Exploring AI-Generated Texts vs. Human-Written Texts in EFL Academic Writing: A Case Study of Qassim University in Saudi Arabia

Mohammed AbdAlgane[1], Rabea Ali[1], Khalid Othman[1], Intisar Zakariya Ahmed Ibrahim[1], Mohamed Kamal Mustafa Alhaj[2], Ezzeldin M. T. Ali[3], Faris Salim Allehyani[4]

[1] Department of English Language & Literature, College of Languages & Humanities, Qassim University, Saudi Arabia

[2] Humanities Department, Ranyah University College, Taif University, Kingdom of Saudi Arabia

[3] Department of English language and Linguistics, Faculty of Arts and Humanities, Gadarif University, Sudan

[4] Department of Languages and Translation, University College of Umluj, University of Tabuk, 71491 Saudi Arabia

Correspondence: Mohammed AbdAlgane, Department of English Language & Literature, College of Languages & Humanities, Qassim University, Saudi Arabia. E-mail: Mo.mohammed@qu.edu.sa

Abstract

This research article examines the syntactic and stylistic differences between AI-generated and human-written academic articles. It also explores the success rate of plagiarism detection tools in identifying AI-generated writing in English as a Foreign Language (EFL), and faculty members' ability to distinguish between the two types. Ultimately, it examines the ethical and institutional implications of utilizing AI in academic settings. SPSS analyzed the responses received from the questionnaire. This study consisted of 52 participants: 14 EFL graduates and 38 undergraduates, 6 of whom were female. Participants were 18–24 years old, including graduates and undergraduates pursuing a bachelor's degree in English language and translation. The results showed that Qassim University graduates and undergraduates have equal familiarity with AI and its usage, scoring an average of 40.77 (graduates) and 40.48 (undergraduates). Respondents indicated the main uses of AI tools were for brainstorming, grammar checking, paraphrasing, and coherence improvement; hence ChatGPT is the most popular tool among them. All tools overall improved the writing process of students. The researchers recommend institutionalizing the teaching of AI literacy in curricula to teach students about the ethical, practical, and strategic use of such tools as ChatGPT, Grammarly, and QuillBot in writing curricula. They recommend support to provide this support through professional development for instructors to assist them in evaluating student work assisted by AI. Clear academic integrity guidelines should be created and communicated to both professors and students. Equally important, motivating students to use AI for peer evaluation, ideation, and collaborative writing, while also teaching them about the hazards of overreliance on AI and emphasizing the importance of originality and critical thinking. Finally, further research is needed to examine the long-term effects of AI. Such studies investigate the influence of AI on writing skills and academic success which should drive future policies as well as sustain excellence in writing while also ensuring the equitable and pedagogically sound integration of AI into education.

Keywords: AI-generated texts, human-authored texts, EFL academic writing, plagiarism detection, academic integrity

1. Introduction

Emerging Artificial Intelligence (AI) in education has paved new ways for facilitating learning, particularly in language acquisition. For example, because English writing poses several grammatical, coherence and structural challenges for EFL learners that are well addressed by AI tools. Balla et al. (2025) asserted that advancements in AI, especially in natural language processing and adaptive learning systems, present promising opportunities to improve adult language instruction. The rapid advancement of AI technologies in EFL education introduces both opportunities and challenges that necessitate careful deliberation. AI shows significant potential to support educators of EFL, help learners acquire language individually, and offer more standardized and scalable evaluations. However, the precise assessment of AI tools and the leadership of responsible innovation will play a major role in benefit maximization and risk minimization. The rapid development of artificial intelligence in natural language processing has led to the massive utilization of s in different fields – first and foremost, education. An increasing trend by students and educators toward dependence on tools like OpenAI's ChatGPT, Google's Bard, and other large language models (LLMs) for academic writing prompts brings with it very important issues about authenticity, quality, and pedagogy. The problems that most students face with linguistic and rhetorical competence in the use of AI-generated texts have created a new dynamic, thus offering challenges and opportunities.

English is a core subject at universities in Saudi Arabia; academic writing proficiency forms the basis of success for students both academically and professionally. Students from this region who are learning EFL have continuously demonstrated ineptness in coherence, grammar, vocabulary, and overall argumentation. The advent of AI writing assistants has also paved the way for new dynamics, as they can provide instant linguistic support on one hand. However, on the other hand, they create issues related to overreliance, leading to

reduced critical thinking and authentic writing ability.

This study contrasts AI-led and human-authored academic texts by EFL learners at Saudi universities. This research aims to identify significant differences and evaluate the implications for EFL writing instruction by analyzing linguistic features, structural organization, and the depth of argumentative content. It then shares insights from students and teachers about using AI in academic writing, focusing on ethics and the necessary teaching changes.

This study seeks to inform the growing and indeed heated debate with concrete empirical data on the advantages or otherwise of s at play in EFL. It is designed to guide educators and policymakers in Saudi Arabia in their quest for the integration of AI tools effectively while maintaining academic integrity, and at the same time fostering authentic writing skills among students.

1.1 Research Problem

While there has been an increasing interest in AI applications in education, there is limited research on how AI tools influence the writing performance of EFL students, particularly in the Middle East. This study aims to fill a significant gap by focusing on diverse EFL learners enrolled in Saudi educational institutions. It explores the differences, difficulties, and impacts of AI-produced content versus human-created compositions amid EFL scholarly writing situations at Saudi institutions.

1.2 Significance of the Study

Understanding AI's role in writing improvement can provide inspiration to educators and policymakers on how to effectively integrate AI tools into language learning curricula. This study is of direct relevance to the following:

1. Saudi higher education institutions are facing AI.
2. EFL teachers who want practical ways to check real student writing.
3. Curriculum makers are developing writing courses.
4. Policymakers who are making rules for using AI.
5. Students are dealing with the moral issues of using writing tools.
6. Saudi higher education institutions are grappling with AI integration.

1.3 Research Objectives

1. The primary purpose is to study the influence that AI-assisted writing tools have on the quality of writing assignments by EFL students at Qassim University.
2. To analyze the linguistic and stylistic variations of academic texts between those generated by artificial intelligence and human-written ones.
3. To perform a critical review of how well plagiarism detection systems work in the identification of AI-generated content in EFL contexts.
4. To investigate faculty members' capacity to differentiate between AI and human writing.
5. To carry out a study on ethical considerations and institutional policies regarding the use of artificial intelligence in academic writing.
6. Set some rules to responsibly use AI tools in teaching EFL writing.

1.4 Research Questions

1. In which aspects can AI be compared with human-written texts regarding linguistic accuracy, coherence, and overall academic rigor in EFL academic writing?
2. What are the major distinguishing features between AI-generated and human-written academic texts produced by Saudi EFL learners?
3. To what degree do AI-generated texts fulfill the academic writing criteria anticipated at Saudi universities in contrast to human-composed texts?
4. Do AI-generated texts display fewer or different kinds of grammatical mistakes compared to human-written EFL texts?
7. Do students and educators believe AI-generated texts can substitute human writing in academic evaluations?

2. Literature Review

2.1 AI in Education

A comprehensive critical review of the literature on AI applications in educational settings reveals advancements in natural language processing (NLP) and how AI supports learners. AI technologies are being integrated into educational environments with the goal of enhancing pedagogy and methodology. The application features personalized learning environments that respond to the needs of each student, intelligent tutoring systems that provide support and feedback tailored to the needs of each learner, and automated grading systems (Adiguzel et al., 2023). Other areas where AI can be involved in education include natural language processing for language

acquisition, virtual teacher assistants, and predictive analytics that identify at-risk students for enhanced interventions (Chan et al., 2019). With the help of machine learning algorithms and data analytics, AI will foster an inclusive and successful educational environment by assisting educators to comprehend various learning styles, monitor student progress instantaneously, and implement specific interventions (Ali et al., 2024). The anticipation regarding the role that AI ought to play in overhauling education is by enhancing teaching approaches and optimizing burdensome managerial tasks so as to offer high-quality learning encounters at scale. This eventually translates into individualized equitable as well as appealing discovery experiences (Khan et al., 2021).

AI in language study has shown great potential for enhancing students' vocabulary and sentence structure (Jia et al., 2022). In this way, AI can deliver personalised and adaptive learning at various proficiency levels through intelligent language-learning systems. Responses from students can be analysed and understood using NLP, which provides instantaneous feedback to reinforce learners' vocabulary and grammar precision (Song & Song, 2023). Chatbots powered by AI, in addition to virtual language tutors, provide conversation practice that enables students to put new words into real contexts by forming sentences through interactive dialogue (Utami et al., 2023). Furthermore, AI will be able to identify frequent errors and patterns in learner performance, allowing customized paths to be created that focus on areas for improvement. Ali & Abdalgane (2022) found that targeted and interactive methodologies can bring speed to vocabulary retention and improve the ability to frame contextually relevant, grammatically correct sentences. Consequently, AI-driven language learning tools have become highly effective in the language teaching process, as they provide learners with resources and support to achieve greater fluency and competence in language use (Shadiev et al., 2022).

2.2 Major Variations in Syntactic Precision Between Machine-Created and Human-Composed Texts in EFL Scholarly Academic Writing

The rise of AI-produced texts has sparked significant curiosity about their syntactic precision when compared with human-composed texts, especially within the realm of EFL academic writing. This segment explores the key differences, informed by perspectives from relevant studies.

1. Syntactic Complexity and Clause Structure: AI-generated texts have so far been noted for their observable differences in syntactic complexity and clause structure when compared with those of human writers. While it has been proven that AI can string structurally sound sentences together, it often falls short when it comes to more complex sentence structures and combinations of clauses within sentences that human authors typically use. Research papers comparing human writing and AI-generated abstracts noted a strong propensity for the latter to use less limited adverbial clauses, and elaborative clauses which are much more typically found in human writing. This further suggests that the competence for using nuanced syntactic structures by human writers in academic contexts has not yet made its way into current AI systems. (Leong, 2023).

2. Grammatical Morphemes & Error Patterns: Another central area of difference between AI-generated and human-written texts lies in the use of grammatical morphemes, which are less accurately marked by EFL undergraduates. Tense markers and subject-verb agreement fall within the same category. The study, which indicated greater errors among upper-intermediate students in lexical choice and syntax, shares its results with observations carried out on output (Lahuerta, 2018). Sometimes, such sentences are produced that are correct grammatically but inappropriate semantically. This phenomenon suggests a lack of knowledge regarding context-specific grammatical rules (Georgiou, 2024).

3. Lexical & semantic accuracy are other areas where AI-generated and human-written texts differ. Although capable of producing lexically rich text, inappropriate word choices and simplistic vocabulary sometimes compromise the overall semantic accuracy of the text (Georgiou, 2024). Human writers use a more varied vocabulary that is contextually appropriate, thus making their writing semantically more precise.

4. Punctuation and Pragmatic Features: Punctuation is another area where differences show between the output of AI and that of a human. Apart from helping determine the grammatical well-formedness of a text, punctuation is very useful in its pragmatic interpretation. According to research, this is sometimes wrongly applied by AI or it fails to capture those pragmatic nuances that human writing would normally convey via punctuation thus making its texts be interpreted wrongly or appear ambiguous.

5. Genre-Specific Writing & Contextualization: The major area in which human content beats AI content is genre-specific writing and contextualization. An experiment conducted using genre analysis methods also found that human-written abstracts provide better and more detailed contextualization. In contrast, AI-generated abstracts focus more on providing clear purpose statements but are much less detailed about the results and other contextual information (Melliti, 2024). This finding is indicative of a possible inability of AI to catch the genre-specific conventions and minute contextual details that are so essential to academic writing.

6. Genre-Based Approaches to Detection: As a way to make AI detection tools more reliable, genre-based approaches to identifying AI-generated texts have begun. In a study by Leong (2023) comparing human-written and AI-generated abstracts, a genre-based framework for identifying AI-generated content was recommended. The best approach is to emphasize the importance of multiple and diverse grammatical features in the design of any AI detection algorithm (Leong, 2023). It will ensure that tools intended for academic writing are functioning optimally while preserving the integrity of academic writing.

7. Error Detection & Reliability: The ability to detect errors and the degree of reliability are significant considerations in the grammatical accuracy of texts produced by AI. Much as AI is capable of producing grammatically accurate texts, it may also

generate equally plausible errors, making its mistakes less readily apparent. An investigation into the accuracy and reliability of scores generated by AI for rating EFL writing tasks revealed that content-related issues and source text integration were less reliably identified by AI than by humans (Kim et al., 2024). Therefore, there is a need for a meticulous review and editing process of all content aspects when using texts generated by AI.

8. Training & Improvement of AI Models: The development and advancement of AI models are very important in making texts generated by AI systems grammatically accurate. Experimental work such as that carried out by Rad et al. (2024) has indeed proved that AI models can be fine-tuned to generate text with high closeness-to-human-written-text; however advanced the current systems may be, there is a giant leap left to be made in syntactic and semantic dimensions.

9. Ethical and Pedagogical Implications: Therefore, ethical and pedagogical implications must be considered when using of AI-generated texts in EFL academic writing. Although AI can be a useful tool for language studies and academic writing, it poses serious threats to issues of academic integrity and presents avenues through which it could be misused. A study of EFL undergraduates' perceptions regarding the use of AI-based tools in their academic writing found that students perceived AI as an extremely valuable resource, but were also well aware of its usage challenges and ethical considerations (Artiana & Fakhrurriana, 2024). This result calls for explicit policies and ethical standards on the use of AI-generated texts in academics.

2.3 How Do AI-generated Texts Compare with Human-Written Texts Regarding Coherence and Logical Flow in EFL Academic Writing?

The issue of comparing s with human-written ones in terms of coherence and logical flow has been empirically treated as a complex one. Various studies that attempted to explain the strengths and weaknesses of both types of texts, focusing on how well they convey ideas and maintain coherence, highlighted similarities as well as differences between them.

2.3.1 Resemblances Between AI-Generated and Human-Composed Texts

1. Linguistic Accuracy and Structure: The AI-generated texts have made great strides in the linguistic accuracy that they can achieve compared to what real humans can produce. In fact, the sentences are coherent and well-structured. There is an over-impression on human adjudicators that AI-generated texts look very coherent and well-structured, usually indistinguishable from those produced by real humans (Hakam et al., 2023; Leong, 2023). This apparent human-like quality is especially evident in the use of correct grammar, syntax, and vocabulary, all of which are essential for maintaining academic writing clarity and consistency.

2. AI-generated and human-written texts utilize cohesive devices to connect ideas and establish logical flows. Definite articles and pronouns were heavily used in the analyzed text produced by EFL students, just as in any other human or AI-generated text. The use of such cohesive words helps establish links between different ideas in a paragraph and improves the understanding of how concepts are developing (Anwar et al., 2024).

3. Theme patterns in all sentences of both texts showed that the use of theme in one sentence as a base for building on ideas was common. An EFL students' thesis introductions study noted that humans and students used Constant Theme Pattern, Linear Theme Pattern, Split Theme Pattern, and Derived Theme Pattern to join ideas coherently (Anwar et al., 2024).

2.3.2 AI-Generated and Human-Written Texts Dissimilarities

1. The depth and substantiation of ideas represent a significant difference between AI-generated and Human-written texts. Human-written texts typically offer better elaboration and depth of development of ideas compared to their AI counterparts, which may lack this quality and occasionally introduce new information without adequate elaboration (Anwar et al., 2024). Such a lack of depth could make the text coherent as well as logically sound.

2. Another major difference lies in the use of finite and non-finite clauses. A study that compared human-written abstracts with those generated by AI found that the latter, even when created by a state-of-the-art model, differed in their use of finite adverbial clauses and "–ing" elaborating clauses (Leong, 2023). This variation suggests a possible inability to match the complexity and diversity of clause structures typically found in human-written text.

3. Referential cohesion, which encompasses the use of pronouns and other referencing mechanisms to connect ideas, also varies between AI and human texts. In the study on Persian EFL learners, it was found that human texts used referential ties more diversely and appropriately than machine-generated texts (Naderi et al., 2013).

2.3.3 Implications of Writing for Academic Writing in EFL

1. Opportunities and Challenges: AI has the potential to generate coherent and logically structured texts, presenting a dual perspective — both an opportunity and a challenge for EFL academic writing. On one hand, AI will assist EFL learners in generating grammatically correct, coherent, well-organized texts. Thus, helping those learners who are not very efficient in linguistic accuracy. On the other hand, if overused, it does not encourage learners to think critically and elaborate their thoughts laboriously (Lindqvist & Arvidsson, 2024).

2. Guidance and feedback are essential in EFL academic writing. Lecturers and teachers share a pivotal role in facilitating the development of students' writing skills, particularly in terms of idea development, depth, and coherence. Such guidance

becomes even more indispensable when there is a lack of depth and proper elaboration, as is often the case with AI-written texts (Anwar et al., 2024).

3. Utilizing AI in writing pedagogy: In teaching writing, the use of AI should be handed to EFL learners if AI is used responsibly with a focus on improving, not replacing human writing. For instance, AI can provide immediate responses on how grammatically correct and coherent the text is. This feedback will result in better and more revised texts by the learners. Equally important is ensuring that the application of AI does not undermine efforts aimed at enhancing critical thinking and creative writing skills (Lindqvist & Arvidsson, 2024).

2.4 Implications of AI-Generated Texts on the Development of Argumentation Skills in EFL Academic Writing

Including AI-generated texts in academic writing has sparked substantial discussion, essentially framed within EFL instruction. As ChatGPT and other natural language generation (NLG) technologies yield more results, their impact on the development of argumentation skills in EFL academic writing remains an increasingly pertinent area of exploration. This response discusses what fruit AI-generated texts may bear for argumentation skills based on nuggets of extant research papers.

2.4.1 Positive Implications of AI-Generated Texts on Argumentation Skills

1. Raised multi-perspective thinking and critical thinking: Studies found that AI-written texts raise multi-perspective thinking and critical thinking of EFL learners. In collaborative argumentation, the use of generative AI may provide students with different perspectives, encouraging them to consider various viewpoints when refining their arguments (Liu & Cui, 2024). Students will therefore able to make more evaluative and diversified ideas into writing by acquiring a different perspective on how to develop argumentative skills; more depth and complexity could be brought into the argument. Further findings suggest that AI-driven dialog systems challenge the assumptions of students, sharpen their cognitive processes, and lead to better-structured forms of persuasion in argumentation (Oberer & Erkollar, 2024). Since these systems allow their users to engage in real-time dialogues with AI, the programs help discover possible aspects of a topic; thus, evidence-based arguments become even higher nuanced-supported.

2. AI will help them organize their thoughts and make their writing more coherent. For example, ChatGPT has been used to provide feedback on essay structure and organization, helping to better articulate arguments (Song & Song, 2023). This assistance is beneficial for EFL learners because they mostly face problems related to the linguistic and structural aspects of academic writing. Additionally, it can be read as a sample of a proto-argument to support a point. The analysis of essays created by AI can help students develop clear introductions, supporting paragraphs, and persuasive conclusions for their arguments (Woo et al., 2023). Such modelling helps EFL students internalize these conventions; hence, it leads them to build logically coherent argumentation.

3. Personalized Feedback and Motivation: The main strength of AI writing is the ability to provide instant and ongoing feedback. Recommendations on how to improve writing can be made available to students and this is of critical importance to learners of EFL who do not have access to highly specialized instruction (Tumiran et al., 2024). Feedback can play an important role in identifying grammatical mistakes, inappropriate vocabulary, or even weaknesses in argumentative structure such as building strong argumentation properly. Further, existing experimental studies have evidenced increased motivation by EFL students when using AI tools. The confidence in building and presenting arguments that AI-assisted writing tends to instill in students makes this motivational factor work, involving learners more critically with academic writing tasks for better argumentation skills (Liu & Cui, 2024).

2.4.2 Challenges and Concerns Regarding AI-Generated Texts

1. Dependence on tools: The major drawback of using s is that it may lead to the over-reliance of users on such tools. EFL students who often use AI in generating and revising their writing might be seen as developing a dependency on such help, which will reduce their ability to develop independent skills for argumentation (Dangin & Hikmah, 2024). For example, those students who depend much on content generated by AI will find it difficult later to generate their own arguments without such support. This dependency can equally extend to the area of critical thinking. While AI tools offer feedback and suggestions that might not encourage the learners to reflect deeply about their arguments or offering proper alternative perspectives, the student may end up with technically sound writing but unoriginal and shallow (Storey, 2023).

2. Ethics and Academic Integrity: The main issues in the use of s are ethical and academic integrity. Since AI tools can write on their own with a high level of coherence, it will be extremely difficult for instructors to judge if the submitted work is genuinely that of the student or AI-generated content (Fleckenstein et al., 2024). It becomes even more complicated considering the fact that not even seasoned educators may find it easy to detect AI-generated texts—hence cases of plagiarism and academic dishonesty (Fleckenstein et al., 2024). Besides, the use of such tools further blurs authorship when utilized in academic writing. As long as AI is used as a writing assistant, it must be ensured that appropriate credit is given to students for their ideas and arguments, and not allowed or relied upon exclusively to generate content (Rabbianty et al., 2023). This becomes more important in EFL contexts where students are already finding difficulty expressing their ideas in a foreign language.

3. Potential for reduced critical thinking: While AI can provide excellent feedback and suggestions, it might simultaneously diminish the room left available for critical thinking and creativity. For instance, students who use AI to generate arguments or the structure of their essays do not engage at the same level of analytical thinking as those developing these elements independently (Dangin & Hikmah, 2024). A lessened degree of critical thought will hinder the development of skills in argumentation, as most students will not have been compelled to consider the multiple nuances involved in a topic from varying perspectives. Similarly, the use of text generated by AI could lead to homogenized writing since students may follow structures and language prescriptions suggested by AI tools rather than using their own, individual voices to create a distinctive style (Tumiran et al., 2024). This very homogenization might diminish diversity in academic writing pertaining to argumentation and perspectives.

2.4.3 Ethical and Pedagogical Considerations

1. Striking a balance between technological aid and human supervision: To combat the problems that AI-generated texts bring, there has to be an equilibrium of technological assistance with human oversight. Educators should encourage the use of AI applications as supplements— not replacements— for students' writing and argumentative abilities (Oberer & Erkollar, 2024). For example, while it is permissible for AI to provide feedback regarding language and structure, actual responsibility for argumentation must remain with the student. The instructors should impress upon the students that originality and critical thinking are essential components of academic writing. Guided in the judicious and ethical use of AI tools, this will help foster those skills necessary for building strong and legitimate arguments (Rabbianty et al., 2023).

2. Developing effective pedagogical strategies: The use of AI-generated texts in EFL academic writing must be accompanied by thoughtful pedagogy. Teachers should create assignments that involve students' cognitive engagement with the AI rather than merely generating content (Woo et al., 2023). Students can utilize the for structural and organizational modeling, simultaneously critiquing and improving these examples with their own input and perspective. There is also a necessity for educators to recall the presence of a digital divide, thus making sure that every student has access to the AI tools along with skills to use them efficiently; this can be done by teaching how to interpret and take advantage of feedback generated by AI as well as by using AI-generated content in writing while maintaining academic integrity (Woo et al., 2023).

3. Promoting collaboration between AI and human writers: The joint efforts of AI and humans in writing present an effective way to develop argumentative skills for EFL academic writing among students. Such cooperation will enable the student to produce work that is both technically attractive and creative (Tumiran et al., 2024). For instance, while AI can substantially assist with grammar and syntax, students may simultaneously focus on developing their unique voices and perspectives. This approach, therefore, encourages students to be critically reflective about the proper role of using AI in academic writing by forming a discerning view of the strengths and weaknesses of textual material produced by AI. As a result, they gain awareness about competence in writing exemplary academic works (Storey, 2023).

2.5 What Are the Linguistic Features that EFL Instructors and Students can Use to Identify AI-Generated Academic Texts?

Identifying AI-generated academic texts requires examining the linguistic features that distinguish them from human-written texts. These are features that EFL instructors and students may use to identify AI-generated content, which they need to know for the sustenance of academic integrity. The research papers review the linguistic characteristics and detection methodologies that might be insightfully specific to this purpose. Below are the main aspects.

1. Phonological and morphological features: It is common to observe that texts generated by AI exhibit distinct phonological and morphological features when compared with human-written texts. Differences have been noted in the application of consonants, word stress, and morphology — including nouns, verbs, and pronouns (Georgiou, 2024).

2. Syntactic and lexical features: The syntactic structures produced in s can be very different from those seen in human writing. Such texts may display a more formulaic sentence structure with diminished syntactic variation. Lexical characteristics involving word length, syllable count, and the ratios of functional words and punctuation are also quite telling. Simpler or more repetitive vocabulary might be the choice for AI-generated texts which stylistic analysis can reveal (Shah et al., 2023).

3. Semantic and readability features: AI-generated texts are often clear and explicit in purpose statements but shallow in presenting results and contexts. This limitation has been observed in genre analysis, where human texts provide richer contextualization and more comprehensive findings (Melliti, 2024). Readability scores and semantic analysis may also help distinguish the content due to their potential to demonstrate different degrees of complexity and coherence (Mindner et al., 2023).

2.5.1 What Can EFL Instructors and Students Use to Identify AI-generated Academic Texts?

1. Detection methods employ machine learning models that utilize features such as Perplexity, Semantic Analysis, and text vector attributes to accurately classify AI-generated texts. Some advanced systems achieve high accuracy in detecting and outperforming state-of-the-art available tools, such as GPTZero (Mindner et al., 2023; Nguyen et al., 2023). In addition to attaining high accuracy, the feature set makes it possible to understand the differentiating features with the help of explainable AI techniques- LIME and SHAP (Shah et al., 2023).

2. Problems and Factors: Other problems come up in hybrid or collaborative contexts. Frequent switching of authorship and short segments do not make it easier for the detector to work. It has been proposed that text segmentation and classification on a sentence basis be used for different types of hybrid texts (Zeng et al., 2024). In addition, variations across domains can lead to differences in accuracy levels and thus necessitate a domain-aware model when applied across domains (Zhou & Wang, 2024).

These linguistic characteristics and methodologies, though presently deemed potent tools in the detection of AI-generated texts, should be used with an understanding of the ever-changing dynamics of AI technology. More advanced AI models may, in the future, increasingly resemble human writing, thereby rendering current detection strategies far less effective. Thus, research efforts must be continuous and also involved in the evolution of methods that can be discovered by researchers as AI continues to advance.

2.6 How Do the Writing Styles and Conventions of AI-generated Academic Texts Differ from Those of Human-Written Texts?

How writing styles and conventions in academic texts generated by AI differ from those written by humans is best considered from a structural perspective. AI content often exhibits perfectly logical sentence structures, featuring balanced, compound, and complex sentences that flow smoothly and logically. By contrast, Human content tends to be quite varied, unbalanced, fragmented, disjointed, and illogical at certain points—divided into several short, simple sentences, whereby a new idea or thought prompts another sentence. AI-generated academic texts and those of human-originated works differ in certain critical respects. Though AI-generated texts are linguistically accurate and grammatically sound, they lack the depth or contextual richness with which a human author writes their work. Such differences can be clearly manifested through the structure, content, and linguistic features of these texts. Purpose statements in s are very explicit, but results and details about the context are very incomplete. Such incompleteness is what makes authenticity and integrity in academic writing important to educators or researchers.

1. Structural and Content Differences:

    •   Purpose and Clarity: AI texts often focus on making purpose statements clear and explicit. They do not have enough space to present results and contextual information with depth- a dimension that, in comparison, is better addressed by human-written texts (Melliti, 2024).

    •   A greater complexity of structure, a more detailed presentation characterizes human texts. Particularly, greater contextualization and fuller discussion of results in the abstract (Melliti, 2024; Leong, 2023).

    •   Linguistic Features: While AI content may be very accurate linguistically, it does not attain the kind of nuanced use of language typical of Human work. For instance, AI-generated content may rely on simpler sentence structures and convey more unified thoughts (Wang & Feng, 2024).

2. Detection and Identification Challenges:

    •   Indistinguishability: Research shows that both scholars and algorithms meant to detect AI have problems differentiating artificially generated texts from human-generated ones. This fact testifies to the capability of AI in producing work that bears a close semblance to human writing (Hakam et al., 2023).

    •   Advanced prompting increases the challenge of detection when the AI is asked to generate or reword messages in the style of human writing. The increased difficulty of detection underscores just how advanced AI is at creating text with human-like characteristics (Schaaff et al., 2024; Mindner et al., 2023).

3. Linguistic and Grammatical Conventions:

    •   Standard American English (SAE): AI writing tools normally stick to the rules of SAE, which can limit how much different ways of speaking are kept. The use of SAE can enhance the richness and variety of language is in school writings (Lee, 2024).

    •   Complexity of Clauses: There may be robust differences in the deployment of certain grammatical structures between s and those created by humans. This particularly pertains to the use of finite adverbial clauses and –ing elaborating clauses. Though the differences might not be overt, they are meaningful in the discrimination of AI-generated material (Leong, 2023).

4. Implications for Academic Integrity:

    •   Authenticity will be a major concern. Any text that cannot be easily attributed as AI-generated raises authenticity issues in academic writing, thus necessitating the urgent need to develop detection tools and more criteria (Hakam et al., 2023; Fleckenstein et al., 2024).

    •   Educational Influence: The use of AI in academics forces educators to change their assessment strategies and assignment designs such that learning can be assessed even with the possible use of AI (Lindqvist & Arvidsson, 2024).

Texts generated by AI always present clarity of language but may be devoid of the deep contextual meaning that only a human writer can bring. The absence of deep contextual meaning presents new and formidable challenges at the level of integrity and authenticity in the academy. As AI continues to develop, one must conceptualize interventions and even instruments to address such issues in preserving academic work as a form of work.

2.7 What Are the Implications of AI-generated Academic Texts on the Assessment and Evaluation of EFL Students' Writing Skills?

The use of AI-generated academic texts for the evaluation and assessment of EFL students' writing skills is a double-edged sword. On the positive side, one may count that ChatGPT and Grammarly belong to an AI tool which can be very helpful in improving writing by sharpening organization, coherence, syntax, and vocabulary. On the negative side, the major demerit is that if these tools are used extensively then student work loses its originality and authenticity in addition to making them dependent on technology. This duality calls for a very nuanced rewriting of methods for assessing writing skills in any framework of AI-assisted learning.

1. Enhancement of Writing Skills:

    •   AI applications have significantly improved the writing skills of EFL learners. Studies reveal that learners who trained with the help of AI tools developed better organization and coherence as well as grammatical and vocabulary components, related to writing (Song & Song, 2023; Krooss, 2023).

    •   AI-powered tools, Grammarly and GPT-3 are used by students to enhance quality output within time constraints with academic integrity (Selim, 2024).

    •   Results of using AI in writing tasks revealed better cohesion and coherence as well as lexical resource and grammatical accuracy (Trần, 2024).

2. Motivation and Engagement:

    •   AI not only upgrade writing skills but also raises the motivational level of students towards the writing task. Students have articulated heightened motivation and a positive attitude toward writing when using AI tools (Song & Song, 2023; Krooss, 2023).

    •   The incorporation of AI tools into coursework has been favored by students, albeit support from instructors varies (Selim, 2024).

3. Challenges and Concerns:

    •   Though advantages are recorded, fears of an overdependency on AI tools that will eventually lead to the non-development of the students' independent writing skills have surfaced (Song & Song, 2023; Krooss, 2023).

    •   Ethical considerations and research integrity are critical concerns, as AI-generated work may not authentically represent a student's actual writing capabilities (Tumiran et al., 2024).

    •   Challenges identified by students include contextual accuracy plus the need for continuous development and adaptation of AI tools (Song & Song, 2023; Kim et al., 2024).

4. Implications for Assessment:

    •   The use of AI in academic writing calls for a redefinition of assessment practices. Educators need to factor in the role of AI tools in students' writing processes when designing new assessment criteria that appropriately account for AI-assisted learning (Tumiran et al., 2024).

    •   There is also a call, concurrently with teaching learning environments enhanced dynamically by technology for student empowerment but preserving academic integrity, between AI and educators (Selim, 2024; Losi et al., 2024).

Although tools of AI can be very advantageous for the improvement of writing skills in English as a foreign language among students, they also pose challenges that must be considered for proper and fair assessment. The potential scope for AI to act as an ancillary resource in the educational process is enormous; however, a deep insight into the ethical issues and new forms of assessment that match the dynamism in language instruction is imperative.

3. Methodology

3.1 Method

The study employed a qualitative analysis approach, involving detailed observations and analysis of AI's impact on students' writing.

3.2 Participants

There were 52 participants involved in this study, including 14 EFL graduates and 38 undergraduate participants, the selection of which was based on subpopulation. Participants were aged between 18 to 24 years old. Both undergraduate and graduate students were specialized in English language and translation as their major area of study or preparing to have a bachelor's degree in this field of study. Although participation was open for both male and female students, the online questionnaire revealed that only six female undergraduate students responded. This small number of females is not of a serious problem since the study based on stratification. In this process, stratification reduces the need for large samples. A purposive sampling method is used to select 40 students. The participants do not receive any type of regular training or lessons in AI usage.

3.3 Data Collection

Data was collected through online questionnaires. Researchers also used writing assignments both before and after using the AI tool.

3.4 Instruments

AI tools (Grammarly, QuillBot, etc.) were used to assist students in improving their writing. Surveys were designed to assess students' attitudes toward AI and their perceived impact on writing.

3.5 Data Analysis

The researchers conducted a qualitative content analysis on the student writing samples. The purpose was to identify changes in performance in the learning of grammar, structure and content coherence. The researchers analyzed survey data to measure student perceptions of AI's role.

3.6 Ethical Considerations

Students' participation was voluntary with informed consent.

4. Results, Analysis & Discussion

The results in this section include all responses to questions raised by the study, where each response is addressed in a separate section to facilitate easier review for readers.

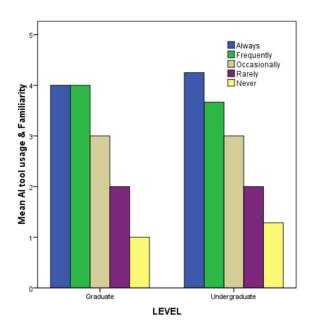*4.1 Usage and Familiarity with AI*

Figure 1. Qassim University's Graduate and Undergraduate AI Usage and Familiarity Rates

Figure (1) shows the overall percentages of graduate and undergraduate students using and being familiar with AI at Qassim University, with average scores of 40.77 and 40.48, respectively. Specifically, graduate students exhibit scores that are nearly identical to those of undergraduates in terms of their familiarity with AI usage, as demonstrated by the findings. The breakdown of familiarity percentages of graduate students was arranged as follows: students using AI always have a percentage of (14.18 %), those who frequently (often) use AI (14.16%) and (10.64%) for occasional use. In contrast, regarding the familiarity and usage of undergraduate with AI the results show that students frequently choose "always scale" which represents their most frequent option (15.07 %), followed by the frequently option (often) at (13%). In comparison, the occasional choice stands at (10.64%). It is noteworthy that both undergraduate and graduate students report very low levels of unfamiliarity with AI; the percentage for those indicating they rarely use AI is (7.09%) for both groups, whereas approximately 3.4% to 4.64% claim they do not use AI at all.

4.2 AI Tools and Tasks Used

Table 1. AI Tool Used against the Task Applied by 52 Saudi Undergraduates and Graduates

AI TOO USED	Brainstorming ideas	Brainstorming ideas, Checking coherence/structure	Brainstorming ideas, Drafting/outlining	Brainstorming ideas, Drafting/outlining, Grammar correction	Brainstorming	Brainstorming ideas, Grammar correction, Checking coherence/structure	Brainstorming ideas, Improving vocabulary/style, Paraphrasi	Brainstorming ideas, Grammar correction, Checking coherence/structure	Checking coherence/structure	Drafting/outlining	Drafting/outlining, Grammar correction	Drafting/outlining, Paraphrasing content, Checking coherenc, Grammar correction	Grammar correction	Grammar correction, Improving vocabulary/style	Grammar correction, Improving vocabulary/style, Paraphrasing content	Improving vocabulary/style	Paraphrasing content	Total
Chatbot partner	3				1				2	2	1		3	1	0	3		16
ChatGPT),		1			1										1			3
Grammar checkers	4										1		1					6
Grammar checkers; Grammarly)						1						1		1				3
Paraphrasing tools;(Instant /AI modes				1	2		1											4
Other									1				1			1	0	3
Paraphrasing tools (e.g., QuillBot)	1												1				2	4
QuillBot/, Chatbots										1								1
Paraphrasing tools (e.g., QuillBot)								1										1
Quilbot (paraphrasing) ChatGPT/Claude (brainstorm)	2		1						1	1			1			3		9
Total	**10**	1	**1**	1	4	1	1	1	**6**	**3**	2	1	**7**	1	3	**7**	2	52

Table (1) shows the types of AI tools utilized by undergraduate and graduate students for various writing tasks. The findings indicate that students at both levels often turn to AI tools for brainstorming and generating ideas when tackling their writing assignments. Among these tools, ChatGPT stands out as the most frequently used AI tool, with a usage count of 16/30.77%. Moreover, the QuillBot tool is commonly employed to assist students in enhancing vocabulary and style usage with a count rate of 3 or 6%, brainstorming (count 3 or 5.6%) and completing tasks like paraphrasing and idea generation (count 6 or 11.53%). Grammar checkers have been cited as the third popular artificial intelligence tools used for writing. Grammarly is in particular, with nine mentions accounting for 17.30% of the total usage. The results suggest that brainstorming, grammar checking, and paraphrasing are key functions that students utilize with the aid of AI tools, alongside some smaller tasks such as ensuring coherence, which was noted six times (11.53%).

4.3 Change of AI in Writing Process

Table 2. AI Changed your Writing Process among 52 Students from Qassim University

Item	No	Yes	Total frequency	%
I collaborate more with peers/instructors	5	4	9	17
I revise my work more thoroughly	7	7	14	26.9
I revise my work more thoroughly, I collaborate more with peers/instructors	1	0	1	1.9
I revise my work more thoroughly, No significant change	1	0	1	1.9
I spend less time editing	4	13	17	32.7
I spend less time editing, I collaborate more with peers/instructors	1	0	1	1.9
I spend less time editing, I revise my work more thoroughly	0	1	1	1.9
I spend less time editing, I revise my work more thoroughly, I collaborate more with peers/instructors	1	2	3	5.8
I spend less time editing, No significant change	2	0	2	3.8
No significant change	2	0	2	

The results clearly indicate a substantial influence of artificial intelligence on the writing processes of 52 Qassim University students. This influence can significantly be illustrated by the fact that 32.7% responded affirmatively to spending reduced time editing their work due to the integration of AI tools, reflecting that these technologies make the editing phase more efficient in the writing process. Another positive effect of artificial intelligence on writing, cited by 26.9% of respondents, was the greater detail of revision made possible by A.I. which resulted in better quality editing. This finding underscores another very important outcome whereby the infusion of A.I. guarantees an infusion of quality through detailed review processes. The influence extends to encouraging more student-peer/instructor collaborations as well; 17% of respondents indicated that collaborative efforts have increased due to help from AI. However, the data also indicate that for some students, their writing processes have not been significantly altered; 3.8% reported no change in their time spent on editing, and 1.9% stated that there was no significant change at all. These results demonstrate that, although AI has positively transformed certain aspects of the writing process for many students, some students experience minimal effects. This discrepancy highlights the need a study to identify the factors behind such differential experiences.

4.4 Impact on Writing Skills

Table 3. Perceived Impact on Writing Skills

Section 3: Perceived Impact on Writing Skills	Cumulative percent	Mean	Std. D.
AI tools enhance my vocabulary and sentence structure.	25.0	3.34	1.379
AI tools help me organize ideas more coherently.	25,0	3.20	1.485
I feel more confident submitting assignments after using AI tools.	75.0	3.04	1.414
AI tools help me improve my grammar accuracy.	100.	3.20	1.371

Results of the findings and data in Table 3 provide an analysis of how AI tools have impacted or are impacting students' writing skills. 25% cumulative respondents rated that indeed these tools improve their vocabulary and sentence structure with a mean of 3.34 rating the effectiveness of such tools toward improving linguistic elements in writing at a moderate level to agree. Again, 25% of students rated that these tools are helping them to organize their ideas more coherently with a mean score rating of 3.2 which rates positively the perceptions that AI can assist in the organization of written content. However, on a rather encouraging note, 75% of the students rated that they would feel or develop more confidence submitting assignments after using the AI tools. The mean score here is even above three (on a scale from one to five), accounting for the psychological boosts that might be accrued from integrating such systems into one's writing process. AI is perceived as a tool for the improvement of grammar accuracy, with a cumulative percentage response of 100% and an average mean rating of 3.20. This essentially means that, apart from the specific areas where AI tools help improve writing skills, they generally boost the morale of students regarding their writing abilities. The benefits that accrue from the use of AI in academic writing are thus multidimensional.

4.5 Collaboration with Peers AI Tools to Collaborate with Peers (e.g., Sharing Drafts for Feedback)?

Table 4. Summary Cases of Peers Collaboration Sharing AI Feedback

LEVEL	collaboration	Mean	% of Total Sum
Graduate	No	33.1667	14.4%
	Yes	27.0000	13.7%
	Total	27.6667	30.1%
Undergraduate	No	23.9412	29.5%
	Yes	26.5263	36.6%
	Total	25.3056	66.1%

The results highlighted in Table 4 throw golden light upon the collaborative practices of students with their peer feedback using AI tools. The data explicitly chalk out substantial differences in the collaborative behaviors of graduate and undergraduate students. For graduates, those who said that they were not collaborating while using AI tools had a mean score of 33.17 which is 14.4% of the total, whereas for those who did collaborate it was even lesser at 27.00, just 13.7% of the total. Thus, it indicates that if graduates do not collaborate, they feel more effective about the usage of AI tools compared to when they do collaborate and undergraduates display an almost inverse trend: among those not collaborating mean scores stand at 23.94 (29.5% of total), compared with a substantially higher score from the collaborators at 26.53 (36.6%). It shows that undergrad learners who join in working together while using AI tools see a better effect on their writing process. In general, the results point to big differences in how students work together when they use AI tools.

4.6 Instructors Response to AI-assisted Work

Table 5. Instructors' Response to AI-Assisted Work

No	Scales	Frequency	Percent	Cumulative Percent
1	Discourage its use	9	17.3	19.2
2	Encourage its use	17	32.7	51.9
3	Neutral	16	30.8	82.7
4	Unsure	9	17.3	100.0

Table 5 provides instructor responses regarding AI-assisted work by students. Results reveal the attitudes of instructors towards the use of AI in academics. Only 17.3% discouraged the application of such tools, which shows a cautious approach to their integration into the writing process. On the other hand, a relatively larger share at 32.7% expressed encouragement for intrepid students to apply AI as an avenue that could open possibilities for improved student writing output. Another 30.8% take no stand on the matter to indicate whether they support or oppose such intrepid adventures into AI assisted work and 17.3%, that indeed express uncertainty about what their real feelings are on this matter. Add up the numbers and it shows that a large majority—82.7% of instructors—support, are neutral, or are uncertain about using AI proving its worth to try the role of AI in education. This finding also proves that while there is a significant amount of enthusiastic encouragement for AI-assisted work, most of the instructors remain neutral or unsure.

4.7 Discussion

The study was highlighted by very high interaction with artificial intelligence tools among undergraduate and postgraduate English as a foreign language students at Qassim University. Apart from minor differences, both groups shared almost the same level of familiarity and usage of AI technologies. Most participants indicated frequent or regular use of AI tools. Only a negligible number indicated any unavailability or non-usage of the tools. This trend speaks volumes about the integration of AI into academic writing practices, particularly in the fields of English and Translation studies. It raises a bar that students have realized the potential that such technologies can offer toward improvement in writing skills.

AI applications are mostly used for ideas, grammar checking, vocabulary, and paraphrasing. ChatGPT is the leading application used for idea generation while QuillBot is the most popular application used for linguistic style improvement and paraphrasing. The dominance of grammar checkers like Grammarly further validates the fact that students' value attributable to linguistic accuracy, thus dominating the use. This pattern establishes that learners do not apply AI as mere automation but an enhancement of different steps in their writing process, particularly idea generation and revision.

The effects of AI on practices of writing are complex and variegated. A considerable number noted that it has helped reduce editing time and at the same time encouraged them to revise more thoroughly. This speaks again to a dual impact, helping both quality and speed—to what extent AI is now an influence on student writing in these dimensions. Over half the students said there was better vocabulary and sentence structure, more grammatically accurate writing, and organization improved by the use of AI. High correlation coefficients between the use of AI and confidence in writing or improved academic performance tend to underscore the positive role such tools can play in enhancing student outcomes.

Collaboration dynamics also seem to change with the addition of AI tools. Undergraduates are more likely than postgraduates to participate in peer collaboration using AI technologies. This could show a generational gap in digital literacy or simply different academic expectations between both groups. In terms of attitudes, most instructors responded with mixed feelings toward the use of AIs, mainly encouraged or neutral, reflecting an evolving pedagogy that does not fully embrace or reject the technology. On the whole, data supports a claim that AI tools are increasingly integrated into the processes of academic writing in EFL by providing functional support for different tasks and promoting learner autonomy and self-confidence.

5. Conclusion

This study examined the demographic background, usage patterns, and perceived effects of AI technologies on the writing processes of EFL students at Qassim University. The results indicate that undergraduate and graduate students exhibit substantial familiarity and regular usage of AI in their academic writing, with ChatGPT, QuillBot, and grammar checkers such as Grammarly being the most often employed tools. These AI applications predominantly facilitate brainstorming, grammatical correction, paraphrasing, and vocabulary enhancement, underscoring their essential significance in students' writing processes.

The study underscores AI's beneficial impact on writing speed and quality, with numerous students indicating diminished editing time, more comprehensive revisions, and heightened confidence in their submissions. Collaboration tendencies differed between undergraduate and graduate students, indicating varying levels of engagement with AI-assisted peer feedback. Another factor is that instructor attitudes regarding AI-assisted work were varied, with a significant segment advocating for its utilization, while others maintained neutrality or ambivalence.

Though these insights have been great, this study decries some limitations of having a small sample size, gender imbalances, and very little spread in the age and academic backgrounds of the respondents that could caution the generalizability of its findings. In the future, studies should entail more diversified demographics of participants and keen analysis of long-term effects that artificial intelligence imposes on writing skills.

In conclusion, AI technologies are progressively integrated into the writing processes of EFL students, providing advantages in efficiency and skill development. Structured guidance on ethical and effective AI utilization, coupled with instructor training, is advised to optimize its pedagogical potential while preserving academic integrity.

6. Recommendations

Since there has been massive use of artificial intelligence (AI) tools by English as a Foreign Language students at Qassim University, it is recommended that curriculum developers formally integrate AI literacy within the writing courses. It will guide the students on how to use such tools as ChatGPT, Grammarly, and QuillBot ethically, effectively, and strategically. In addition to this, the government should back instructors through professional development programs in comprehending and evaluating AI-assisted student work. Many teachers are still hesitant or unsure about using AI; hence the institution must have a clear academic integrity policy related to AI that can direct the teaching method and student behavior.

Encourage students to use AI tools as part of collaborative writing activities, such as peer review and sharing ideas. Simultaneously, mount a campaign about the dangers of depending too much on such technologies stress the importance of maintaining creativity and critical thinking abilities. Another study can assess the impact of AI on writing competence over time and achievement in the long run that would guide policy formulation in future decisions. Such efforts will improve student writing and bring a balanced yet pedagogically sound approach to the infusion of Artificial Intelligence in Higher Education.

Authors' contributions

This study is the product of joint efforts by all seven authors with major contributions from each in different capacities. The two leading authors conceptualized the design of the study, framed questions, and developed a theoretical framework. Data collection was largely an exercise conducted by the third author-an administration of questionnaires among participants-and ensured compliance with research ethics. The fourth and fifth authors analyzed the data through SPSS and interpreted statistical findings concerning objectives set for this study. The sixth author significantly contributed to reviewing literature by extracting current debates on AI and academic writing while article seven mainly drafted and polished discussion as well as made sure that pedagogical, ethical, and institutional implications are addressed in the manuscript. All have written parts of this article, reviewed it, revised it, accepted its final version for submission, and assumed equal responsibility for its scholarly integrity.

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Sample: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Obtained.

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due to privacy or ethical restrictions.

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No additional data are available.

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References

Adiguzel, T., Kaya, M. H., & Cansu, F. K. (2023). Revolutionizing education with AI: Exploring the transformative potential of ChatGPT. *Contemporary Educational Technology, 15*(3). https://doi.org/10.30935/cedtech/13152

Ali, R., & Abdalgane, M. (2022). The Impact of Gamification "Kahoot App" in Teaching English for Academic Purposes. *World Journal of English Language, 12*(7), 18-27. https://doi.org/10.5430/wjel.v12n7p18

Ali, R., Abdalgane, M., Youssif, E., Elkot, M. A., & Abbass, D. (2024). Elevating English Reading Comprehension: The Synergy of Dialogic Teaching and Technology Integration in ESP Learning Environments. *International Journal of Information and Education Technology, 14*(8), 1109-1118. https://doi.org/10.18178/ijiet.2024.14.8.2139

Anwar, I. W., Sailuddin, S., & Ismail, H. (2024). Evaluating cohesion and coherence in thesis introductions: a thematic progression analysis of EFL students' texts. *Indonesian Journal of Learning and Instruction*. https://doi.org/10.25134/ijli.v7i1.9594

Artiana, N., & Fakhrurriana, R. (2024). EFL undergraduate students' perspective on using ai-based chatgpt in academic writing. *Language and Education Journal, 9*(1), 1-11. https://doi.org/10.52237/lej.v9i1.468

Balla, A. A. S., AbdAlgane, M., Ahmed, A. O. A., & Osman, E. (2025). AI-Driven Innovations in Adult EFL Learning: Exploring Potentials and Practicalities. *International Journal of Interactive Mobile Technologies (iJIM)*, *19*(8), 4-26. https://doi.org/10.3991/ijim.v19i08.52295

Chan, C. M. H., Ab Rahman, J., Tee, G. H., Wee, L. H., Ho, B. K., Robson, N. Z. M. H., …Nik Mohamed, M. H. (2019). Perception of Harms and Benefits of Electronic Cigarettes Among Adult Malaysian Men: A Comparison by Electronic Cigarette Use and Smoking Status. *Asia-Pacific Journal of Public Health, 31*(7_suppl), 32S-43S. https://doi.org/10.1177/1010539519860730

Dahl, A. (2018). The Graphic and Grammatical Structure of Written Texts. *Studia Neophilologica*, *90*, 24-36. https://doi.org/10.1080/00393274.2018.1531248

Dangin, D., & Hikmah, I. (2024). The Potential Uses and Missuses of AI-Powered Writing Skills on Academic Writing: Students' Side. *Journal on Education*, *7*(1), 8593-8598. https://doi.org/10.31004/joe.v7i1.7709

Elmahdi, O., AbdAlgane, M., & Balla, A. (2024). AI's Role in EFL: Optimizing Opportunities while Mitigating Risks. *International Journal of Linguistics, Literature & Translation*, *7*(10). https://doi.org/10.32996/ijllt.2024.7.10.4

Fleckenstein, J., Meyer, J., Jansen, T., Keller, S., Köller, O., & Möller, J. (2024). *Do teachers spot AI? Evaluating the detectability of AI-generated texts among student essays*. https://doi.org/10.1016/j.caeai.2024.100209

Georgiou, G. P. (2024). *Differentiating between human-written and AI-generated texts using linguistic features automatically extracted from an online computational tool*. https://doi.org/10.48550/arxiv.2407.03646

Hakam, H., Prill, R., Lettner, J., Korte, L., Lovreković, B., Ostojic, M., & Mühlensiepen, F. (2023). Human-Written vs AI-Generated Texts in Orthopaedic Academic Literature, a Comparative Qualitative Analysis (Preprint). *JMIR Formative Research*. https://doi.org/10.2196/52164

Jia, F., Sun, D., Ma, Q., & Looi, C. K. (2022). Developing an AI-Based Learning System for L2 Learners' Authentic and Ubiquitous Learning in English Language. *Sustainability (Switzerland), 14*(23). https://doi.org/10.3390/su142315527

Khan, I., Ahmad, A. R., Jabeur, N., & Mahdi, M. N. (2021). An artificial intelligence approach to monitor student performance and devise preventive measures. *Smart Learning Environments, 8*(1). https://doi.org/10.1186/s40561-021-00161-y

Kim, H., Baghestani, S., Yin, S., Karatay, Y., Kurt, Ş., Beck, J., & Karatay, L. (2024). *ChatGPT for Writing Evaluation: Examining the Accuracy and Reliability of AI-Generated Scores Compared to Human Raters*. 73-95. https://doi.org/10.31274/isudp.2024.154.06

Krooss, T. (2023). *Enhancing academic writing skills and motivation: assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students*. https://doi.org/10.3389/fpsyg.2023.1260843

Lahuerta, A. C. (2018). Study of accuracy and grammatical complexity in EFL writing. *International Journal of English Studies*, *18*(1), 71-89. https://doi.org/10.6018/IJES/2018/1/258971

Lee, S. J. (2024). Analyzing the Use of AI Writing Assistants in Generating Texts with Standard American English Conventions: A Case Study of ChatGPT and Bard. *The CATESOL Journal*, *35*(1). https://doi.org/10.5070/b5.25364

Leong, A. P. (2023). Clause complexing in research-article abstracts: Comparing human- and AI-generated texts. *ExELL, 11,* 99-132. https://doi.org/10.2478/exell-2023-0008

Lindqvist, M. H., & Arvidsson, C. (2024). Exploring Student and AI Generated Texts: Reflections on Reflection Texts. *Electronic Journal of E-Learning*. https://doi.org/10.34190/ejel.22.6.3473

Liu, W., & Cui, X. (2024). Generative AI-assisted Collaborative Argumentation: Implications for the Argumentation Process and Outcome. In *2024 4th International Conference on Educational Technology (ICET)* (pp. 220-225). IEEE. https://doi.org/10.1109/icet62460.2024.10868171

Losi, R. V., Putra, E. P., Ali, N., & Dewi, A. S. (2024). Using Artificial Intelligence (AI) to Improve EFL Students' Writing Skill. *International Journal of English and Applied Linguistics (IJEAL)*, *4*(1), 62-70. https://doi.org/10.47709/ijeal.v4i1.3694

Melliti, M. (2024). Using Genre Analysis to Detect AI-Generated Academic Texts. *Dia-Logos*. https://doi.org/10.61604/dl.v16i29.377

Mindner, L., Schlippe, T., & Schaaff, K. (2023). Classification of human-and AI-generated texts: Investigating features for ChatGPT. In *International conference on artificial intelligence in education technology* (pp. 152-170). Singapore: Springer Nature Singapore. https://doi.org/10.48550/arxiv.2308.05341

Naderi, S., Keong, Y. C., & Latif, H. (2013). The Use of Referential Cohesion in Academic Texts by Persian EFL Learners. *GEMA Online Journal of Language Studies*, *13*(3), 45-62. Retrieved from https://ejournals.ukm.my/gema/article/download/4220/2337

Nguyen, T. T., Hatua, A., & Sung, A. H. (2023). How to detect AI-generated texts?. In *2023 IEEE 14th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON)* (pp. 0464-0471). IEEE. https://doi.org/10.1109/uemcon59035.2023.10316132

Oberer, B., & Erkollar, A. (2024). Improving Argumentation Skills through AI-Driven Dialogues: A Transdisciplinary Approach. *Journal on Systemics, Cybernetics and Informatics*, *22*(6), 1-17. https://doi.org/10.54808/jsci.22.06.1

Rabbianty, E., Azizah, S., & Virdyna, N. (2023). AI in academic writing: Assessing current usage and future implications. *Insania: Jurnal Pemikiran Alternatif Kependidikan*, *28*(1a), 14-35. https://doi.org/10.24090/insania.v28i1a.9278

Rad, M. H., Farsi, F., Bali, S., Etezadi, R., & Shamsfard, M. (2024). RFBES at SemEval-2024 Task 8: Investigating Syntactic and Semantic Features for Distinguishing AI-Generated and Human-Written Texts. *arXiv.Org*, *abs/2402.14838*. https://doi.org/10.48550/arxiv.2402.14838

Schaaff, K., Schlippe, T., & Mindner, L. (2024). Classification of human- and AI-generated texts for different languages and domains. *International Journal of Speech Technology*. https://doi.org/10.1007/s10772-024-10143-3

Selim, A. S. M. (2024). The Transformative Impact of AI-Powered Tools on Academic Writing: Perspectives of EFL University Students. *International Journal of English Linguistics*. https://doi.org/10.5539/ijel.v14n1p14

Shadiev, R., Wang, X., Halubitskaya, Y., & Huang, Y. M. (2022). Enhancing Foreign Language Learning Outcomes and Mitigating Cultural Attributes Inherent in Asian Culture in a Mobile-Assisted Language Learning Environment. *Sustainability (Switzerland), 14*(14). https://doi.org/10.3390/su14148428

Shah, A., Ranka, P., Dedhia, U., Prasad, S., Muni, S., & Bhowmick, K. (2023). Detecting and unmasking AI-generated texts through explainable artificial intelligence using stylistic features. *International Journal of Advanced Computer Science and Applications*, *14*(10). https://doi.org/10.14569/ijacsa.2023.01410110

Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2023.1260843

Storey, V. A. (2023). AI Technology and Academic Writing. *International Journal of Adult Education and Technology*. https://doi.org/10.4018/ijaet.325795

Trần, T. T. H. (2024). AI Tools in Teaching and Learning English Academic Writing Skills. *Proceedings of the AsiaCALL International Conference*, *4*, 170-187. https://doi.org/10.54855/paic.23413

Tumiran, M. A., Mohammad, N., & Bahri, S. (2024). Implications of Leveraging AI in Students' Academic Writing: A Review Analysis. *Malaysian Journal of Social Sciences and Humanities*, *9*(8), e002954. https://doi.org/10.47405/mjssh.v9i8.2954

Utami, S. P. T., Andayani, Winarni, R., & Sumarwati. (2023). Utilization of artificial intelligence technology in an academic writing class: How do Indonesian students perceive? *Contemporary Educational Technology, 15*(4). https://doi.org/10.30935/cedtech/13419

Wang, Z., & Feng, B. (2024, April). Study on Decision Tree-Based Recognition of AI-Generated Texts. In *2024 Third International Conference on Distributed Computing and Electrical Circuits and Electronics (ICDCECE)* (pp. 1-7). IEEE. https://doi.org/10.1109/icdcece60827.2024.10548393

Woo, D. J., Susanto, H., Yeung, C. H., Guo, K., & Fung, A. K. Y. (2023). Exploring AI-Generated text in student writing: How does AI

help? *arXiv preprint arXiv:2304.02478*. https://doi.org/10.64152/10125/73577

Zeng, Z., Liu, S., Sha, L., Li, Z., Yang, K., Liu, S., Gašević, D., & Chen, G. (2024). Towards Detecting AI-Generated Text within Human-AI Collaborative Hybrid Texts; Challenges, strategies, and insights. *arXiv.Org*, *abs/2403.03506*. https://doi.org/10.24963/ijcai.2024/835

Zhou, Y., & Wang, J. (2024, August). Detecting AI-Generated Texts in Cross-Domains. In *Proceedings of the ACM Symposium on Document Engineering 2024* (pp. 1-4). https://doi.org/10.1145/3685650.3685673

Appendix (I)

Questionnaire: Utilizing AI in Writing Assignments by EFL University Students
Target Group: EFL Students at Saudi Universities (e.g., Qassim University)

Section 1: Demographic Information

1. Age:
   - 18–20
   - 21–23
   - 24+

2. Gender:
   - Male
   - Female

3. Academic Level:
   - Undergraduate (Year 1–2)
   - Undergraduate (Year 3–4)
   - Graduate

4. Major: _____

Section 2: AI Tool Usage and Familiarity

5. How often do you use AI tools (e.g., Grammarly, QuillBot, ChatGPT) for writing assignments?
   - Never
   - Rarely
   - Occasionally
   - Frequently
   - Always

6. Which AI tools do you use most? (*Select all that apply*)
   - Grammar checkers (e.g., Grammarly)
   - Paraphrasing tools (e.g., QuillBot)
   - Chatbots (e.g., ChatGPT)
   - Translation tools (e.g., Google Translate)
   - Other: _____

7. For which tasks do you use AI tools? (*Select all that apply*)
   - Brainstorming ideas
   - Drafting/outlining
   - Grammar correction
   - Improving vocabulary/style
   - Paraphrasing content
   - Checking coherence/structure

8. Does your university provide access to AI writing tools?
   - Yes
   - No

o Unsure

Section 3: Perceived Impact on Writing Skills

(*Rate on a scale of 1–5: 1 = Strongly Disagree, 5 = Strongly Agree*)

9. AI tools help me improve my grammar accuracy.

[1] [2] [3] [4] [5]

10. AI tools enhance my vocabulary and sentence structure.

[1] [2] [3] [4] [5]

11. AI tools help me organize ideas more coherently.

[1] [2] [3] [4] [5]

12. I feel more confident submitting assignments after using AI tools.

[1] [2] [3] [4] [5]

13. My grades have improved since using AI tools.

[1] [2] [3] [4] [5]

Section 4: Challenges and Limitations

14. What challenges do you face when using AI tools? (*Select all that apply*)

- Over-reliance on AI suggestions

- Technical errors (e.g., incorrect feedback)

- Reduced creativity/originality

- Limited understanding of cultural/contextual nuances

- Ethical concerns (e.g., plagiarism)

- Other: _____

15. Do you inform your instructors about using AI tools?

- Always

- Sometimes

- Never

16. How do instructors respond to AI-assisted work?

- Encourage its use

- Discourage its use

- Neutral

- Unsure

Section 5: Behavioral and Collaborative Aspects

17. Has AI changed your writing process? (*Select all that apply*)

- I spend less time editing

- I revise my work more thoroughly

- I collaborate more with peers/instructors

- No significant change

18. Do you use AI tools to collaborate with peers (e.g., sharing drafts for feedback)?

- Yes

- No

Section 6: Future Perspectives

19. Should Saudi universities integrate AI tools into EFL curricula?

- Strongly agree

- Agree

- Neutral

- Disagree

- Strongly disagree

20. What improvements would you suggest for AI writing tools?

Open-Ended Questions

21. Describe a situation where AI tools significantly improved your writing.

22. What barriers prevent you from using AI tools more effectively?

23. Additional comments:

Thank you for your participation!

Notes for Implementation:

- Ensure confidentiality and anonymity.

- Translate into Arabic if participants have limited English proficiency.

- Use mixed methods (quantitative Likert scales + qualitative open responses) for comprehensive analysis.

This questionnaire aligns with the study's focus on sociocultural theory (collaboration, AI as a mediator) and addresses regional gaps in AI research within Saudi EFL contexts.