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Artificial Intelligence Tools for Research Writing: Practical Tips for Teachers

On the Internet

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Abstract

Writing research papers is a challenging task for many students, particularly when it comes to organizing ideas, finding appropriate references, and adhering to academic styles. This responsibility places significant demands on teachers to guide students through the complexities of academic writing. This paper explores the integration of artificial intelligence (AI) tools into the research writing process as a solution to these challenges. It examines various AI applications that support content generation, literature review, data analysis, editing, and citation management. While these tools offer substantial benefits in enhancing students' writing skills, the paper emphasizes the critical role of teachers in ensuring responsible use of AI. Practical instructional strategies are provided for teachers to effectively incorporate AI tools at different stages of writing, such as brainstorming, drafting, refining clarity and style, managing references, ensuring originality, and analyzing data. The conclusion highlights that although AI tools are valuable assets in research writing, teachers remain essential in guiding students to use these technologies critically and effectively.

Keywords: Artificial Intelligence, research writing, classroom activities

Writing research papers is an important task for English and non-English major students, particularly for those in graduate programs and final-year undergraduate studies. Developing strong research writing skills is essential, yet many students find it challenging to organize their ideas, locate appropriate references, and adhere to an academic style. These challenges place a significant responsibility on teachers, who must guide students through the complexities of academic writing.

In recent years, the integration of artificial intelligence (AI) into language teaching has gained momentum as a potential solution to address challenges in research writing (Praphan &

Praphan, 2023). AI-powered tools, such as *Grammarly* and *Trinka*, offer real-time feedback on grammar, style, and coherence, helping students refine their writing. Additionally, AI-based tools such as *Elicit* can assist students in efficiently finding relevant literature, while citation management tools such as *Recite* can simplify the process of handling references. To fully benefit from these tools, it is important that teachers provide guidance. This support helps students think critically about AI-generated content, which is crucial for maintaining originality and ensuring academic integrity.

This paper offers practical ideas for teachers on integrating AI tools into the research writing process. It outlines how AI can assist at various stages of writing and provides suggestions for incorporating these tools into classroom activities. The goal is to equip teachers to guide students in using AI responsibly and effectively, helping them improve their research writing skills while maintaining academic integrity. These ideas are particularly useful for university professors teaching non-English major college students, who need additional support in developing their academic writing skills in English.

AI Tools for Enhancing Research Writing Skills

AI tools have become crucial in research writing. These tools assist in various stages of the research process, including drafting, editing, data analysis, and literature review. These AI tools can be categorized based on their primary functions, as outlined below.

Generating Content

AI tools facilitate tasks such as brainstorming ideas, outlining, and generating drafts. AI-driven tools can help students overcome writer's block by providing interactive support. Gilburt (2023) explains that these tools can simulate a conversation, giving students a way to explore ideas by "talking" to the AI. This process is similar to brainstorming with another person. AI can suggest new ideas, ask questions, and offer different perspectives, helping students work through creative blocks. By engaging with AI, students can get fresh ideas they might not have considered. AI can also suggest alternative approaches to help them move past writing challenges. Gilburt (2023) highlights that AI can be especially useful when students struggle with structuring their writing or developing ideas. Through this interaction, students can better organize their thoughts and continue writing.

Further reinforcing the value of AI tools, Wang (2024) conducted a study involving six first-year writing students at a U.S. university, both native and nonnative English speakers. The research gathered data through thematic analysis of the students' written work, self-reflections, and interviews. The students recognized *ChatGPT*'s usefulness in generating initial ideas and *ChatGPT*'s effectiveness in helping students structure their writing. For example, Lydia, one of the participants, found *ChatGPT* helpful for narrowing down her essay topic on South Korea's low fertility rate by identifying key focus areas. Emma, another participant, used *ChatGPT* extensively to organize her outline, which allowed her to better decide on which specific topics to explore.

MacDonald et al. (2023) also studied the use of *ChatGPT* in drafting a research paper concerning vaccine effectiveness. Their study indicated that *ChatGPT* could support the drafting of essential parts of the document, such as the methods, abstract, and results and discussion. This is useful as it enables students to focus more on refining and expanding content rather than starting from scratch. Specifically, *ChatGPT* was used to draft the results and discussion following the "Strengthening the Reporting of Observational Studies in Epidemiology" (STROBE) guidelines, which are standards for reporting observational studies.

AI tools like *ChatGPT* and other drafting aids offer significant support during the writing process by helping students generate content, brainstorm ideas, and overcome writer's block. By providing interactive feedback and suggestion, these tools enable students to organize their thoughts more effectively. AI-generated drafts serve as useful starting points, allowing students to focus on refining and expanding their ideas, rather than struggling with how to begin. Through this process, AI tools help make the drafting phase more efficient while still requiring human input to ensure accuracy and creativity.

Assisting with Literature Review

One of the most challenging aspects of research writing is doing a literature review because students must find, evaluate, and synthesize relevant academic sources. AI-driven literature review tools, such as *Elicit*, *Research Rabbit*, or *Semantic Scholar*, have changed this process significantly by making it quicker and more thorough.

Burns et al. (2021) conducted an assessment of the effectiveness of *DistillerAI* in selecting suitable references for a systematic review. The objective of the research was to evaluate the performance of *DistillerAI* in relation to human reviewers, particularly investigating its ability to accurately assess the eligibility of 300 articles based on a set of criteria. The findings indicated that *DistillerAI* was able to make article selection decisions similarly to human assessors.

Similarly, a recent study by Enomoto et al. (2023) showed how effective *Elicit*, an AI-powered tool, can be in speeding up literature searches. The authors conducted a meta-analysis on liver cancer risks in patients treated for hepatitis B. *Elicit* identified 70 relevant papers in just 10 minutes, with 48 of these published during the study period (January 2006 to April 2020) and 22 more recent ones. Notably, 37 of these studies were newly discovered and had not been found through traditional search methods. However, it missed 20 papers that were found in traditional searches, which suggests *Elicit* is fast and useful but may not always be complete. This highlights the importance of using AI tools like *Elicit* to speed up the research process, while also combining them with traditional methods to ensure nothing is missed.

Another study by MacDonald et al. (2023) explored *ChatGPT*'s role in performing literature searches for creating a literature review. While *ChatGPT* assisted in identifying studies and generating a bibliography, the authors noted that the references provided by *ChatGPT* were sometimes inaccurate. This suggests that while AI tools can be helpful in speeding up the literature review process, human oversight remains crucial to verify the accuracy and reliability of the sources generated.

AI-driven tools such as *Elicit*, *DistillerAI*, and *ChatGPT* have transformed the literature review process by making it more efficient and thorough. However, despite their speed and capabilities, human oversight remains essential, particularly in ensuring the accuracy of search results. It is necessary to combine AI-assisted searches with traditional methods to guarantee a comprehensive and reliable review of the literature.

Performing Data Analysis

AI tools show potential in facilitating data analysis in qualitative research. *ChatGPT*, for example, has shown its ability to help with coding interview transcripts, finding patterns, and cleaning up quotes for manuscript preparation (Lee et al., 2024). In a medical research study, Lee et al. (2024) explored how *ChatGPT* could label text with specific codes during thematic analysis. It was also noted that *ChatGPT* could generate themes from these codes and clean up interview quotes to make them more readable. Similarly, Bijker et al. (2024) examined *ChatGPT*'s performance in analyzing forum posts about reducing sugar consumption. The study found that *ChatGPT* was quite consistent with human coders, achieving accuracy levels

between 66% and 88% when identifying behavioral changes. This suggests that AI tools like *ChatGPT* can be reliable partners in the research process, helping researchers save time and effort on tasks like coding and theme generation.

In addition to handling qualitative data, AI tools are also useful for analyzing complex quantitative data. AI can process large amounts of information, perform statistical analyses, and combine different types of data to provide comprehensive insights. Torrente et al. (2022) showed how AI was used to analyze data from 5,275 cancer patients. The AI tool brought together clinical records, questionnaire responses, and data from wearable devices to study treatment outcomes, classify patients, and examine diseases. This ability to work with large, complex datasets highlights how AI can help streamline research. Additionally, MacDonald et al. (2023) conducted an analysis using *ChatGPT* to process a dataset of 100,000 healthcare workers, which included key variables such as age, BMI, and comorbidities. *ChatGPT* provided valuable guidance by recommending statistical methods like survival analysis and multivariate logistic regression.

AI tools such as *ChatGPT*, *IBM SPSS Modeler*, and other quantitative and qualitative data analysis systems are proving to be valuable in the research process. These tools not only save time but also provide reliable support in coding, generating themes, and performing statistical analyses. However, the effectiveness of AI must still be complemented by human oversight to ensure accuracy and context in research findings.

Editing and Proofreading

AI-powered tools such as *Grammarly*, *Wordtune*, and *Trinka* offer valuable support in enhancing academic writing by providing instant feedback on grammar, vocabulary, and coherence. These tools help students identify errors and suggest improvements, making writing clearer and more concise.

Witteveen and Andrews (2019) investigated how the *GPT-2* model could be utilized for producing high-quality paraphrases. They used the Universal Sentence Encoder (USE) to evaluate semantic similarity, and they discovered that the paraphrases generated by *GPT-2* were similar to those created by humans, successfully preserving the original meaning while changing the wording. Nevertheless, some of the outputs still showed a lack of coherence or semantic similarity. The use of the AI tool clearly needs human supervision.

John and Woll (2020) analyzed the performance of grammar checkers, including *Grammarly*, *Virtual Writing Tutor*, and *Microsoft Word*, on both authentic compositions and simpler sentences written by French ESL learners. Their findings revealed that *Grammarly* and *Virtual Writing Tutor* were more effective at detecting grammatical errors compared to *Microsoft Word*, although none of the tools offered comprehensive coverage. Despite some limitations, these grammar checkers provided fairly reliable feedback.

Xia et al. (2021) examined the effectiveness of AI-based tools like *iWrite* in improving students' English writing abilities. Their study compared traditional teaching methods with AI-assisted instruction and found that students who used *iWrite* demonstrated significant improvements in their writing. This underscores the potential of AI tools to enhance educational outcomes, as they provide immediate, personalized feedback that helps students refine their work.

AI-powered tools like *Grammarly*, *Wordtune*, and *Trinka* play a significant role in improving academic writing by offering instant feedback on grammar, vocabulary, and coherence. While they can assist with identifying errors and suggesting improvements, they do not yet offer comprehensive coverage. These tools serve as valuable aids, but their use should be balanced with critical human input.

Managing Citations

Accurate citation management is crucial in research writing. AI-enabled citation management tools such as *Refworks*, *Recite*, and *Mendeley* simplify the process of organizing references and generating accurate citations. According to Butros and Taylor (2010), these tools provide valuable features that make research and writing more efficient while supporting collaboration between users. These AI tools allow students to focus on content creation and analysis rather than spending excessive time on citation formatting.

Lorenzetti and Ghali (2013) highlight the widespread use of citation management software in academic publishing. Their study, which reviewed systematic reviews in clinical journals, found that nearly 80% of authors used reference management tools, with *EndNote* being the most popular, followed by *Reference Manager*, and *RefWorks*. These tools are valuable for maintaining consistency and organization throughout the writing process. These tools significantly reduce the manual workload involved in academic writing.

AI-enabled citation management tools such as *Refworks*, *Recite*, and *Mendeley* significantly streamline the process of organizing references and generating accurate citations. By automating citation tasks, these tools allow students to focus more on content creation and analysis, reducing the manual workload involved in maintaining accurate references.

Checking Originality

Maintaining academic integrity is crucial in research writing. AI-powered plagiarism detection tools, such as *Turnitin*, *iThenticate*, and *Copyleaks*, help ensure the originality of student submissions by detecting instances of copied content.

Foltýnek et al. (2020) evaluated 15 online text-matching tools and discovered that, although they were mostly successful in identifying 'word-for-word' or direct plagiarism, these tools do not identify every case. The research highlighted that these tools occasionally marked original content as plagiarized, suggesting that human assessment is still crucial in identifying plagiarism.

Elkhatat et al. (2023) conducted an evaluation of AI content detection tools to assess their ability to distinguish between human and AI-generated text, particularly from *ChatGPT* Models 3.5 and 4. The study found that while these tools were more accurate in identifying content generated by *GPT 3.5*, there were inconsistencies and false positives when evaluating human-written text. Both studies highlight the importance of combining software tools with human oversight to promote academic honesty and uphold ethical standards in writing.

AI-powered plagiarism detection tools, such as *Turnitin*, *iThenticate*, and Copyleaks, are valuable for maintaining academic integrity. However, these tools can sometimes produce inconsistencies and false positives. Therefore, it is essential to combine them with human oversight to ensure academic honesty and uphold ethical writing standards.

In summary, the section *AI Tools for Enhancing Research Writing Skills* highlights the key role of AI tools in facilitating different phases of research writing, such as generating content, analyzing data, reviewing literature, editing, and managing citations. Nevertheless, it is essential to acknowledge the limitations of AI tools. Human supervision remains essential to guarantee accuracy, originality, and ethical standards in scholarly work.

Instructional Strategies for Enhancing Students' Research Writing Skills with AI

As AI becomes an important tool in research writing, teachers play a crucial role in guiding students to use it effectively. However, differences in familiarity with AI and technology—

often referred to as the digital gap—can create challenges in utilizing these tools. This section offers strategies that work for a range of skill levels, from novice to more experienced users. Each sub-section provides practical classroom ideas for using AI at different stages of the writing process, including brainstorming, finding sources, drafting, editing, and managing references. These activities are designed to help students enhance their research writing skills while maintaining high standards of academic integrity.

Brainstorming

In a classroom context, teachers can introduce tools like *ChatGPT*, *Microsoft Copilot* and *Gemini* to help students generate ideas by inputting prompts related to their interests. For example, a teacher might begin with a broad topic such as "student motivation" and use AI-generated suggestions to explore more specific research issues. Figure 1 presents AI-generated research questions about student motivation in EFL classrooms. Examples of these questions include:

- What are the primary factors that motivate EFL students to learn English?
- How do students' intrinsic and extrinsic motivations differ in EFL classrooms?
- What is the role of positive reinforcement in fostering student motivation?
- How does the classroom environment (e.g., physical setting, teaching methods) influence student motivation?

These questions illustrate how AI tools like Gemini can assist students in narrowing broad topics into specific, researchable questions. This instructional strategy gives students practical insight into how AI can refine their ideas and focus their research.

Teachers can implement a guided practice session where students are encouraged to use *ChatGPT* individually to generate a list of potential research topics. The teacher can provide specific prompts or keywords to get students started. For example, during a brainstorming session, students might generate five research topics related to a general area assigned by the teacher, and then select one topic to develop further by formulating research questions with AI assistance.

It is also essential to teach students how to critically evaluate AI-generated suggestions. Bansal et al. (2021) emphasize that AI suggestions should not be accepted without scrutiny. Teachers can introduce a Comparative Analysis activity, where students assess each AI-generated idea based on criteria such as originality, scope, available resources, and personal interest. To enhance comprehension, students can compare AI-generated ideas with their own or those developed through traditional brainstorming methods. Group discussions can follow, allowing students to share their evaluations, gain diverse perspectives, and refine their ideas further.

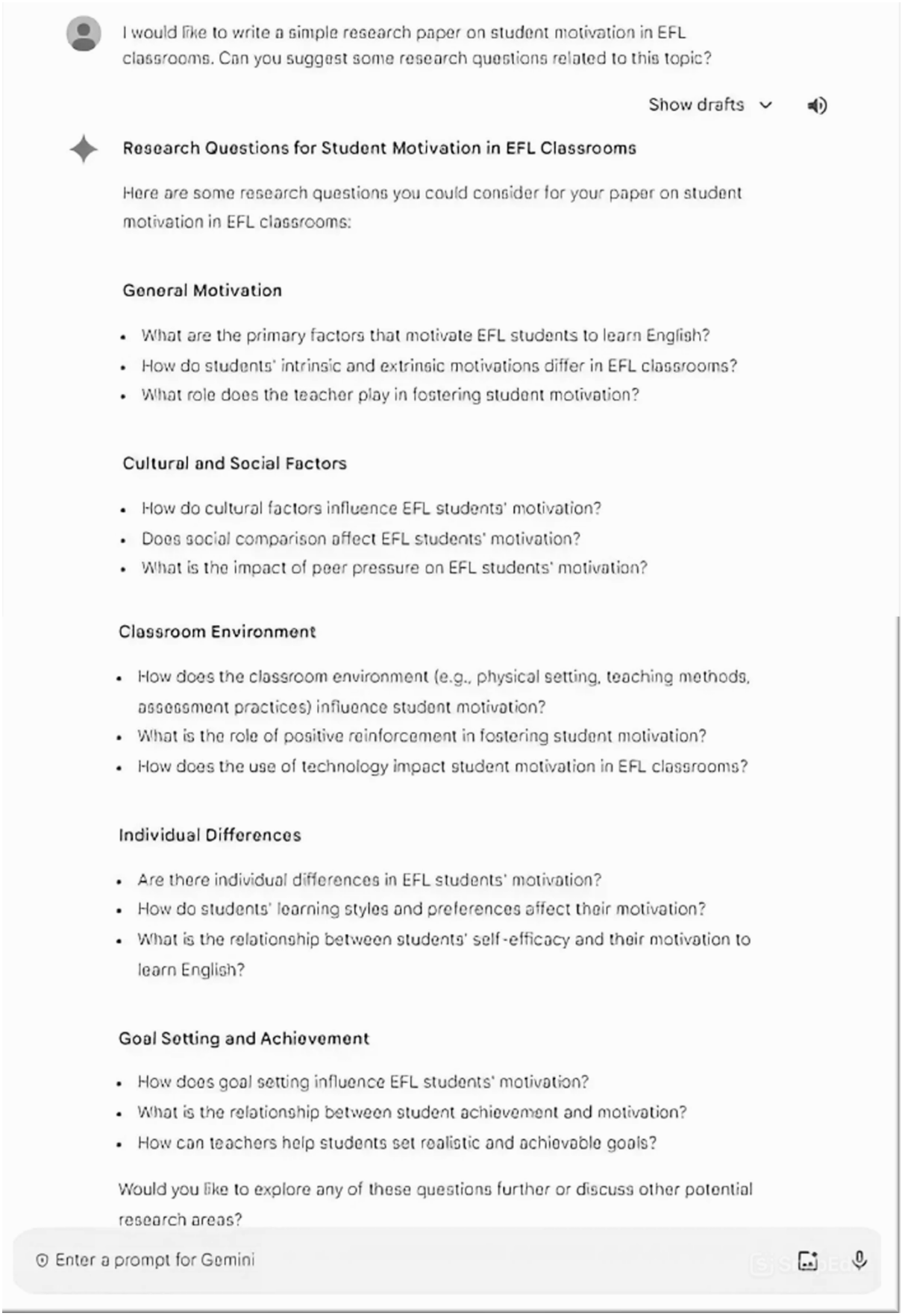

Figure 1. AI-Generated Research Questions for EFL Student Motivation (Created by *Gemini*, Version 1.5)

Finding Relevant Sources

Teachers can begin by demonstrating advanced search techniques using AI tools such as *Elicit*, *Semantic Scholar*, and *Research Rabbit*, guiding students on how to input specific keywords, refine search parameters, and identify key research articles. For example, building on the research question "What are the primary factors that motivate EFL students to learn English?", students could use *Elicit* to generate a list of relevant studies. They might input keywords such as "EFL student motivation," "factors influencing English learning," or "motivational strategies in EFL," allowing the AI tool to curate a selection of potentially useful academic articles.

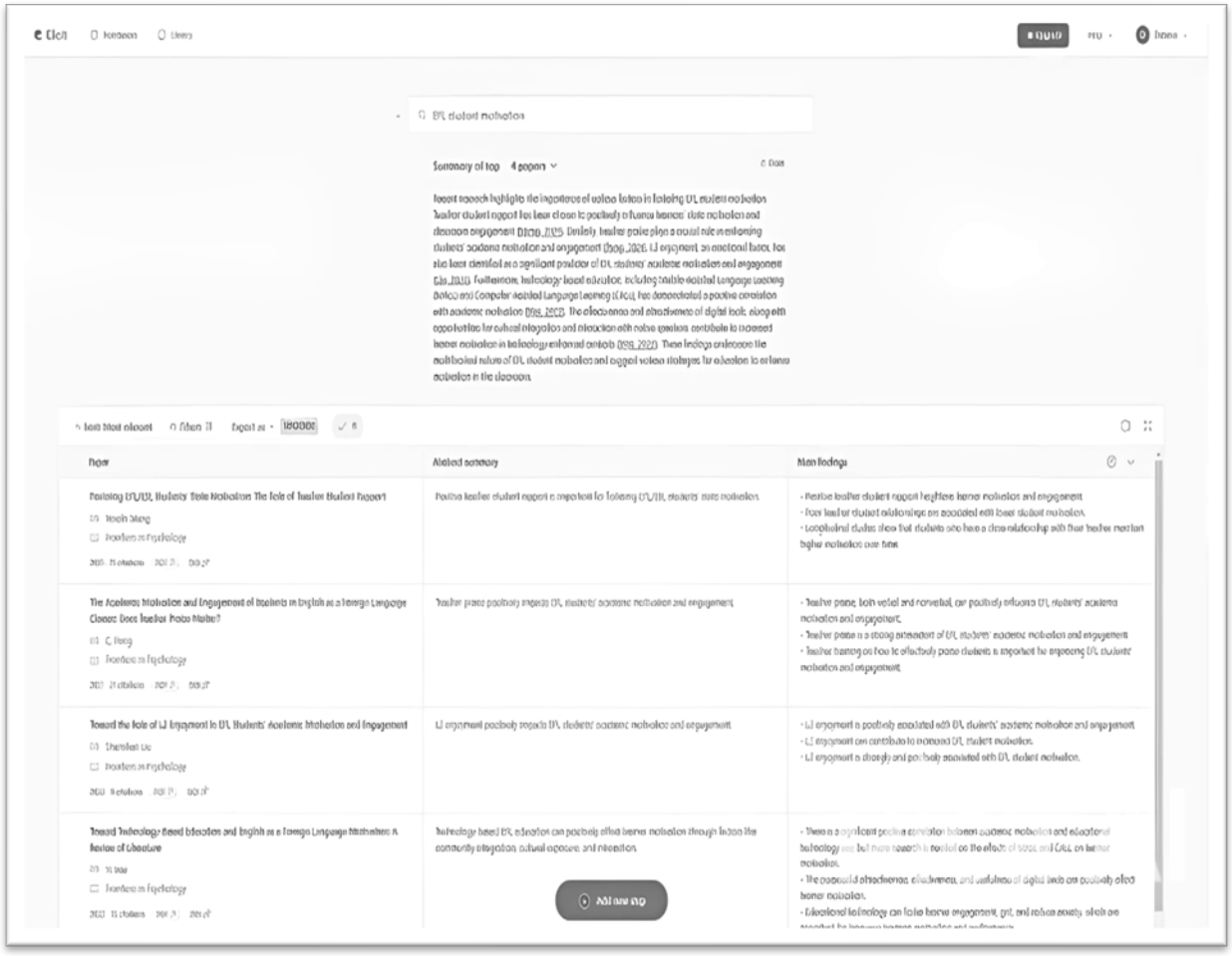

Figure 2. AI-Generated Relevant Studies on EFL Student Motivation (Created by *Elicit*)

These AI tools can significantly reduce the time and effort involved in conducting literature reviews by automating the search process and quickly sifting through large volumes of data (Enomoto et al., 2023). However, it is important to note that while AI tools offer efficiency, they are not without flaws; they may produce errors, providing incorrect facts or failing to include important sources in the research.

A helpful classroom exercise for students is to compare traditional database searches with AI-generated searches. In these exercises, students can analyse the differences in terms of speed, relevance, and scope. For example, students might search for a specific topic in a traditional academic database like *Google Scholar* or *JSTOR* and then repeat the process using an AI tool. They can analyze whether AI tools provide more targeted results or if traditional databases yield more comprehensive sources.

Another classroom activity involves having students critically evaluate AI-recommended sources alongside traditionally sourced articles. In discussions, students can analyze the research quality of AI-sourced articles by applying criteria such as methodological rigor, writing style, and adherence to field-specific norms, as emphasized by Thelwall et al. (2023). For instance, students can discuss whether AI-suggested sources use strong research methodologies, if the writing is suitable for academic work, and whether the sources follow the established standards of the field.

Additionally, students can assess other metrics, such as total citation counts, to evaluate the scholarly impact of articles, following the suggestions of Oswald (2007). Total citations can provide insight into how influential or widely accepted a study is within its field. They might also assess the Journal Impact Factor as another common measure of quality, as discussed by Piedra (2020). Students can examine whether AI-sourced articles come from high-impact journals, which often publish more rigorous and visible research.

Writing Initial Drafts

For drafting, AI tools such as *ChatGPT* and *Wordtune* can provide valuable support, though it is essential that students first attempt to write their drafts independently. Vicente-Yagüe-Jara et al. (2023) highlight that writing without immediate AI assistance allows students to explore their creative potential, which is critical for developing unique and original ideas. While AI can assist with certain writing tasks, it cannot replace human creativity and intelligence.

Building on the earlier research question "What are the primary factors that motivate EFL students to learn English?", students can use their findings from AI tools like *Elicit* to outline and begin writing their drafts. For instance, after gathering key articles on motivational strategies in EFL classrooms, students might organize their drafts by structuring sections around themes such as intrinsic motivation, extrinsic motivation, and the role of teachers.

Teachers should encourage students to rely on their own ideas and abilities before consulting AI tools. One instructional strategy is to organize drafting workshops in which students first draft paragraphs or essays independently. Afterward, they can use AI tools to refine their drafts. In these workshops, teachers can highlight the significance of establishing a solid base rooted in students' original ideas. Students can then evaluate AI-generated improvements alongside their original pieces to understand how AI enhances clarity, organization, or grammar while still preserving the authors' voices.

For example, a student might produce an initial draft such as the following: "Motivation is important because students need it to study English. Teachers help students by motivating them and making the classroom good. There are two types of motivation like intrinsic and extrinsic motivation. Intrinsic is when students like learning, and extrinsic is like getting grades. Both motivations are important, but it is hard to know which one is better." This draft demonstrates common challenges, such as repetitive phrasing, vague expressions, and limited depth in explaining key concepts. After creating such a draft, students can use AI tools like *Wordtune* to refine their language, enhance clarity, and improve the overall structure while maintaining the original intent of their ideas.

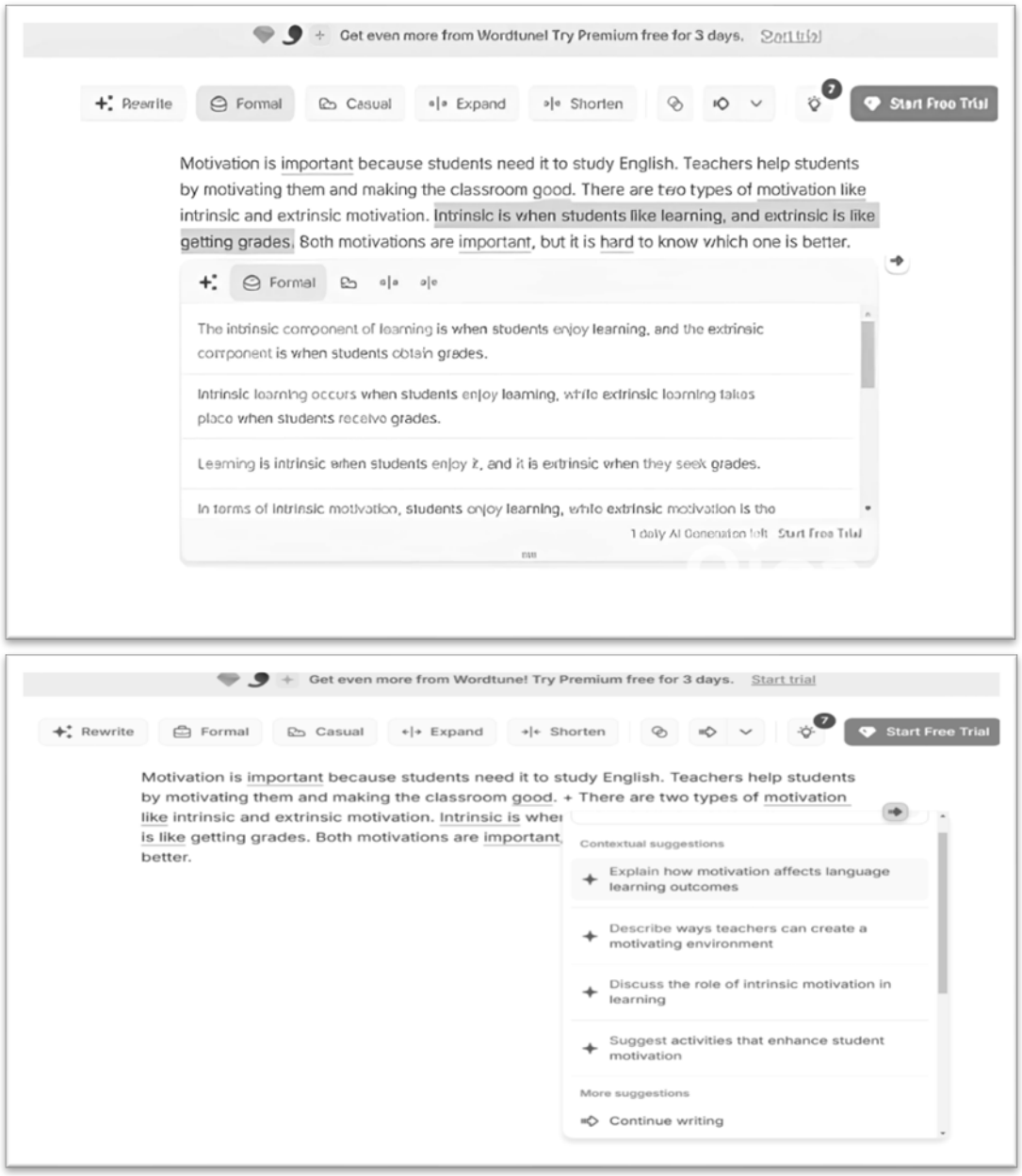

Figure 3. AI-Assisted Language Improvement (Created by *Wordtune*)

To enhance the learning experience, peer review sessions may be implemented. Once students utilize AI tools to improve their drafts, they swap papers and assess each other's work manually. This practice motivates students to thoughtfully analyze both the AI recommendations and peer feedback, promoting a balance between technology use and human evaluation.

MacDonald et al. (2023) caution that while AI tools like *ChatGPT* can draft and structure text, they may not have the domain expertise to fully grasp complex topics, which can lead to inaccuracies or oversimplifications. Therefore, critically assessing AI-generated suggestions is essential for enhancing initial drafts while maintaining students' originality.

Teachers can also organize activities focused on error analysis where students identify and discuss the differences between content generated by AI and their own intended meanings. These activities may include comparing AI-generated statements with the original sentences that students initially created. Another instructional strategy is to ask students to mark parts of their writing where AI has made important modifications and to discuss whether these changes

have enhanced or weakened their original thoughts. These activities encourage students to develop a deeper understanding of the limitations of AI and learn how to use this technology critically.

Enhancing Clarity and Style

Once an initial draft is completed, AI tools such as *Grammarly*, *Trinka*, and *Paraphraser.io* can assist students by offering suggestions on grammar, vocabulary, sentence structure, readability, and style. Beyond correcting technical errors, these tools also help adjust tone and formality, ensuring the text aligns with academic writing conventions. However, it is essential that students critically evaluate each AI recommendation to ensure it aligns with their intended message and tone. Rather than relying entirely on AI, students should see these tools as complementary aids to enhance their drafts.

Teachers play a crucial role in reinforcing this mindset. Vicente-Yagüe-Jara et al. (2023) highlight that although AI tools can enhance drafts, they should serve a supportive role, enabling students to have their individual writing style. In a similar way, Gilburt (2023) emphasises the need to balance AI support with human contributions. This balance is crucial for students to keep developing their writing skills rather than depending entirely on content created by AI.

Explicit teaching on the use of AI tools is crucial. Yahia and Egbert (2023) found that students' skills improved significantly with direct instruction. In this case, teachers can conduct sessions where they show how to use AI tools and interpret feedback. For instance, after students refine a paragraph with *Wordtune*, they are asked to input the revised text into Grammarly for further enhancements. Figure 4 presents an example of how Grammarly evaluates and provides suggestions for a student's improved draft.

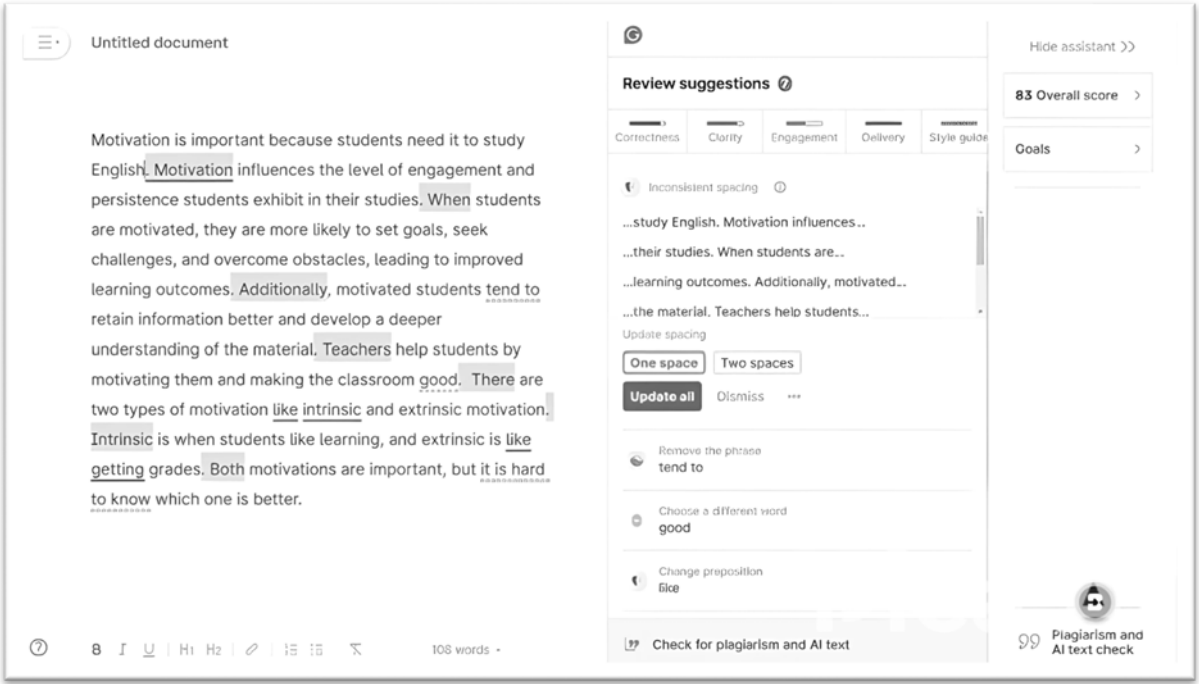

Figure 4. AI-Assisted Writing Feedback (Created by *Grammarly*)

Teachers can use this example to emphasize the significance of human judgment in in evaluating AI-generated feedback and to highlight the scope and limitations of AI-generated feedback. Grammarly, for instance, can improve style by recommending changes to tone, formality, and sentence variety. For example, the tool may suggest replacing word like "good" with more formal alternative such as "suitable". Similarly, Grammarly might advise rephrasing

repetitive structures to enhance flow of writing. These recommendations not only address the technical aspects of writing but also refine its stylistic elements, ensuring that students' work aligns with academic standards. While these adjustments can improve the clarity of the writing, students should carefully assess whether the changes align with their original intent.

To enhance this learning journey, teachers might include peer editing tasks. Once learners utilize AI tools to improve their drafts, they share their AI-modified drafts with classmates for evaluation. This practice allows students to receive further insights on how AI-enhanced modifications correspond with human assessments. Using both AI feedback and peer reviews can encourage students to carefully reflect on the importance of each suggestion and to develop a balanced view between advice from AI and input from their peers.

Teachers may also give students reflection activities in which they compare drafts that have been edited with AI assistance and those that have not. By engaging in such activities, students develop a deeper comprehension of how AI improves writing, and they can become more selective in determining which recommendations to follow and which to ignore.

It is equally important for students to understand the limitations of AI tools. Falke et al. (2019) caution that while AI tools can assist in summarizing texts, AI-generated summaries, though fluent, often contain factual errors. Similarly, John and Woll (2020) point out that grammar checkers, although helpful, may have errors or provide inaccurate feedback. Therefore, students should be encouraged to review AI-generated feedback carefully.

Teachers can arrange activities for critical evaluation in which students identify the limitations of AI tools. These activities may include students spotting mistakes in summaries or feedback generated by AI or evaluating how well AI handles stylistic elements such as tone and coherence By including practical tasks that enable students to examine AI results closely, teachers promote a deeper understanding of how to utilize AI tools effectively and responsibly.

Managing References

Penders (2018) emphasizes that referencing is crucial not only because it demonstrates the foundation upon which new studies are built but also because it shows how these studies differ from previous works. Accurate referencing ensures transparency and helps others see how the research was done. AI-enabled citation management tools like *Bibcitation*, *Mendeley*, *Zotero*, and *Recite* streamline the process of organizing references and generating accurate bibliographies. These tools can save students time and effort, particularly when handling large numbers of sources from various formats.

Nevertheless, even though AI tools help with automation, it is important for students to understand the concepts of referencing. Teachers have a responsibility in making sure students understand the reasons for proper citation methods, encouraging them not to depend only on automated tools but also to think critically about the sources they are referencing.

As instructional strategies, teachers can organize sessions that demonstrate how to use AI citation management tools and reinforce the basic principles of proper referencing. For example, teachers might show students how to use *Bibcitation* to generate references in APA, MLA, or Chicago styles quickly. These sessions can begin with practical demonstrations on how to create citations directly from article titles, URLs, DOIs, or by manually inputting data.

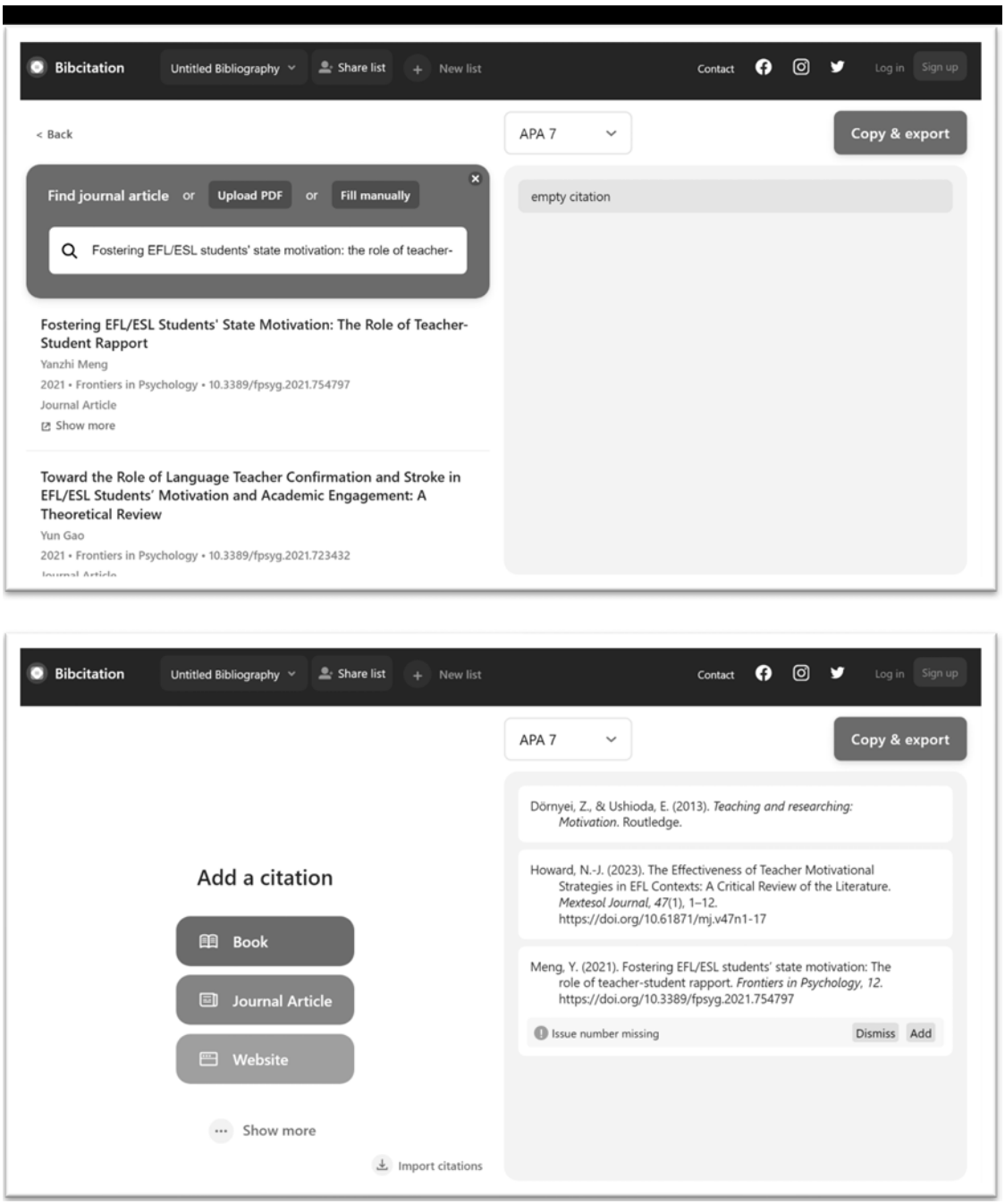

Figure 5. AI-Assisted Citation Management (Created by *Bibcitation*)

Following this, teachers can conduct tutorials focusing on the basic principles of different citation formats, emphasizing their specific formatting guidelines and the importance of accurate referencing. Such sessions help students understand that proper citation is not merely about avoiding plagiarism but also about demonstrating intellectual integrity and precision in academic work.

To deepen this understanding, teachers can present case studies where students evaluate real examples of citation errors caused by reliance on AI tools. These case studies may include issues such as incorrect attribution of sources or errors in formatting. By analyzing these examples, students learn to verify the accuracy of AI-generated references and to make manual adjustments when necessary to ensure academic precision.

Peer review tasks can be included to strengthen students' comprehension of correct referencing. In these activities, students exchange papers and check each other's references for accuracy. Teachers can introduce specific criteria for the peer review, such as verifying the completeness of citations (e.g., author names, publication dates, journal titles), ensuring that in-text citations match the entries in the bibliography, or checking whether the chosen citation style has been applied consistently throughout the paper. This activity motivates students to critically evaluate both AI-generated citations and those entered manually, making sure that all citations comply with the guidelines.

Ensuring Originality

Gasparyan et al. (2017) point out that poor writing, paraphrasing, and referencing skills are common causes of plagiarism. Therefore, it is essential to teach students on publication ethics and forms of plagiarism to minimize unintentional errors and enhance accountability. In this regard, Weber-Wulff et al. (2023) emphasize the significance of preventive measures, encouraging educators to address these problems before they occur.

Teachers might arrange sessions focusing on ethics in publishing, especially focusing on plagiarism and correct citation methods. These sessions could feature hands-on activities where students detect plagiarism in sample texts or practice effective paraphrasing. This helps students understand proper attribution and enhances their capability to prevent unintentional plagiarism.

Live demonstrations of AI-powered tools such as *ZeroGPT*, *Turnitin* or *iThenticate* should guide students through the process of checking for both plagiarism and AI-generated content, interpreting the results, and understanding how to revise their text. These sessions should emphasize that while AI tools provide valuable support, human critical thinking remains essential.

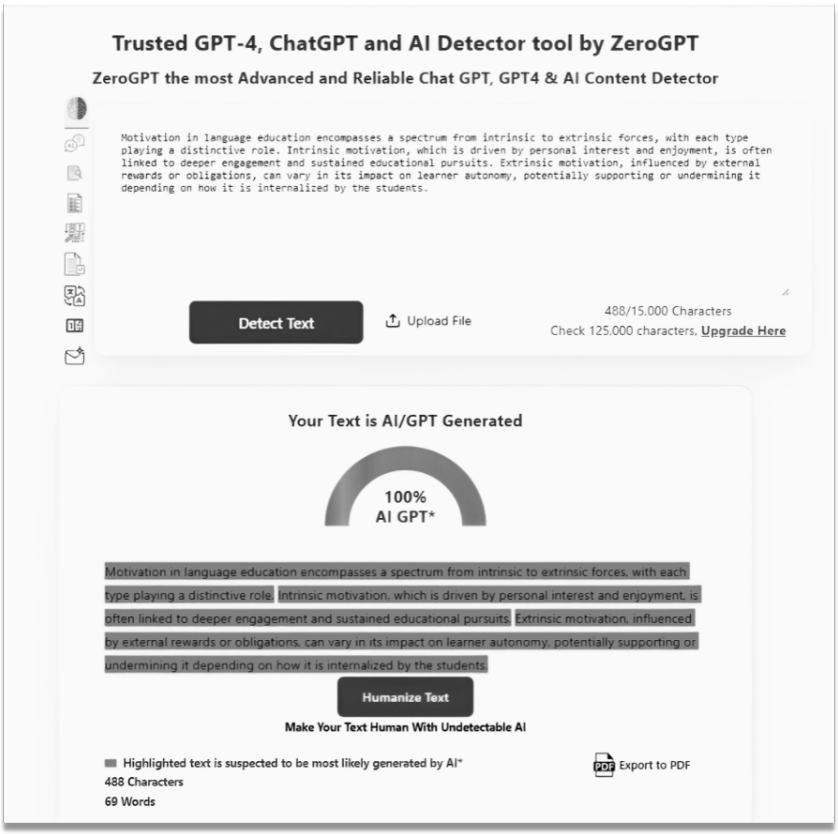

Figure 6. AI-Assisted Plagiarism Detection (Created by *ZeroGPT*)

Furthermore, teachers can also lead discussions on the limitations of plagiarism detection tools, as suggested by Foltýnek et al. (2020). These discussions can cover issues such as false positives where the tool flags correctly cited content as plagiarism or missed detections where actual cases of plagiarism or AI-generated text are overlooked. Engaging students in such discussions helps them think critically about the results instead of just accepting them as the final answer. In addition to classroom activities, establishing clear classroom policies on the responsible use of AI tools is very important. Teachers should highlight the need for transparency and assist students in understanding the ethical aspects of using content generated by AI. For instance, students are asked to add a note in their assignments that shows where AI tools were utilized, or they are allowed to use AI tools only for certain activities like brainstorming or drafting. These clear guidelines help students develop their own writing abilities, with AI tools acting as their support rather than substitutes.

Analysing Data

AI tools such as *NVivo* or *Ailyze* can help students in coding and analyzing qualitative data, while tools like *Julius* and *Microsoft Power BI* are useful for performing statistical analyses for quantitative data. *ChatGPT* can support both types of analysis by identifying patterns in text-based data, generating themes, or processing numerical datasets. Teachers can guide students in using these tools to analyze data more efficiently while ensuring accuracy and critical evaluation of the results.

In a qualitative research session, students can be asked to use *ChatGPT* to analyze responses from EFL students about their motivation for learning English: "I want to learn English to travel and communicate with people worldwide," "My goal is to get a better job," and "English is mandatory for passing my school exams." Using *ChatGPT*, students input this dataset with a prompt such as, "Identify the key themes in these responses." *ChatGPT*'s output might group the responses into themes namely Global Communication, Career Advancement, and Academic Requirements. Teachers can use this process to show how AI tools can quickly organize qualitative data into meaningful themes.

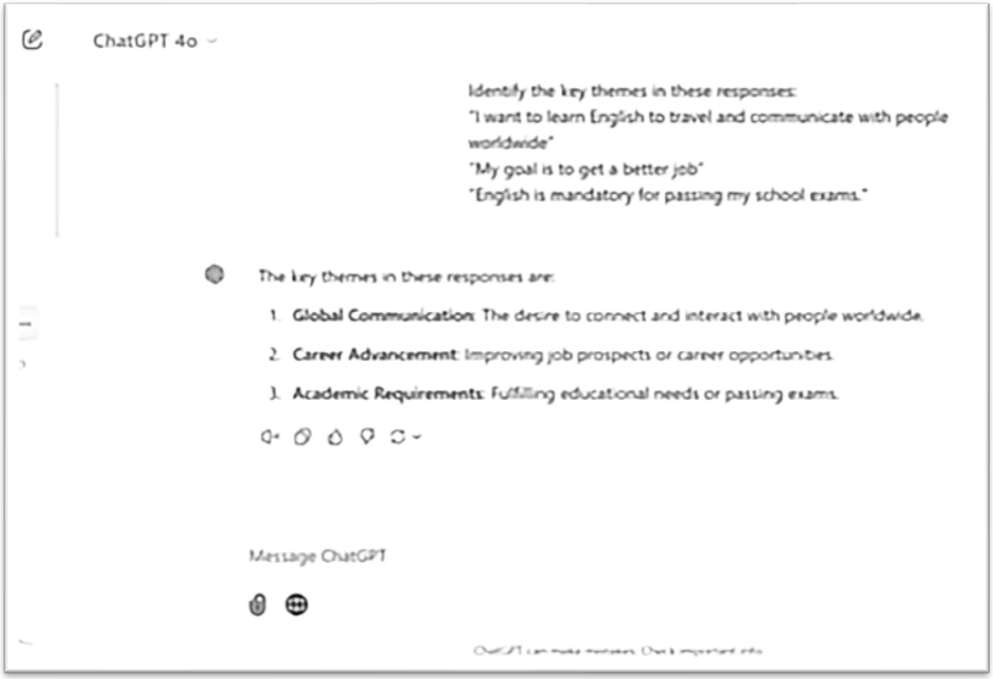

Figure 7. AI-Assisted Qualitative Data Analysis (Created by *ChatGPT*, Version 4.0)

In a quantitative research session, students can be asked to use *ChatGPT* to analyze a dataset of EFL test scores such as 78, 85, 92, 67, and 74. Students could prompt *ChatGPT* with, "Calculate the mean, median, and standard deviation of these scores." *ChatGPT* might respond with a mean of 79.2, a median of 78, and a standard deviation of 9.3. Teachers can use this activity to demonstrate how AI tools simplify calculations.

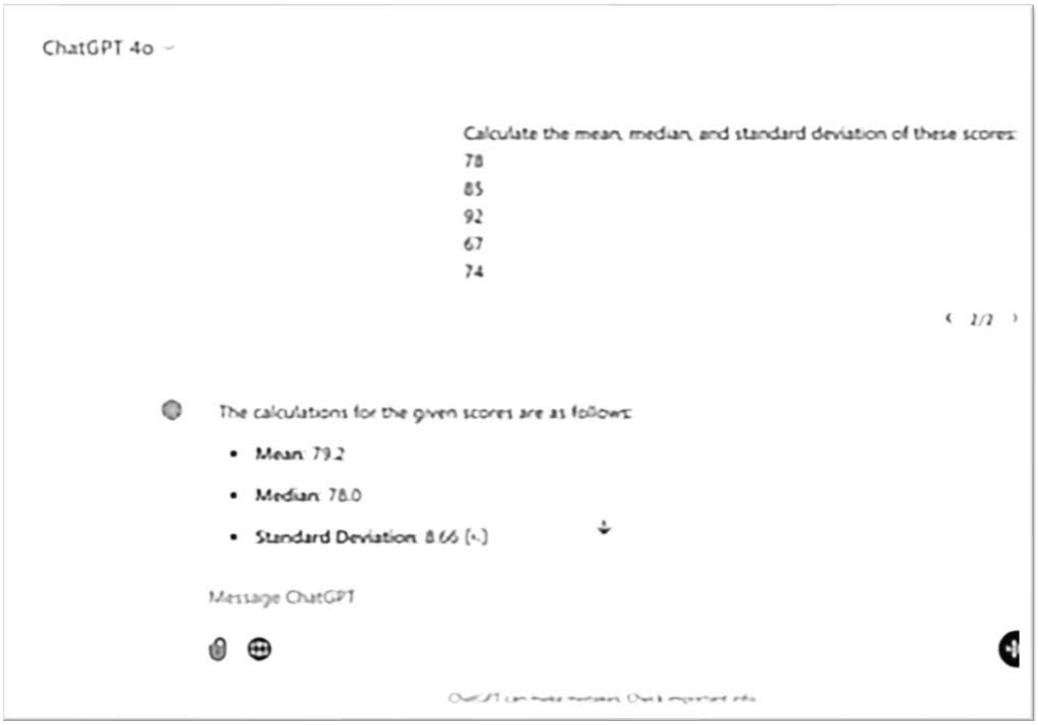

Figure 8. AI-Assisted Quantitative Data Analysis (Created by *ChatGPT*, Version 4.0)

To enhance students' understanding, teachers can arrange comparison tasks. For example, in a qualitative research session, students can be instructed to manually code a dataset and then utilize AI tools to automatically generate codes. Later, they would analyze the outcomes, looking at how AI coding corresponds with or contrasts their own manual coding. In a quantitative research session, teachers can provide datasets for students to analyse using AI tools. Students could be assigned the task of calculating statistics manually prior to employing AI-driven software to verify their results. This will enable students to recognize the effectiveness AI contributes to data analysis while also learning how to check AI-generated results for possible discrepancies.

Buchanan (2023) highlights the importance of encouraging students to reflect on ethical concerns when using AI in data analysis. In this case, teachers should lead classroom discussions on important considerations such as data privacy, bias, and the need for human oversight in AI-driven research. For example, teachers might share a case study where an AI tool examined a hiring dataset showing more male applicants than female, which led to biased results that favored male candidates. This case study can spark a discussion about how biased data can cause unfair AI-generated results and about the importance of human supervision to ensure both accuracy and fairness in research.

In conclusion, the section *Instructional Strategies in Enhancing Students' Research Writing Skills with AI* demonstrates that AI tools have the potential to significantly improve students' research writing skills by assisting in some key areas including brainstorming, drafting, data analysis, and citation management. However, effective teacher involvement is critical to ensure

that students not only utilize these tools for efficiency but also maintain academic integrity and critically assess AI-generated content.

Conclusion

AI tools offer valuable support at each stage of the research writing process. These tools can enhance the writing process by automating certain tasks and providing personalized feedback. However, despite the increasing role of AI in research writing, the role of teachers remains crucial. Teachers play an essential role in guiding students to use AI tools responsibly, ensuring they critically evaluate AI-generated suggestions and avoid over-reliance on technology. By incorporating structured instructional strategies, such as workshops, comparative analysis activities, and reflective exercises, teachers help students develop essential writing skills while maintaining their creativity and academic integrity. As AI technology continues to advance, its implications for research writing will likely grow. While these developments present exciting opportunities to enhance student writing, they also highlight the need for instructional approaches and active teacher involvement. As discussed during the 2023 AI+Education Summit, "Great teachers remain the cornerstone of effective learning" (Chen, 2023).

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Appendix

AI Tools for Research Writing

Stage of Writing	Tool	Description
Brainstorming	*ChatGPT*	Generates ideas, refines research questions, and offers topic suggestions.
	Microsoft Copilot	Generates ideas and research questions; assists in structuring brainstorming documents.
	Gemini	Generates research questions and supports brainstorming by identifying key issues in a topic.
Finding Sources	*Elicit*	Identifies and summarizes academic papers using keyword inputs, highlighting recent and relevant studies.
	Semantic Scholar	Searches and filters academic papers with focus on citation analysis and relevance.
	Research Rabbit	Builds citation networks and generates recommendations for academic papers, offering a visual approach to literature exploration.
Writing Initial Drafts	*ChatGPT*	Assists in drafting content by generating paragraphs, expanding ideas, and improving initial drafts.
	Wordtune	Suggests improved phrasing, clarity, and sentence structure for drafts.
Enhancing Clarity and Style	*Grammarly*	Offers grammar, vocabulary, tone, and style suggestions.
	Trinka	Improves formality, vocabularies, and sentence structure.
	Paraphraser.io	Simplifies rewriting content by offering rephrasing suggestions while maintaining the original meaning.
Managing References	*Bibcitation*	Simplifies citation generation using titles, URLs, or DOIs and supports various citation styles.
	Mendeley	Provides a reference library for organizing and managing academic sources. Includes features like PDF annotation, seamless syncing, and mobile app accessibility.
	Zotero	Provides a reference library for organizing and managing academic sources. Open-source tool with tagging feature.

Stage of Writing	Tool	Description
	Recite	Checks for consistency between in-text citations and reference lists, ensuring accuracy.
Ensuring Originality	*ZeroGPT*	Free AI detection tool with a 15,000-character limit per check and 300-word plagiarism checking reset monthly. More features available via subscription.
	Turnitin	Offers subscription-based plagiarism and AI detection tools designed for educational institutions.
	iThenticate	Provides professional plagiarism detection and AI writing detection. Primarily used by publishers.
Analyzing Data	*ChatGPT*	Assists in identifying themes in qualitative data and performs calculations for quantitative data.
	NVivo	Supports qualitative research by organizing and coding data for thematic analysis.
	Ailyze	Provides advanced AI-powered analysis for qualitative data, offering sentiment analysis and keyword extraction.
	Julius	Focuses on statistical analysis, including hypothesis testing and regression analysis for quantitative research.
	Microsoft Power BI	Creates visualizations and dashboards for analyzing and summarizing quantitative data.

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