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Investigating AI Writing Tools in Enhancing Academic Writing Skills of Diploma in TESL Students of a Private College in Malaysia: The Moderating Role of Students' Perceptions

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Abstract

The rapid advancements in Artificial Intelligence (AI) have transformed language education, especially in higher education. Many studies have been done related to AI integration in education, but none on the use of language AI tools among Diploma TESL students at Poly-Tech institutions in Malaysia. This study investigates the use of AI writing tools such as Grammarly, QuillBot and ChatGPT in enhancing the academic writing skills of Diploma in Teaching English as a Second Language (DTESL) students at Kolej Poly-Tech Mara (KPTM) Kota Bharu, Malaysia. The study is grounded in Sociocultural Theory (SCT) and the Technology Acceptance Model (TAM) to investigate the relationship between AI writing tool use which is the independent variable and academic writing skills as the dependent variable including grammar accuracy, vocabulary usage, coherence and organization and self-editing skills. Students' perceptions of AI writing tools that are operationalized through perceived usefulness and perceived ease of use will serve as the moderating variable. A mixed-method explanatory sequential design under the pragmatic paradigm will be employed with Phase 1 comprising a quantitative survey that will be administered to 150 students followed by Phase 2 involving qualitative semi-structured interviews with 15 purposively selected students to explore their experiences, challenges and suggestions for improving the integration of AI writing tools. Quantitative data will be analysed using SPSS Statistics Version 29 through descriptive statistics, Pearson correlation and multiple regression analysis. Qualitative data will be analysed thematically through a manual process. This study will provide empirical insights into how AI writing tools support ESL academic writing performance and offer practical recommendations elicited from students' suggestions for incorporating these tools into writing instruction. By focusing on the Malaysian higher education ESL context, this study addresses critical gaps in the literature on AI-assisted academic writing.

Keywords: AI Writing Tools, Grammarly, QuillBot, ChatGPT, Academic Writing Skills, Student Perceptions, Sociocultural Theory (SCT), Technology Acceptance Model (TAM)

Introduction

The advent of artificial intelligence in education has changed both the ways that students learn and create written material and the types of written materials they create, particularly for those who teach English as a second language (TESL). Many students using English as a second language (ESL) and especially English as a foreign language, utilize artificial intelligence writing tools such as Grammarly, Quillbot and ChatGPT to obtain immediate, real-time, feedback about grammar, vocabulary, coherence and editing. These tools can serve as a type of digital scaffold to provide students with assistance in improving their writing abilities and to promote learner autonomy and confidence in the learning process (Nguyen et al., 2024; Subramaniam & Mohamad, 2024). In recent years, AI integration in education has also become a global priority, reflecting a broader shift toward technology-mediated learning that encourages self-directed and data-informed writing development. These emerging technologies represent both a new pedagogy and an essential skill set for both future educators and learners who will be able to engage with AI-based learning environments successfully.

However, researchers caution that relying too heavily on AI generated feedback may negatively impact student's ability to be creative, original and think critically during writing assignments, thus raising questions concerning the ethical and responsible use of AI in an academic context (Abdul Rahman et al., 2023; Aljuaid, 2024). Additionally, while most of the current literature focuses on university level students, little attention has been paid to diploma-level TESL students in Malaysia. It is crucial to understand diploma-level TESL students' perceptions and practices when utilizing AI tools to support their academic writing because they face long-standing challenges with respect to grammatical accuracy, vocabulary usage, coherence and self-editing (Najlaa et al., 2024). Therefore, the absence of an empirical study at the diploma level in private higher education institutions like Kolej Poly-Tech MARA (KPTM) Kota Bharu, underlines the need for further empirical research at this level. This is significant as diploma TESL students are a key stage of preparation for language teaching, yet they have fewer resources and less exposure to formal academic writing support compared to university students.

Therefore, the purpose of this study is to explore how Diploma in TESL students at Kolej Poly-Tech MARA (KPTM) Kota Bharu utilize AI writing tools to support their academic writing. Specifically, this study investigates the relationship between AI tool use and students' writing skills and whether students' perceptions of usefulness and ease of use of AI tools moderate this relationship. This study was grounded in Sociocultural Theory (SCT) which considers AI tools to be mediational artefacts that facilitate learning and the Technology Acceptance Model (TAM) which provides a theoretical explanation for how individuals accept new technologies based on their perceived usefulness and ease of use. This study is expected to provide several benefits to different stakeholders. For example, students can have a greater sense of independence and confidence when writing with AI tools as they will have access to consistent and personalized feedback. Furthermore, for teachers or instructors, the results of this research will be useful in developing AI-assisted writing activities that help their students develop their writing skills and increase reflective practice. Additionally, for those responsible for curricula and policy makers, this research provides an insight into both the pedagogical and ethical considerations necessary to implement AI-assisted writing tools effectively and responsibly in the ESL (English as a Second Language) context in Malaysia. Overall, this study

will contribute to the understanding of how AI assisted writing is effective and practically applicable in supporting sustainable language development among TESL (Teaching English as a Second Language) students.

Literature Review

Academic writing is an extremely cognitively demanding task for all second-language (L2) writers, especially English Second Language (ESL) students. The bulk of L2 students' efforts are devoted to lower-order aspects of language such as spelling and grammar as a result, they may neglect their ability to think at higher order levels and develop coherent arguments (Dizon & Gayed, 2024). As ESL students' lack of focus on language form contributes to poorly expressed ideas and poorly developed essays, these inherent challenges have caused educators to explore ways to include technology in the teaching of academic writing. Specifically, using Artificial Intelligence (AI) based writing software can decrease cognitive load for students by giving immediate feedback on the students' writing (Mahapatra, 2024). The AI writing software is described as an application that analyzes a student's written work, identifies errors, recommends corrections to the errors identified and even creates additional text (Mahapatra, 2024). For example, Grammarly automatically corrects spelling and grammatical errors in writing while QuillBot provides rewritten versions of text for clarity and ChatGPT provides contextualized recommendations.

With the role of digital scaffold, AI tools allow learners to focus on content rather than technical writing processes. Students can quickly identify and repair errors rather than wait for instructor feedback. According to Raad et al., (2023), AI writing applications increase students' writing efficiency because they allow students to spend less time on the monotonous and time-consuming process of proof-reading and enable students to write drafts more quickly. Similar to the findings of Raad et al., (2023), Llausas et al., (2024) stated that allowing students to automate basic proof-reading enables writers to be able to develop their ideas and organize their thoughts for better coherence. In terms of empirical research on the effectiveness of the integration of AI writing tools, there are several examples of positive results from studies conducted on the adoption of AI writing tools. For example, a large number of Malaysian university students report using AI writing tools and report having a generally positive attitude toward them. For example, Subramaniam and Mohamad (2024) found that the majority of Malaysian ESL students viewed AI tools like Grammarly and ChatGPT as helpful tools to aid their learning and not as forms of cheating. Similarly, Hadi et al., (2024) reported similar finding regarding the relationship between PU and PEOU of ChatGPT and the likelihood that students would utilize the tool and engage in writing assignments.

Importantly, while empirical research indicates that AI writing tools can improve the writing accuracy and fluency of ESL students when properly utilized, researchers note that the benefits of AI writing tools will be contingent upon learners' attitudes toward AI writing tools. Consistent with the Technology Acceptance Model (TAM), research has demonstrated that both PU and PEOU shape users' intentions to adopt new technologies. As stated by Subramaniam and Mohamad (2024), ESL students who hold positive perceptions of Grammarly and ChatGPT do not only utilize these tools more frequently, but also report better grammar and vocabulary skills. Similarly, Hadi et al., (2024) reported similar findings regarding ChatGPT in which stating that positive attitudes toward the tool increased usage

and enhanced the quality of students' essay submissions. Furthermore, Anani et al., (2025) found that ESL students who believe that AI tools enhance their writing abilities are more likely to utilize the tool throughout the writing process. On the other hand, some researchers have warned about pitfalls of adopting AI writing tools, including Ismail (2024) warning that some students may accept AI generated responses without critically evaluating them and risk superficial knowledge acquisition. Additionally, Ramli et al., (2025) reported that even students who hold high PU scores may not necessarily utilize metacognitive strategies to evaluate the appropriateness of AI generated responses in which suggesting that while holding a positive perception of AI writing tools is necessary to effectively utilize them, it is not sufficient to ensure the students' positive learning habits.

In conclusion, the literature demonstrates that AI writing tools have the potential to positively impact ESL students' academic writing by providing immediate feedback on their writing and decreasing their cognitive load. However, in order for students to benefit from AI writing tools, they must utilize them in an effective manner. Therefore, this study examines not only the direct effect of utilizing the AI writing tool on ESL students' writing skills, but also how students' perceived usefulness and ease-of-use moderates that effect.

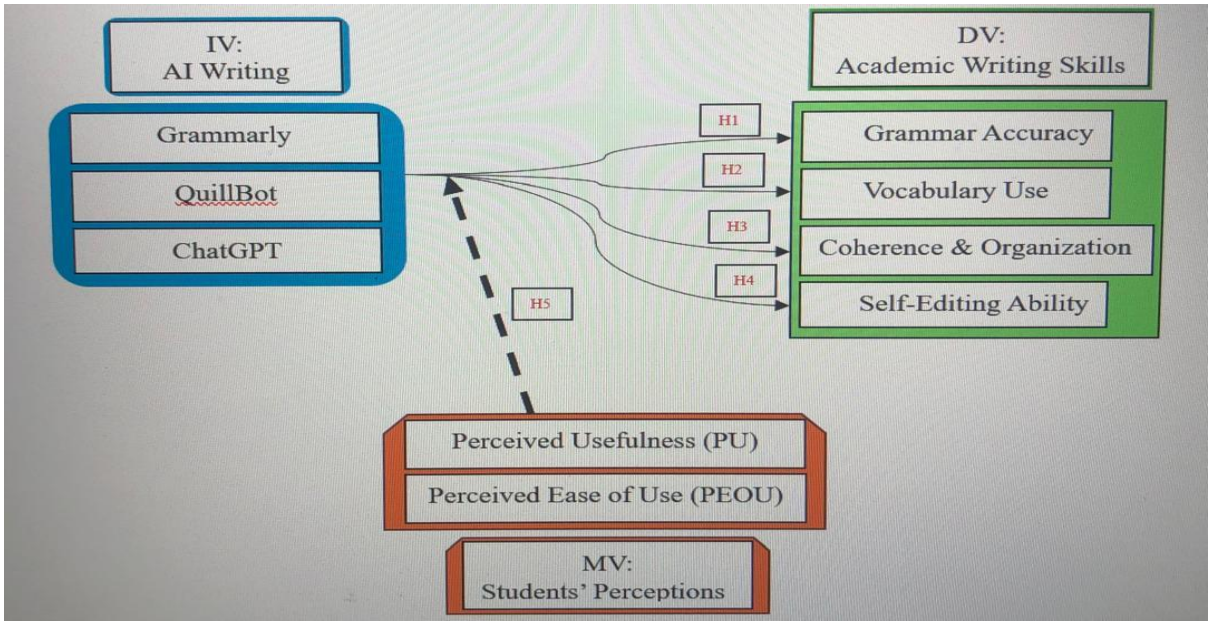

Figure 1. Conceptual Framework of the Study

This framework illustrates the hypothesized relationships between AI writing tools (IV), academic writing skills (DV) and students' perceptions (MV) as the moderating variable.

Methodology

This research utilises an explanatory sequential mixed-methods research design using a quantitative survey method followed by qualitative interview study. The first, quantitative phase is to collect data via a structured questionnaire administered to 150 DTESL students from KPTM Kota Bharu. The survey contains Likert-scale items on frequency of use of three AI tool (Grammarly, QuillBot, Chat GPT) and self-assessed scores for writing sub-skills (accuracy of grammar, range of vocabulary, coherence and organisation of writing and self-editing) informed by prior studies. It also measures perceived usefulness (PU) and ease-of-

use (PEOU) of the tools. The descriptive statistics will not only provide summaries of usage patterns but also test hypotheses H1–H4 (tool use vs writing skill correlations) via Pearson's correlation in SPSS. Hypothesis H5 (moderation by perceptions of tool use) will be tested using multiple regression with the interaction terms according to approaches used in studies in AI-writing for examples, Ahmed et al., (2025) and Mohammadi & Zoghi (2023).

The qualitative phase will consist of semi-structured interviews with 15 purposively-selected respondents of the first survey. These students will be selected to maximise variations for usage of AI tool and perceived improvements for example, high-use and low-use students. Interviews will explore students' experiences, where, how tools are used, perceived benefits and challenges and perceived improvements as well as enhancements to the writing experience and suggestions for its integration into the writing instruction process. This explanatory sequential design provides a context to understand and explain the quantitative survey findings and hence depth for the statistical terms. This study is located in a pragmatic paradigm which enables a combination of quantitative and qualitative approaches to the research problem. This is consistent with the SCT (tools are mediators) and TAM (attitudes and intentions are observable) frameworks. It is pragmatic, then the outcomes within this research can be connected from the measured relationship (via survey) to the mediated learner experiences (via interviews) a comprehensive understanding can be ascertained.

Sampling

The population is all current students enrolled in Diploma TESL students at KPTM Kota Bharu. The study will adopt purposive sampling in order to ensure that participants have experience with AI writing tools. The questionnaire will be widely distributed to all semesters to secure approximately 150 responses which will provide sufficient power for correlation and regression. 15 students selected from the respondents will subsequently be interviewed, representing a balance of AI usage frequency and performance. This is parallel to the previous ESL technology research in which capturing both common patterns and diverse perspectives.

Data Collection

The online survey will be pilot-tested and refined for validity. Quantitative data will be collected via an online questionnaire during the academic term. Interviews will be conducted in English, recorded (with consent) as well as transcribed for analysis.

Data Analysis

The quantitative data will be analysed in SPSS (v29). Descriptive statistical properties will provide means, frequencies and correlations. Pearson correlations will be used to test H1-H4 (tool use vs each writing skill). Multiple regression (including interaction terms for PU and PEOU) will be used to test H5 (moderation). The qualitative data will be analysed through manual thematic analysis. The transcripts will be coded continuously according to Braun and Clarke's six phase model. Themes will be compared with survey data to elucidate how and why the tool use affects the writing outcomes. In this way the information from the qualitative and quantitative aspects, for example student explanations of specific AI feedback opportunities for revision in writing essays can provide proper insights into the conclusions toward quantitative trends.

Ethical Considerations

The study will gain institutional ethics approval. Participation is voluntary and informed consent is gained whereby respondents are welcome to withdraw at any time. Anonymity and confidentiality will be assured and data will be to held securely. All aspects will follow best practice educational research practice ethics.

Expected Findings

It is anticipated that the results from the survey will show strong positive relationship among the frequency of students using AI writing tools and the writing skills measured. Prior studies have shown that ESL students who used tools frequently such as Grammarly, Quillbot and ChatGPT, scored significantly higher than those who did not in each of the three aspects of writing skills assessed. Thus, it is expected that the Pearson correlation analysis supporting H1-H4 where the more frequently students use any one AI writing tool, the better they are at reporting their own grammar and coherence. The qualitative data from the interviews will provide further insight into these quantitative results. There is an expectation that several common themes related to the use of AI tools will be evident in the interviews. These could include student comments about how the AI feedback was helpful to them in identifying errors, increased confidence in writing and reduced time spent on revision. Other possible themes could include comments about how students' reliance on the suggestions generated by the AI, difficulties in understanding the AI's feedback or ethical concerns about using the tools, could potentially limit the benefit derived from the tools.

On a theoretical basis, it is expected that the findings from the research will be consistent with SCT and TAM. That is, students will likely report that the AI tools act as mediating agents that extend their writing development, consistent with Vygotsky's conceptualization of tools that extend the zone of proximal development (ZPD). Consistent with TAM, it is expected that students who perceive greater utility in the tools and easier to use will report more frequent and effective use of the tools. Conversely, students with lower levels of PU and PEU may report less frequent use of the tools and report fewer benefits. This would support H5 (moderator) where positive perception would enhance the effect of the AI tools on the students' writing development.

On a practical basis, it is expected that the research will produce an evidence-based pedagogical model for integrating AI into the writing instruction process. Potential recommendations could include teacher-facilitated orientations to AI tools, scaffolded writing assignments that incorporate AI feedback, instructor-facilitated peer review of AI-generated content and guidelines for the responsible and ethical use of AI in the classroom. For example, the research may recommend that teachers train students in how to evaluate the suggestions generated by AI, so as to prevent plagiarism and create writing assignments that require students to integrate AI-generated feedback into their writing while still allowing students to maintain control over their own writing processes. In summary, there is an anticipation of both empirical support for the effectiveness of AI writing tools as aids to students' writing development and specific recommendations for ESL teachers on how to effectively utilize this technology in their classrooms.

Conclusion

This research will be a mixed-methods examination of the use of AI writing aids in enhancing the academic writing skills of Diploma TESL students. The primary goal of this study is to provide insight into how tools (Grammarly, QuillBot and ChatGPT) are used and what learners think about using them and ultimately, how they can facilitate improvements in grammar, vocabulary, coherence and editing. This study will utilize a SCT and TAM theory to determine if the tools function as learning mediators and if positive attitudes, for example (high levels of perceived usefulness and ease of use) positively affect their ability to do so. Expected results will add to the understanding of theory by verifying the use of SCT and TAM in the context of an AI mediated writing environment. Furthermore, expected results will provide practical value through evidence-based recommendations on the integration of AI writing support into ESL curricula and policy recommendations on increasing digital literacy. Overall, this research will aid educators and educational institutions in utilizing AI-enhanced writing supports to improve student outcomes in language education.

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