English Paraphrasing Strategies and Levels of Proficiency of an AI-generated QuillBot and Paraphrasing Tool: Case Study of Scientific Research Abstracts

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Abstract
AI-generated paraphrasing tools, especially QuillBot and Paraphrasing Tool, play a crucial role in preventing plagiarism in academic writing. However, their effectiveness and proficiency have been questioned, particularly regarding the adequacy of their strategies. This qualitative study analyzed the paraphrasing strategies and proficiency levels of QuillBot and Paraphrase Tool. Using a purposive sampling technique, all 30 abstracts from one issue of the *Journal of Second Language Writing* were paraphrased using the two paraphrasing tools in their standard modes, and the results were analyzed using the frameworks of Keck (2014) and Nabhan et al. (2021). The results of the study indicated that both tools primarily used synonym substitution, with QuillBot favoring word-level changes and Paraphrase Tool emphasizing sentence restructuring. QuillBot tended to show minimal revision, followed by moderate revision, while Paraphrase Tool

	exhibited more moderate revision, followed by minimal and substantial revision. Paraphrase Tool exhibited broader paraphrasing capability than QuillBot, but both tools show some paraphrasing limitations. Overall, while these tools may enhance some writing, writers should thoroughly review the core concepts of the original texts and grammatical structures in specific contexts. For novice writers, paraphrasing practice in classrooms should be conducted under teachers' guidance. AI-generated tools should be secondary.

INTRODUCTION

Formal academic writing requires a thorough and comprehensive examination of theories, concepts, and studies from credible sources that are then paraphrased, summarized, and referenced. Paraphrasing involves the expression of the original meaning of a text using different grammatical and lexical features. It is often a topic of discussion in the context of incidents of academic misconduct, as the use of improperly paraphrased texts or even properly paraphrased texts provided without citation can be considered plagiarism (Chanpradit, 2022, p. 4). According to Soles (2003) and Trivette (2020), paraphrasing is the practice of rewriting an original written text or part of one in the manner and style of the paraphraser rather than the original author.

Paraphrasing is a crucial skill, as it helps prevent plagiarism in academic writing; for instance, university students regularly employ paraphrasing strategies (Bairagi & Munot, 2019; Fandl & Smith, 2014; Trivette, 2020) regarding the writing of research papers, essays, and other academic documents (Dung, 2010; Irmadamayanti, 2018; Josua, 2024; Masniyah, 2017; Purnamasari, 2018). All universities require students to be able to produce academic writing, such as theses and papers including assertions that are supported by scientific sources or references, so that they can effectively paraphrase information (Rogerson & McCarthy, 2017). To help novice writers avoid plagiarism, various strategies are employed, including using synonyms, changing word forms, dividing long sentences into short ones, condensing, using varied sentence structures, combing sentences, and expanding phrases for clarity. These techniques are recommended in writing manuals and textbooks (e.g., Bailey, 2006; Kick, 2014; Pears and Shields, 2019; Pinjaroenpan & Danvivath, 2017; Swales & Feak, 2012) by EFL teachers, using paraphrasing to assess students' linguistic abilities.

Since the mid-20th century, education has been closely connected with technology (Reinders, Dudeney, & Lamb, 2022), and more recently with artificial intelligence (AI), a subset of technology that may draw on machine learning, deep learning, natural language

processing, and computer vision. The advancement of AI has generated AI-generated paraphrasing tools such as QuillBot and Paraphrasing Tool. Despite the arrival and growing use of paraphrasing programs, few studies of internet-based paraphrasing tools in academic writing (e.g., Injai, 2015; Rogers, 2007) have suggested that students should learn paraphrase effectively without heavy reliance on such tools; the ability of students to restate the ideas of original texts with acknowledgment is at the heart of academic integrity.

According to Sarair et al. (2019), large numbers of students face challenges in paraphrasing original sources, such that in their data, there were substantial instances of practical plagiarism, in which 50% of the content was duplicated. This pervasive issue of plagiarism has both moral and legal implications (Adam, 2016; Kaposi & Dell, 2012). An unethical act with potential criminal consequences (Hu & Sun, 2017) can lead to severe disciplinary measures, reputational damage, and even expulsion from educational institutions. The recognition of the gravity of academic misconduct leads to crucial emphasis on prevention, including strategies of summarization, paraphrase, and proper citation, as effective strategies for mitigating the risk for plagiarism (Adam et al., 2017).

Online paraphrasing tools are an emerging technology that has come into play in this context, modifying text so that it does not duplicate an original text (Prentice & Kinden, 2018). Rogerson and McCarthy's (2017) study showed that students who used paraphrasing tools to help them write academic work used free online paraphrasing tools for the paraphrasis of journal articles, enabling them to avoid using the same language as the original and thus avoiding plagiarism. However, concerns have arisen regarding the quality, efficacy, reliability, and limitations of some tools, particularly those generated using machine translation approaches and easy to access through the internet (Chanpradit, 2022; Niño, 2009; Somers, 2013).

This study examined the paraphrasing strategies and proficiency levels of QuillBot and Paraphrasing Tool, following Keck (2014) and Nabhan et al. (2021). QuillBot and Paraphrasing Tool were selected because of their growing popularity with novice writers, according to Driessen's (2023) ranking of such tools. The two following research questions were addressed: 1) What paraphrasing strategies are used by QuillBot and Paraphrase Tool? and 2) At what level of proficiency do QuillBot and Paraphrase Tool demonstrate? The findings of this study can enhance the understanding of novice writers, especially university students, regarding competent uses of paraphrasing tools as assistants, foster learner autonomy, and facilitate the improvement of students' writing skills, with reduced reliance on AI-generated tools.

LITERATURE REVIEW

Paraphrasing entails transforming others' sentences, words, or phrases to distinguish them from their original source while incorporating others' ideas (Fitria, 2022; Solanki et al., 2019). It is a crucial writing skill, allowing students to effectively articulate thoughts in their work (Xuyen, 2023).

Badiozaman (2014) characterizes paraphrasing as extracting the content of an original for a new context, providing clarity and conciseness to demonstrate a profound understanding of the subject. However, novice writers, including students, face

challenges in paraphrasing, even when using tools. Na and Nguyen's (2017) research on second-year Vietnamese higher education students of English found that most struggled with paraphrasing due to a limited understanding of the source material and a lack of vocabulary. Azkar (2021) and Nabhan et al. (2021) explored strategies and techniques to address writing difficulties, where the latter identifying common challenges and strategies. Zulkarnain (2020) identified effective paraphrasing in language-related journals.

Nabhan et al. (2021, as cited in Dung, 2010, p. 12 & Injai, 2015, p. 30), identifies eight paraphrasing strategies: 1) using varied sentence structure (UVS); 2) changing word order (CWO), reordering words, phrases, or sentences, especially where original sentences have multiple clauses; 3) changing parts of speech (CPS); 4) making long sentences shorter (SLS); 5) using synonyms (USN); 6) expanding phrases for clarity (EPC) or adding more details to a phrase for clarity; 7) condensing (CDN), which refers to shortening some phrases; and 8) combining sentences (CBS).

See Table 1 for Keck's (2014) classification of paraphrasing. This taxonomy was used here to explore the paraphrasing of Scopus-indexed research abstracts paraphrased in the standard mode using two AI-generated tools, QuillBot and Paraphrase Tool. The taxonomy of paraphrasing levels, adapted from Keck (2014, p. 9), which includes four levels of paraphrasing with eight strategies, is shown in Table 1.

Table 1. *Taxonomy of paraphrasing levels*

Levels	Number of strategies employed
Near copy	Use of 1–2 of 8 strategies. *This implies 50% or more words contained with unique links (copying words and word strings).*
Minimal revision	Use of 2–4 strategies. *This implies 20%–49% or more words contained with unique links.*
Moderate revision	Use of 3–6 strategies. *This means 1%–19% or more words contained with unique links.*
Substantial revision	Use of 7–8 strategies. *This means (almost) no unique links.*

METHOD
Research Design
This study employed a qualitative descriptive method. The samples were 30 abstracts purposively selected from those published in the Scopus-indexed *Journal of Second Language Writing*. The frameworks of Keck (2014) and Nabhan et al. (202) were used for the analysis. Descriptive statistics were also adopted.

Procedures

All selected 30 abstracts were evaluated for both sentence structure and grammar, which demonstrating high quality and reliability. The standard versions of QuillBot and Paraphrase Tool were used to paraphrase the abstracts. The resulting paraphrases were then used for the analysis. The analysis followed the framework of Nabhan et al. (2021). Assessment of proficiency was done with Keck's (2014) taxonomy. Descriptive statistics were used to summarize the proficiency of both tools, presenting the frequency of occurrence of strategies.

FINDINGS

All paraphrased abstracts were analyzed using the eight paraphrasing strategies. The frequencies of paraphrasing strategies employed in all 30 paraphrased research abstracts by QuillBot and Paraphrase Tool are summarized in Table 2.

Table 2. *Frequencies of paraphrasing strategies used by QuillBot and Paraphrase Tool*

Paraphrasing strategies	QuillBot (n = 30)	Paraphrase Tool (n = 30)
Using varied sentence structure	19	23
Changing word order	29	6
Changing parts of speech	20	20
Making long sentences shorter	9	19
Using synonyms	30	30
Expanding phrases for clarity	7	22
Condensing	15	28
Combining sentences	1	8

Table 2 shows QuillBot used key paraphrasing strategies, including prioritizing USN (100%), CWO (96%), CPS (66%), UVS (63%), and CDN (50%). Paraphrase Tool emphasized strategies such as USN (100%), CDN (93%), UVS (76%), EPC (73%), CPS (66%), and SLS (63%).

In terms of the levels of paraphrasing proficiency of QuillBot and Paraphrase Tool compared to the abstracts paraphrased by the two tools, it can be concluded in Table 3.

Table 3. *Paraphrasing proficiency levels of QuillBot and Paraphrase Tool*

Paraphrasing levels	QuillBot (n = 30)	Paraphrase Tool (n = 30)
Near copy	0	0
Minimal revision	17	7
Moderate revision	13	21
Substantial revision	0	2
Total	30	30

The following section presents examples of minimal, moderate, and substantial revisions of abstracts that were paraphrased using QuillBot and Paraphrase Tool. It is important to keep in mind that the Near copy level did not appear: all the paraphrased abstracts employed more than two strategies.

Minimal revision

Minimal revision uses three or four paraphrasing strategies, while retaining text that is almost the same as the original. Consider the following example of an original text paraphrased by QuillBot.

> **Original text:** This paper looks at critical and critical pragmatic orientations as competing discourses within applied linguistics in general and English for Research Publication Purposes (ERPP) in particular. Adopting a critical and evaluative approach, it examines the ways in which critical language awareness (CLA) intersects with critical and critical pragmatic approaches to ERPP, as well as with asset-oriented frameworks and discourses of social justice and equity. More specifically, we aim to a) highlight the significance of the CLA framework to ERPP scholarship, and b) assess the (in) applicability of critical and critical pragmatic approaches, informed by CLA, and the affordances and limitations of these approaches in today's neoliberal and capitalist academic knowledge regime. (Habibie & Flowerdew, 2023)
>
> **Paraphrased text:** In this essay, we examine critical pragmatic and critical analytical orientations as opposing discourses in English for Research Publication Purposes (ERPP) and applied linguistics in general. It studies how critical language awareness (CLA) interacts with critical and critical pragmatic approaches to ERPP, asset-oriented frameworks, and discourses of social justice and equality by taking an evaluative and critical stance. More specifically, we want to: a) emphasize the importance of the CLA framework to ERPP scholarship; and b) evaluate the applicability and affordances of critical and critical pragmatic approaches, informed by CLA, in the current neoliberal and capitalist academic knowledge regime.

Here, QuillBot adopted three key paraphrasing strategies: UVS, CWO, and USN. These strategies indicate a tendency toward subtle modifications in the paraphrased text, as shown in Table 4.

Table 4. *Strategies used by QuillBot compared to original text*

Strategies	Original text	Paraphrased text by QuillBot
Using varied sentence structure (applicable text in italics)	*Adopting a critical and evaluative approach*, it examines *the ways in which* critical language awareness (CLA) intersects with critical and critical pragmatic approaches to ERPP, as well as with asset-oriented frameworks and discourses of social justice and equity.	It studies *how* critical language awareness (CLA) interacts with critical and critical pragmatic approaches to ERPP, asset-oriented frameworks, and discourses of social justice and equality *by taking an evaluative and critical stance*.
Changing word order (applicable text in italics)	Adopting a *critical and evaluative* approach, it examines the ways in which critical language awareness (CLA) intersects with critical and critical pragmatic approaches to ERPP..."	It studies how critical language awareness (CLA) interacts with critical and critical pragmatic approaches to ERPP, asset-oriented frameworks, and discourses of social justice and equality by taking a *critical and evaluative* stance**.**
Using synonyms (applicable text in italics)	*paper* *examines* *aim (to)* *as well as* *highlight* *in today's*	*essay* *studies* *want (to)* *and* *emphasize* *in the current*

Consider the following example of the original text paraphrased by the Paraphrase Tool at the minimal revision level, as shown below.

> **Original text:** In this article, we highlight how theoretical support from research in second language acquisition supports critical language awareness (CLA) as a writing pedagogy. We then illustrate how CLA compares to a popular composition pedagogy, Writing about Writing (WAW). We conclude by proposing a version of CLA specific to postsecondary writing instruction, one that unites the strengths of CLA with the written focus of WAW along with (often overlooked) support from empirical research on language learning. (Di Gennaro et al., 2023)
>
> **Paraphrased text:** In this article, we talk about how some research about learning a second language supports a way of teaching writing called critical language awareness (CLA). We also compare CLA to another popular way of teaching writing called Writing about Writing (WAW). In the end, we suggest a new way of teaching writing in college that combines the good parts of CLA and WAW, along with research on how people learn languages.

The paraphrased text shows four paraphrasing strategies: CPS, USN, EPC, and CDN. This approach embodies minimal revision. The original and paraphrased texts above are presented in Table 5.

Table 5. *Strategies used by Paraphrase Tool compared to original text*

Strategies	Original text	Paraphrased text by Paraphrase Tool
Changing parts of speech (applicable text in italics)	… along with (often overlooked) support from empirical research on language *learning*.	… along with research on how people *learn* languages.
Using synonyms (applicable text in italics)	*highlight* *pedagogy/instruction* *conclude by proposing* *strengths*	*talk about* *teaching* *suggest* *good parts*
Expanding phrases for clarity (applicable text in italics)	… second language acquisition supports critical language awareness (CLA) as a *writing pedagogy*.	… second language supports a *way of teaching writing* called critical language awareness (CLA).
Condensing (applicable text in italics)	We *conclude by proposing a version of CLA specific to post-secondary writing instruction, one that unites the strengths of CLA with the written focus of WAW* along with *(often overlooked) support from empirical research on language learning*.	In the end, we *suggest a new way of teaching writing* in college *that combines the good parts of CLA and WAW*, along with *research on how people learn languages*.

Moderate revision

Moderate revision entails the use of five or six strategies of paraphrasing, producing a text that demonstrates moderate similarity to the original. Consider the following example, paraphrased by QuillBot.

Original text: Despite extensive interest in peer interaction in collaborative writing (CW) research, few studies have focused on conflict during the knowledge coconstruction process. This study adopting a CT (complexity theory) perspective investigated the complex and dynamic nature of conflict during peer interaction in collaborative L2 writing. Recruited from a Chinese university, 15 students formed five face-to-face writing groups. With data triangulated with observation notes, stimulated-recall interviews, screen recordings, and tree diagrams, the study identified three types of conflict. One case group was chosen and analyzed in depth to reveal how elements in the conflict system dynamically interacted with the component agents and the context. We also examined the link between conflicts and the writing outcome. (Chen & Lee, 2022)

Paraphrased text: Few studies have concentrated on conflict during the knowledge coconstruction process, despite the fact that peer interaction is a topic of intense interest in the field of collaborative writing (CW) research. An investigation into the

complex and dynamic nature of conflict during peer interaction in collaborative L2 writing was conducted in this work using a complexity theory (CT) perspective. Five face-to-face writing groups were created by 15 students who were recruited from a Chinese institution. The study identified three types of conflict using data that was triangulated using observational notes, stimulated-recall interviews, screen recordings, and tree diagrams. To demonstrate how components of the conflict system interacted dynamically with the component agents and the context, one case group was selected and subjected to in depth analysis. We also looked at the relationship between conflicts and the results of writing.

Here, QuillBot used five paraphrasing strategies: UVS, CWO, CPS, USN, and EPC. These strategies constitute moderate revision, as shown in Table 6.

Table 6. *Strategies used by QuillBot compared to original text*

Strategies	Original text	Paraphrased text by QuillBot
Using a varied sentence structure (applicable text in italics)	This study adopting a CT (complexity theory) perspective *investigated* the complex and dynamic nature of conflict during peer interaction in collaborative L2 writing.	An investigation into the complex and dynamic nature of conflict during peer interaction in collaborative L2 writing *was conducted* in this work using a complexity theory (CT) perspective.
Changing word order (applicable text in italics)	With data triangulated with observation notes, stimulated-recall interviews, screen recordings, and tree diagrams, *the study identified three types of conflict.*	*The study identified three types of conflict* using data that was triangulated using observational notes, stimulated-recall interviews, screen recordings, and tree diagrams.
Changing parts of speech (applicable text in italics)	This study adopting a CT (complexity theory) perspective *investigated* the complex…	An *investigation* into the complex and dynamic…
Using synonyms (applicable text in italics)	*focused* *adopting* *university* *reveal* *examined*	*concentrated* *using* *institution* *demonstrate* *looked at*
Expanding phrases for clarity (applicable text in italics)	*Recruited from a Chinese university, 15 students* formed five face-to-face writing groups.	Five face-to-face writing groups were created by *15 students who were recruited from a Chinese institution.*

Consider the following example of an original text paraphrased by the Paraphrase Tool at the moderate revision level.

Original text: Given the crucial role that student assessment literacy plays in the development of L2 writing, the present mixed-method study seeks to develop and

validate a student writing assessment literacy (SWAL) scale to measure this key construct with learners across multiple languages. Interviews were first conducted and coded to partially inform the follow-up scale development. The scale was validated by using questionnaires. In analyzing the questionnaire data, factor analysis and structural equation modeling were utilized. Results showed that the developed scale had higher reliability and validity, and can be generalized across three language groups (English, French, and Japanese) in the higher education context. Further, SWAL significantly predicted positive engagement in the L2 writing context. Implications for L2 writing instruction are discussed in light of the findings. (Xu et al., 2023)

Paraphrased text: This study wanted to understand how well students understand and can assess their own writing in different languages. The researchers interviewed students and used their answers to make a questionnaire. They gave this questionnaire to many students and analyzed the data using special math. They found that the questionnaire was reliable and useful for measuring how well students understand writing in different languages. They also found that when students understand their writing better, they are more engaged and do better in their language classes. This information can help teachers teach writing better in different languages.

Here, Paraphrase Tool adopted the following six strategies: UVS, CWO, CPS, USN, CDN, and CBS. The use of five or six strategies is considered moderate revision. Table 7 provides details on the changes.

Table 7. *Strategies used by Paraphrase Tool compared to original text*

Strategies	Original text	Paraphrased text by Paraphrase Tool
Using a varied structure (applicable text in italics)	The scale *was validated* using questionnaires.	They used this questionnaire *to validate* the scale.
Changing word order (applicable text in italics)	The *scale* was validated using questionnaires.	They used this questionnaire to validate the *scale*.
Changing parts of speech (applicable text in italics)	*Interviews* were first conducted and coded… The results showed that the developed scale had higher *reliability* and validity…	The researchers *interviewed* students… They found that the questionnaire was *reliable* and useful for measuring…

Using synonyms (applicable text in italics)	*showed (that)* *students* *utilized*	*found (that)* *learners* *used*
Condensing (applicable text in italics)	Given the crucial role that student assessment literacy plays in the development of L2 writing, *the present mixed-method study* seeks to *develop and validate a student writing assessment literacy (SWAL) scale to measure this key construct with learners across multiple languages.*	*This study* aimed to *understand how well students understand and can assess their own writing in different languages.*
Combining sentences (applicable text in italics)	*Interviews were first conducted and coded to partially inform the follow-up scale development. The scale was validated using questionnaires.*	*The researchers interviewed the students and used their answers to create a questionnaire.*

Substantial revision

Substantial revision involves the use of seven or eight paraphrasing strategies. The resulting paraphrased text clearly differs from the original and only barely resembles it. Across the 30 abstracts, QuillBot demonstrated limitations in its paraphrasing capabilities, falling short of the achievement of a significant level of proficiency at the level of substantial revision. Therefore, the following only presents an example of an original text paraphrased by the Paraphrase Tool.

> **Original text:** This study explores two writing task variables (genre and idea support) that have been extensively employed in L2 writing research. It specifically examines L2 learners' perceptions and production of the narrative and argumentative tasks within which the condition of idea support is manipulated. Seventy-six ESL learners participated in this study (each wrote four essays), and they completed a self-rating task questionnaire immediately after each writing performance. Their essays were analyzed using 12 syntactic and lexical complexity measures. Results showed that the learners perceived the two genres as inducing similar cognitive demands, while judging the writing tasks with idea support as less cognitively demanding. In contrast, the learners' use of syntactic structures differed widely across the two genres, but not across the idea support conditions. (Yoon, 2021)
>
> **Paraphrased text:** This study looked at two things that are often studied in writing research: different types of writing and how much help someone gets with their ideas. The researchers wanted to know what students thought about these two things and how it affected their writing. They asked 76 students who were learning English as a second language to write four essays. After each essay, the students filled out a questionnaire about how they thought they did. The researchers also looked at the students' essays to see how complex their writing was. They found that the students thought the two types of writing were similar, but the ones with more help were easier.

> The students' use of certain words and sentence structures was different depending on the type of writing, but not depending on how much help they got.

In this paraphrased text, QuillBot used seven strategies: UVS, CWO, CPS, SLS, USN, EPS, and 7) CDN. These strategies exemplify with the substantial revision category, shown in Table 8.

Table 8. *Strategies used by Paraphrase Tool compared to original text*

Strategies	Original text	Paraphrased text by Paraphrase Tool
Using a varied structure (applicable text in italics)	In contrast, the learners' use of syntactic structures *differed* widely across the two genres, but not across the idea support conditions.	The students' use of certain words and sentence structures *was different* depending on the type of writing, but not depending on how much help they got.
Changing word order (applicable text in italics)	… and they completed a self-rating task questionnaire immediately *after each writing performance*.	*After each essay*, the students filled out a questionnaire about how they thought they did.
Changing parts of speech (applicable text in italics)	Their essays were analyzed using 12 syntactic and lexical *complexity* measures.	The researchers also looked at the students' essays to see how *complex* their writing was.
Separating long sentences into short sentences (applicable text in italics)	*It specifically examines L2 learners' perceptions and production of the narrative and argumentative tasks within which the condition of idea support is manipulated.*	*The researchers wanted to know what students thought about these two things and how it affected their writing.*
Using synonyms (applicable text in italics)	*explores* *writing task variables* *genres* *perceived* *showed* *learners*	*looked at* *different types of writing* *types* *thought* *found* *students*
Expanding phrases for clarity (applicable text in italics)	*Seventy-six ESL learners* participated in this study (each wrote four essays)…	They asked *76 students who were learning English as a second language* to write four essays.
Condensing (applicable text in italics)	It specifically examines L2 learners' *perceptions and production of* the *narrative and argumentative tasks* within which the condition of idea support is manipulated.	The researchers wanted to know what students *thought about* these *two things* and how it affected their writing.

DISCUSSION

This study analyzed the paraphrasing strategies and proficiency levels of QuillBot and Paraphrasing Tool within the frameworks of Keck (2014) and Nabhan et al. (2021). QuillBot and Paraphrase Tool adopted distinct strategies in their paraphrasing approaches. QuillBot placed its primary emphasis on changing words, including CWO, CPS, and USN. By contrast, Paraphrase Tool focuses predominantly on changing the structure and grammar, incorporating strategies such as UVS, SLS, EPC, CDN, and CSN.

In our sample, QuillBot occasionally condenses the original text in 15 out of 30 abstracts, whereas the Paraphrase Tool employs this strategy more frequently, as is evident in 28 of 30 abstracts. This aligns with the findings of Nabhan et al. (2021), who highlight the common use of synonym substitution and condensation in paraphrasing. Similarly, Prentice and Kinden (2018) showed that online tools tend to substitute synonyms without making substantial changes to sentence structure, potentially resulting in awkward language or incomprehensibility and potential distortion of the original text.

Na and Nguyen (2017) found that students predominantly employed lexical modifications, with synonym substitution as the most common technique, similar to the prevalent strategy observed in both QuillBot and the Paraphrase Tool. QuillBot focuses primarily on changing words, with a notable emphasis on changing word order. Paraphrase Tool has a more diverse approach, involving changes in sentence structure and grammar, as identified by various techniques, such as the use of SVS, SLS, EPC, CDN, and CSN. This diversity contrasts with Zulkarnain's (2020) findings, which underscored the use of condensed phrases and emphasis of key concepts in paraphrasing.

In addition to these issues, quality, efficacy, and reliability concerns may arise in paraphrases. For example, in this study, QuillBot primarily provided minimal revision in 17 out of 30 abstracts and moderate revision in 13; Paraphrase Tool only provided substantial revision for 2 out of 30 abstracts, moderate revision for 21, and minimal revision for 7. This means that QuillBot did not achieve the highest level of revision. While the Paraphrase Tool did reach this level, it only produced acceptable results for 7 out of 30 abstracts, and its overall performance did not reach paraphrasing standards.

QuillBot tends to preserve technical terms and concepts in paraphrased content, maintaining the integrity of the original for better comprehension. Paraphrase Tool often transforms technical terms into more descriptive language, potentially impacting the intended meaning. Here, confusion may arise due to altered technical terminology in specific contexts. Another concern involves the substitution of impersonal pronouns with personal ones, complicating comprehension. Thus, users of Paraphrase Tool should exercise caution, especially with regard to technical terms, and review and edit the results in the light of the original intent.

Due to the abovementioned limitations and concerns over the use of the two paraphrasing tools, writers should note that postediting may be necessary for refining the raw output and ensuring its suitability for the intended purpose (Inaba et al. 2007). For novice writers, in particular university students who have limited proficiency in the language being taught or assessed, postediting online output can pose challenges. Those with lower language skills may be less able to identify and correct grammatical inaccuracies and awkward phrasing (Niño, 2009). Thus, the academic support and guidance of teachers are necessary.

CONCLUSION

In conclusion, both QuillBot and Paraphrase Tool consistently relied on USN across all 30 abstracts. QuillBot predominantly used this strategy throughout, and CWO in 29 abstracts. Other strategies included CPS, UVS, CDN, SLS, EPC, and CSN. Paraphrase Tool primarily employed synonym usage in all abstracts, with common strategies involving CDN, UVS, EPC, CPS, and SLS. CWO was the least frequent strategy for both tools. Ultimately, QuillBot achieved minimal revision in 17 abstracts and moderate revision in 13. Paraphrase Tool generated substantial revision in 2 abstracts categorized, moderate revision in 21, and minimal revision in 7.

The present study demonstrates that AI paraphrasing tools can have several advantages, including speed and the ability to deal with large volumes of text. However, there are some limitations and concerns over the use of AI-generated paraphrasing tools, especially in terms of producing contextually inappropriate or semantically incorrect outputs, misinterpreting complex academic texts, and struggling with maintaining the academic tone and style required for scholarly writing.

Overall, the results of this study suggest that the importance of human proofreading and postediting after utilizing AI paraphrasing tools can be seen as necessary. Researchers, teachers, and even students wishing to use AI-generated tools should have the ability to critically evaluate the AI-generated content to ensure clarity and accuracy. The competent application of AI-generated paraphrasing tools requires a balanced approach that combines technological innovation with critical human judgment.

LIMITATIONS

Two main limitations arose in this study. First, its relatively small dataset may impact the study's overall reliability. Second, the study only used the standard selection mode of QuillBot and Paraphrase Tool, while opting for a different mode could yield different results. It would be interesting for future research to use a larger dataset with a different tool selection mode to offer additional insight into potential variation in paraphrased texts.

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