 2021; Z. Zhang, 2020).

Knowing both parties' perspective is important in the process of integrating it into teaching and learning. In order to achieve a balance implementation of AI writing tools in classroom instructions, the cooperation of both teachers and students are recommended particularly to counter the limitations inherited in the tools and thus provide an effective teaching and learning environment by one of which teachers' more dominant intervention (Chen & Cheng, 2008; Huang & Renandya, 2020; Stevenson & Phakiti, 2014). Secondly, this study addressed the issue of academic integrity which is under-investigated (Adams & Chuah, 2022). This study will enrich the literature about the academic integrity issue of the utilisation of AI writing correction tools. Thirdly, this study informs feasibility of practical implementation of AI writing correction tools in education through the lens of teacher and students. It also suggested some recommendations regarding what factors to consider in achieving the effective implementation.

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