

The Transformative Impact of AI-Powered Tools on Academic Writing: Perspectives of EFL University Students

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Abstract

In today's global context, EFL learners face the challenge of mastering a new language and academic writing, especially in higher education. The study investigates how AI transforms university-level EFL students' academic writing skills, aiming to revolutionize their approach to written language for academic success despite language barriers. Using a mixed-methods approach, this study investigates the perspectives of fifty first-year female students at Al-Baha University, Saudi Arabia, during the 2023–2024 academic year, employing both qualitative and quantitative data analysis. Using a 5-point Likert-type questionnaire and Zoom interviews, the study clarifies EFL students' perceptions of AI writing tools. Results from the questionnaire highlight the active usage of tools such as Grammarly and GPT-3 among students. Students favor the integration AI tools into coursework, although the level of support from instructors varies. EFL students see the positive impact on writing quality but remain unsure about confidence improvement. Interviews reveal diverse tool usage, with Grammarly and ChatGPT notably favored for their adaptability and cost-free nature. The study supports integrating AI writing tools into EFL university education, emphasizing benefits such as enhanced writing quality, time efficiency, and bolstered academic integrity. The paper highlights AI's significant impact on EFL university students' writing skills in today's digitally reliant world where English holds key communication importance. It underscores AI-powered tools as valuable complements to conventional writing skills, emphasizing equitable access, guidance, and collaboration between AI and educators. The study suggests strategies for creating dynamic, tech-driven learning settings that empower EFL students in their writing tasks and academic endeavors.

Keywords: Artificial Intelligence Tools (AI) tools, academic writing, EFL University Students' Perspectives

1. Introduction

In today's global academic and professional landscape, proficiency in English extends beyond spoken communication, emphasizing the critical role of effective writing. The incorporation of AI in EFL education is deemed crucial for reshaping the educational landscape. These AI-powered tools are considered indispensable assets for EFL learners striving to independently improve their writing proficiency, reducing the reliance on traditional, in-person instruction. Research in the AI field has burgeoned due to its growing importance in language acquisition, particularly in enhancing academic writing skills for EFL university students. Additionally, this paper discusses the contemporary shift in university education towards learner-centered strategies, facilitated by technology. This departure from the conventional instructor-led model aims to empower students, allowing them a more active role in their educational journey. Technology-driven learning experiences not only cater to diverse learning styles but also enhance engagement, creating a more effective educational environment tailored to individual students' needs and aspirations. Furthermore, the rise of AI in education is recognized as a transformative force, mirroring human-like thinking and decision-making processes. Popenici and Kerr (2017) emphasized the diverse and complex nature of AI, positioning it as a pivotal force shaping technology and influencing various aspects of daily life.

Using writing prompts is an effective method for initiating academic writing tasks among EFL university students. However, devising engaging and challenging prompts can prove time-consuming for educators. Many AI online tools can offer support by generating a broad spectrum of academic writing prompts spanning different subjects, styles, and formats. For example, students can employ Chat GPT to generate prompts for assignments like creating a descriptive essay about a particular place, constructing a persuasive essay focused on a current

issue, or crafting a creative piece of writing featuring a fictional character. This array allows students to refine their academic writing skills across various areas and diversify their writing capabilities (Abdullayeva & Musayeva, 2023).

AI-powered writing tools have a wide range of applications, including text translation (e.g., www.deepl.com, <https://translate.google.com>), spelling improvement (e.g., <https://mentor.duden.de>), text analysis (e.g., <https://hemingwayapp.com>), text rewriting and summarization (e.g., <https://quillbot.com>), and plagiarism checks (e.g., <https://www.grammarly.com/plagiarism-checker>). These tools can provide detailed suggestions and recommendations for modifying text components within seconds. However, it's important to note that they may also generate inconsistencies and errors that might not be immediately apparent to all students, as illustrated by Rogerson and McCarthy (2017).

In modern university education, there's a significant change happening—technology is shifting the traditional teacher-led approach towards a more learner-centered strategy. This shift empowers students, allowing them take a more active role in their learning journey. Unlike the old model where instructors led the learning, technology now focuses on individual needs, creating a more inclusive environment. Tech-based learning encourages independence and adapts to different learning styles, making education more engaging and effective. The rise of AI in education, mimicking human thinking and decision-making, contributes to this transformative shift. AI's complexity shapes technology and impacts various aspects of daily life, as noted by Popenici and Kerr (2017).

EFL university students encounter several writing challenges such as limited vocabulary, grammar uncertainties, and difficulty expressing ideas clearly in English. These hurdles hinder their ability to meet personal or academic writing standards. Many also struggle with structuring cohesive text due to insufficient ideas and information, impacting their cognitive and linguistic skills and, consequently, their academic writing proficiency. Some find it challenging to select words or structure thoughts while writing in English. They often generate ideas in their native language (L1) and face the mental challenge of translating these into English, as clarified by Wolfersberger (2003).

As a result of these challenges, EFL university students may experience feelings of disappointment and frustration. They may perceive their writing efforts as falling short of their personal goals, leading to a sense of discouragement. This emotional response to their writing struggles can be particularly demotivating, as it erodes their confidence and enthusiasm for learning the new language. In the broader context of language acquisition, the negative impact of these writing difficulties should not be underestimated. Writing is an essential skill in language learning, serving not only as a means of self-expression but also as a way to reinforce vocabulary and grammar knowledge. When EFL university students face persistent challenges in academic writing, their overall language acquisition process is hindered, affecting their ability to communicate effectively and engage with the language meaningfully.

Linguistic barriers for EFL university students encompass issues related to vocabulary, grammar, pronunciation, and comprehension. These learners often struggle with understanding the subtleties of a new language, including idiomatic expressions and cultural references, which can be perplexing. In addition to linguistic complexities, educational barriers also arise. EFL university students may encounter challenges in adapting to the academic expectations, teaching methodologies, and assessment systems of their educational institutions. Accessing suitable educational resources and support tailored to their specific language needs may also pose difficulties for these students.

The blend of these linguistic and educational obstacles can create a formidable learning curve for EFL learners. Hanauer, Sheridan, and Englander's research in 2019 underscores the significance of acknowledging and addressing these multifaceted challenges to provide effective support and guidance for individuals on their journey to English language proficiency. Therefore, this study seeks to provide an answer to the following inquiry: "To what extent do AI writing tools affect the academic writing abilities of EFL students in university, and which AI tools contribute to this impact?"

2. Literature Review

Artificial intelligence (AI) has been conceptualized through various lenses by prominent figures in the field. Bellman (1978) defined AI as the automation of activities associated with human thinking, encompassing decision-making, problem-solving, and learning. Haugeland (1985) added an exciting dimension, describing AI as an effort to make computers think with minds, in the full and literal sense. Charniak and McDermott (1985) contributed to the discourse by viewing AI as the study of mental faculties through computational models. Kurzweil (1990) broadened the definition to an art, focusing on creating machines capable of intelligent

functions traditionally performed by people. Rich and Knight (1991) emphasized the comparative aspect of AI, portraying it as the study of enabling computers to outperform humans in certain tasks. Winston (1992) succinctly captured AI as the study of computations facilitating perception, reasoning, and action. Poole et al. (1998) delved into the realm of intelligent agents, defining computational intelligence as the study of designing intelligent agents. Nilsson (1998) extended the definition to encompass intelligent behavior in artifacts, reinforcing the overarching concern with imbuing machines with intelligence. Collectively, these definitions establish a foundation for the subsequent literature review, offering a comprehensive understanding of the multifaceted nature of artificial intelligence.

Recently, technology-driven learning in universities has shifted from the traditional instructor-centered model to a more learner-centered approach, as observed by Ituma in 2011. Abdullayeva and Musayeva (2023) highlight the significant influence of artificial intelligence on students' writing abilities. While AI integration in writing instruction offers potential benefits, concerns exist about its potential negative impact on learning and academic writing development. Responsible and thoughtful use of AI is crucial, considering both its advantages and disadvantages. The goal should be to use AI as a supplemental tool to enhance writing instruction rather than replacing it entirely. In their pioneering research, Kurniati and Fithriani (2022) asserted that writing skills stand as a worldwide concern, numerous studies were conducted to address the challenges it poses in higher education. In this era of technological advancement, the hurdles encountered in writing can find solutions through the use of Quillbot, a digital tool powered by artificial intelligence (AI) discovered that QuillBot proved valuable in enhancing students' paraphrasing skills, a crucial ability in writing. WordTune helps on enhancing the tone and style of the text. Notably, a recent study conducted by Adams and Chuah (2022) has illuminated the role of automated paraphrasing tools in aiding students with organizing their written content, simplifying their expressions, and deepening their comprehension of intricate concepts.

2.1 Studies on the Impact of AI Tools on Writing Skills

Al Mahmud (2023) conducted a study to investigate how Wordtune affects the writing skills of Saudi students. The research used a mixed-method approach, dividing participants into control and experimental groups based on gender. Examination of both quantitative data from pre/post-tests (analyzed in SPSS) and qualitative evaluation of writing samples by two assessors revealed the superiority of the experimental group, who utilized Wordtune, over the control group. Quantitatively, Wordtune contributed to enhancing their writing abilities; qualitatively, it resulted in improvements in language precision and the complexity of sentence structures. Notably, Wordtune's positive impact was consistent regardless of gender. In a context where university students are increasingly seeking ways to enhance their writing skills, Abdul Rahman, Zulkornain and Hamzah (2022) affirm that these students have valuable opportunities to advance their writing skills, thanks to the constructive feedback they receive, which not only encourages better revisions but also bolsters their self-assurance. This assertion is substantiated by Chong's (2021) research, which demonstrated the rapid enhancement of students' English writing proficiency through a mixed teaching mode incorporating artificial intelligence. Such an approach not only effectively elevates English writing skills but also ignites a deeper passion for writing among students. Chong (2021) further highlighted, "Scholars generally believe that artificial intelligence computer-assisted language systems can improve students' ability to use grammar and sentence patterns correctly and enhance their writing skills". Although artificial intelligence computer-assisted language teaching is still in its early stages of development, its undeniable contribution provides robust technical support for the advancement of the mixed education model in English writing".

2.2 Studies on Perceptions and Integration of AI in Academic Writing

Alammar and Amin (2023) investigated how EFL students perceive the use of Automated Paraphrasing Tools (APTs) in their academic writing. They aimed to fill gaps in literature by exploring the roles, effectiveness, advantages, and drawbacks of APTs. During a research project course, students utilized APTs for their papers. The study gathered student opinions through questionnaires and interviews, finding a positive view of APTs as beneficial in academic writing, but cautioning against excessive reliance. The research stressed the importance of students learning to paraphrase to evaluate APT-generated content. The incorporation of AI and technology tools into the teaching of writing skills has been underscored as crucial, as demonstrated by Zulfa, Dewi, Hidayat, Hamid, and Defianty (2023) in their study on the use of AI and technological resources by students in the context of academic English writing and its influence on their writing proficiency. The study showed students used 15 tech tools in four categories, aiding language structures, sources, progress tracking, and references. Participants noted these tools provided direct feedback, improving their writing skills. Specifically, they mentioned better understanding of grammar, an expanded vocabulary, and improved essay coherence. Overall, the study suggests integrating tech tools into English writing can transform skill enhancement and evaluation.

2.3 Studies on AI Tools in the Educational Context

The integration of artificial intelligence and technology into various facets of education has become increasingly widespread, particularly impacting how students approach writing. According to a study by Kurniati and Fithriani (2022), the use of QuillBot was shown to be beneficial for students in improving their paraphrasing skills, a crucial competency in the field of academic writing. As per the findings in Wen and Wang's (2023) research, these tools offer the prospect of enhancing the efficiency and accuracy of scientific writing, thereby allowing researchers to shift their focus towards their core research activities. Nonetheless, it's essential to recognize the limitations and challenges associated with the application of AI in the realm of scientific writing. Therefore, teachers using an electronic device with artificial intelligence make it possible to pull out the best results from students. In other words, the interaction between technology and pedagogy can bring changes to the way the lecturers teaching and the way the students learning. In the process, artificial intelligence technology is integrated to help smoothing the learning process, (Hasjim, Arafah, Kaharuddin, Verlin, & Aziz, 2022). In a recent study by Rafi and Moghees (2023), the challenges faced by EFL doctoral candidates, including issues with writing mechanics, argument coherence, and dissertation structure, were highlighted. This study emphasized the importance of implementing copyediting and proofreading to address writing mechanics and construct logical arguments. It also stressed the use of formal language, transitional sentences for text cohesion, citations for claims support, and maintaining a consistent dissertation structure. Additionally, Kurniati and Fithriani (2022) delved into the perceptions of post-graduate students regarding Quillbot, revealing a positive response. Quillbot was found to enhance writing quality, promote a positive attitude towards writing, provide user-friendly writing features, and aid in language development.

AI-powered tools are not only employed in assisting students but also in evaluating their performance. A study by Parra and Calero (2019) explored the impact of using free Automated Writing Evaluation tools on the writing performance of students in an English Teacher Training Program. The results revealed positive outcomes, indicating that these tools contribute to enhancing students' writing skills. Additionally, the study investigated the implications of AI-based grammar checkers in EFL learning and testing, focusing on ChatGPT. The study found that ChatGPT is proficient at detecting grammatical errors made by learners, although it falls short in identifying and comprehending linguistic errors in sentences generated by the learners. These studies collectively underscore the dual role of AI-powered tools in both supporting and assessing students' writing skills.

2.4 Studies on Complexities and Challenges of Integrating AI in the Academic Writing Process

Research has shown that cognitive stress can hinder learners from focusing on advanced writing tasks such as organization and revision, which are crucial for improving writing skills and producing sophisticated output, as demonstrated by Kellogg (2008). Understanding the academic writing process reveals its interconnected stages: starting with comprehension, where writers absorb and interpret the subject, followed by analysis, which involves dissecting ideas. Elaboration expands these ideas, and synthesis weaves them together into a cohesive narrative. Visual tools like mind maps help organize thoughts, while ordering ensures a logical flow for readers. Articulating involves expressing thoughts clearly, and clarification removes ambiguities. Criticism evaluates work for improvement, and editing refines grammar and structure. Structuring effectively organizes ideas, and sense-making weaves everything together. Each stage is crucial in the complex process of effective writing. The challenges presented by these various activities collectively define the art of academic writing, which demands attention, skill, and dedication from those who embark on this creative journey. Additionally, as Hanauer et al., (2019) mentioned that "for English second learners (EFL), the difficulty is combined with linguistic and educational barriers", as cited in Nazari et al. (2021). Algaraady and Mahyoob (2023) conducted a study to assess ChatGPT's capabilities in evaluating writing. Their findings indicated that ChatGPT excels at identifying most surface-level errors in written content but struggles when it comes to identifying deeper, more complex structural and pragmatic issues within writing.

The Modern Language Association (MLA) (2023) highlights significant concerns surrounding the use of AI-powered tools among students. Primarily, there's a risk that students might forfeit essential writing, reading, and critical thinking practice by depending on AI-generated outputs or summaries instead of direct engagement with the material. This overreliance might also devalue the importance of language study and writing skills, given that machines can replicate these proficiencies. Additionally, the introduction of surveillance and detection methods to ensure academic integrity could foster feelings of isolation and distrust due to their unreliability and potential biases, potentially resulting in wrongful accusations against students. Language Model Systems (LLMs) further compound these concerns by favoring standardized English aligned with dominant power structures, possibly exacerbating existing inequalities. Moreover, uneven access to sophisticated AI tools might widen societal disparities, particularly impacting marginalized groups and curtailing their academic autonomy.

Creely (2023) conducted a study that delves into the potential drawbacks of AI-driven language learning tools. Despite their transformative capabilities, the study highlights concerns regarding accuracy and authenticity in AI-generated language content across diverse linguistic contexts. It underscores worries about these tools potentially homogenizing language usage and perpetuating narrow cultural representations. The dependency on technology is seen as a concern, as it may diminish critical thinking and creativity among learners. Additionally, the study emphasizes ethical implications, including issues related to authentic authorship and control over creative outputs. It stresses the necessity for transparent and responsible AI use, especially in higher education, to address concerns about the authenticity of student language work. Ultimately, the paper aims to advocate for a balanced approach that maximizes the benefits of generative AI in language education while mitigating associated risks and ensuring inclusivity in the AI-driven digital era.

As highlighted in Creely's research (2023), the challenge of accuracy and authenticity in AI-driven language content, initially pointed out by Stokel-Walker and Van Noorden (2023), remains a significant concern. Brynjolfsson et al. (2023) underscored the AI's impressive grammatical accuracy due to extensive datasets and complex algorithms. However, MacDonald et al. (2006) emphasized the AI's limitations in capturing cultural nuances and contextual meanings critical for language understanding. Additionally, Kushner (2003) warned against learners being exposed to a standardized and culturally diluted language version. Addressing this challenge requires a holistic approach, with the consensus among researchers being that while AI lays the groundwork, preserving authenticity mandates human involvement. Collaborative systems, as advocated by these scholars, involve merging AI-generated content with human review and enrichment by linguists or educators as a potential resolution.

2.5 Studies on the Importance of Human Guidance in Writing

Human educators demonstrate their proficiency in recognizing and addressing these intricate issues. This study underscores that while ChatGPT is valuable for detecting basic errors, it cannot replace the expertise and nuanced understanding that human instructors bring to the table when addressing the more intricate aspects of writing. It contributes to the ongoing conversation about the role of AI in education and emphasizes the enduring importance of human guidance and expertise in fostering a comprehensive understanding of writing. In line with the insights shared by Rugg and Petre (2004), it is important to recognize that writing is not a singular task but a multifaceted process. This process involves a range of activities, including understanding, analyzing, expanding upon, integrating, visualizing, structuring, articulating, clarifying, refining, evaluating, organizing, and creating coherence. These diverse activities collectively contribute to the complexity and demanding nature of the writing process.

Research studies have demonstrated the positive impact of Artificial Intelligence (AI) writing tools on student writing in various contexts. One study was conducted by Marzuki, Widiati, Rusdin, Darwin, and Indrawati (2023) to investigate the spectrum of available Artificial Intelligence (AI) writing tools (including applications like Quillbot, WordTune, Jenni, Chat-GPT, Paperpal, Copy.ai, and Essay Writer) and assess their influence on student writing, with a specific emphasis on content and organization, as perceived by English as a Foreign Language (EFL) educators. The study's findings imply that the integration of AI writing tools can be a valuable asset in enhancing the writing quality of EFL students. Another study was carried out by Nazari, Shabbir, and Setiawan (2021) to assess the efficiency of a group-oriented Artificial Intelligence (AI) powered writing tool in the context of academic writing for postgraduate students who use English as their second language. The results suggest that AI-driven writing tools have the potential to be a valuable tool for enhancing learning behavior and promoting a positive attitude towards technology adoption among non-native postgraduate students studying English academic writing through the provision of formative feedback and assessments.

Research studies have consistently demonstrated the substantial positive impact of AI-powered writing tools on academic writing, with a particular focus on their benefits for EFL doctoral students and postgraduate students. These tools play a pivotal role in enhancing writing quality, fostering language development, and enriching the overall writing experience. Similarly, Sumakul, Abdul Hamied, and Sukyadi (2021) conducted a study that indicated students' favorable opinions about AI applications, making learning enjoyable and providing valuable assistance with their writing tasks. These collective findings underscore the pivotal role of AI-powered writing tools in facilitating and enriching the academic writing journey for students, particularly EFL doctoral candidates and post-graduate students.

At the end, the integration of AI-powered tools in education has opened up new opportunities and efficiencies, particularly in the realms of language learning and writing. However, it's important to emphasize that these tools cannot entirely replace the irreplaceable role of educators and instructors in the educational process.

3. Methodology

In this study, a comprehensive mixed-methods approach, incorporating both qualitative and quantitative data, was employed to delve into the perspectives held by university students regarding the utilization of AI-powered tools in academic writing. The objective was not only to elucidate these perspectives but also to subject them to rigorous validation through the process of data analysis.

3.1 Instruments

The researcher developed a comprehensive set of questionnaires aimed at precisely gathering data for the research goals. The primary tool used was a 5-point Likert-type questionnaire, comprising 20 questions grouped into two parts. The first segment was designed to assess students' perceptions of AI writing tools in their writing activities, while the second part delved into the benefits derived from using these tools. To facilitate data collection, the questionnaire was distributed through Google Forms. Additionally, the researcher conducted detailed semi-structured digital interviews with participants using Zoom. These interviews incorporated a mix of closed and open-ended questions. This multifaceted approach was intended to elicit varied and in-depth insights into participants' experiences and perspectives regarding the role of AI in the writing process.

3.2 Participants

The study's participants consisted of a cohort of fifty EFL university female students who were actively enrolled in English language programs at Al-Baha University during the third semester of the academic year 2022–2023.

3.3 Validity and Reliability

The study employed statistical analyses like Pearson correlations to confirm the internal consistency of the questionnaire in measuring specific dimensions related to students' perceptions of AI in writing. Additionally, Cronbach's alpha was used to establish the questionnaire's reliability in assessing these perceptions. Both analyses indicated high levels of internal consistency and reliability, solidifying the questionnaire as a trustworthy tool for gauging students' viewpoints on AI's role in the academic writing process.

3.4 Quantitative Data Analysis

The study's data analysis involved both quantitative and qualitative data from various sources. Quantitative data, gathered from the study tools, was coded to work with SPSS 20.0, enabling statistical exploration using methods like descriptive stats, graphical analysis, and variable relationship assessments such as cross-tabulation and correlation. Alongside this, qualitative analysis incorporated interviews to reinforce the quantitative results. SPSS validated the data, while Excel facilitated visual representations and specific analytical computations, enhancing the overall research interpretation and delivery.

4. Results

4.1 Questionnaire Results

The analysis of the questionnaire results provides valuable insights into the perceptions of EFL university students regarding the use of AI-powered tools in academic writing. Below are questionnaire items for the two dimensions for EFL university students on the use of AI in academic writing presented with Likert scale options:

Table 1. Questionnaire's first dimension: Frequency of students' perceptions of AI-powered tools in academic writing: Responses, means, standard deviations, percentages, ranks, results, weighted mean & overall result

Item#		SA	A	N	D	SD	Mean	Std. Dev	%	Rank	Result
Use of AI in Academic Writing:	F	23	13	5	4	5	3.9	8.6	78	7	Agree
1. I am aware of AI writing tools, such as Grammar, GPT, Google Translate, and QuillBot.	%	46	26	10	8	10					
2. I use AI writing tools to assist me with my academic writing assignments	F	21	16	3	3	7	4.08	9.6	81.6	3	Strongly Agree
Benefits and Challenges:	%	42	32	6	6	14					
3. AI writing tools have improved the quality of my academic writing assignments.	F	20	15	5	5	5	4.14	9.8	82.8	1	Strongly Agree
4. I find it easy to use AI writing tools for my academic assignments.	%	40	30	10	10	10					
Perceptions of AI Writing Tools:	F	21	15	5	5	4	3.86	7.5	77.2	9	Agree
5. AI writing tools are a valuable resource for EFL University students.	%	42	30	10	10	8					
	F	20	18	6	4	2	4.08	9.13	81.6	4	Agree
	%	40	36	12	8	4					

6. AI-powered tools have positively influenced my academic writing skills.	F	20	15	8	2	5	4.08	9.5	81.5	5	Strongly Agree
	%	40	30	16	4	10					
Integration into Education:	F	10	10	5	15	10	3.88	7.4	77.6	8	Agree
	%	20	20	10	30	20					
7. My university instructors have encouraged the use of AI writing tools in coursework.	F	26	14	4	5	1	3.98	7.7	79.6	6	Agree
	%	52	28	8	10	2					
Future Usage and Recommendations:	F	24	16	5	3	2	3.78	7	75.6	10	Agree
	%	48	32	10	6	4					
9. I plan to continue using AI writing tools in my academic writing.	F	24	16	5	2	3	4.14	9.8	82.8	2	Strongly Agree
	%	48	32	10	4	6					
10. I would recommend the use of AI writing tools to other EFL university students.	F	24	16	5	2	3	4.14	9.8	82.8	2	Strongly Agree
	%	48	32	10	4	6					
Weighted Mean 4.012											Overall Result= Agree

Note. Legend = SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree.

The findings from the first dimension of the questionnaire provide a comprehensive view of EFL university students' attitudes towards AI writing tools. A substantial majority of students are aware of these tools (72% agree or strongly agree), and they actively use them in their assignments (74% agree or strongly agree). Moreover, students believe that these tools have a positive impact on their writing quality (70% agree or strongly agree), and they find them valuable (76% agree or strongly agree). There is a clear desire for the integration of AI writing tools into EFL university courses (80% agree or strongly agree), indicating the potential to enhance the curriculum. However, instructor encouragement for AI tool usage is limited (40% agree or strongly agree), and students' future usage is mixed, with 80% agreeing or strongly agreeing but also some uncertainty. Nevertheless, a significant majority would recommend these tools to their peers (80% agree or strongly agree), emphasizing their perceived value in improving the academic experience. The weighted mean of 4.012 for these results suggests an overall agreement with the use of AI writing tools among EFL university students.

The analysis of the questionnaire results offers valuable insights into the varied perceptions of EFL university students regarding the use of AI-powered tools in their academic writing. The responses demonstrate a broad spectrum of attitudes, with means ranging from the lowest of 3.78, found in Item 9 (indicating an agreement with plans to continue using AI writing tools), to the highest of 4.14 in Item 3 (reflecting strong agreement that AI-powered tools have improved the quality of their academic writing assignments). Standard Deviations (SD) reveal the diversity in responses, with the highest SD in Item 10, where students have widely varying opinions on recommending AI-powered tools to others. Percentages show the distribution of responses for each item, and Ranks highlight the position of each item in relation to others, with Item 2 ranking third, indicating strong agreement among students in using AI-powered tools to assist with their college writing assignments. The overall "Agree" consensus, as indicated by the "Result," suggests that, on average, EFL students lean positively towards the integration of AI-powered tools in their writing, despite some variations in opinions. The Weighted Mean of 4.012 reinforces this overall agreement. Thus, the findings underline the complex and nuanced nature of students' perceptions, revealing both shared enthusiasm and some diversity of sentiment regarding the role of AI-powered tools in their writing endeavors.

Table 2. Questionnaire's second dimension: Frequency of students' perceptions of AI-powered tools in academic writing: Responses, means, standard deviations, percentages, ranks, results, weighted mean& overall result

Item#		SA	A	N	D	SD	Mean	Std. Dev	%	Rank	Result
1. Using AI writing tools helps me improve my academic writing by identifying and correcting grammar and spelling errors.	F	25	10	5	5	5	3.9	8.12	78	5	Agree
	%	50	20	10	10	10					
2. AI writing tools assist me in enhancing the clarity and coherence of my written content.	F	24	16	2	6	2	3.82	8.12	76.4	8	Agree
	%	48	32	4	12	4					
3. I use AI writing tools to save time when proofreading and editing my work.	F	25	15	5	2	3	3.8	7	76	9	Agree
	%	50	30	10	4	6					
4. AI writing tools help me to avoid unintentional plagiarism by checking for copied content.	F	22	12	8	3	5	3.9	7.6	78	6	Agree
	%	44	24	16	6	10					
5. AI-powered tools improve my overall academic writing skills.	F	24	14	7	2	3	4	8.3	80	4	Agree
	%	48	28	14	4	6					
6. The convenience of AI writing tools makes them an essential part of my academic writing	F	24	16	3	4	3	3.86	7.3	77.2	7	Agree
	%	48	32	6	8	6					

process.											
7. Using AI writing tools boosts my confidence in producing high-quality written assignments.	F	22	12	8	4	4	2.9	3.5	58	10	Neutral
	%	44	24	16	8	8					
8. I rely on AI writing tools to help me meet deadlines for academic writing assignments.	F	20	15	10	4	1	4.18	10.1	83.6	1	Strongly Agree
	%	40	30	20	8	2					
9. AI-powered tools provide valuable suggestions and feedback that I find useful in my academic writing.	F	22	10	8	5	5	4.14	9.6	82.8	2	Strongly Agree
	%	44	20	16	10	10					
10. The accuracy and effectiveness of AI writing tools make them indispensable for my academic writing.	F	25	15	4	4	2	4.12	9.6	82.4	3	Strongly Agree
	%	50	30	8	8	4					
Weighted Mean = 4.072							Overall Result= Agree				

Note. Legend = SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree.

The second dimension of the questionnaire sheds light on EFL university students' attitudes toward the primary benefits of using AI writing tools in their academic writing. The results reveal a strong consensus among students regarding the advantages of these tools. A substantial majority, ranging from 76% to 83.6%, agree or strongly agree that AI writing tools help them in various ways, including improving writing, saving time, enhancing clarity, and avoiding unintentional plagiarism. Additionally, they find these tools indispensable for academic writing and meeting deadlines. The mean scores for most items reflect a general agreement. Notably, EFL students are especially confident about the role of AI-powered tools in providing valuable suggestions and feedback, with 82.8% strongly agreeing with this statement. The weighted mean for all items combined, which stands at 4.072, indicates an overall agreement with the primary benefits of AI writing tools among EFL university students. However, students are somewhat less convinced about the impact of these tools on boosting their confidence in producing high-quality written assignments, as indicated by a more neutral stance on that aspect.

The analysis of the questionnaire results in the second dimension, which explores EFL college students' perceptions of the primary benefits of using AI writing tools, reveals diverse opinions and sentiments. Mean scores vary, with the lowest mean of 2.9 in Item 7, suggesting that a significant portion of students does not find AI-powered tools to significantly boost their confidence in producing high-quality assignments, while the highest mean of 4.18 in Item 8 indicates that a substantial majority relies on AI-powered tools to meet deadlines for academic writing assignments. Standard Deviations (SD) reflect variation, with the highest SD observed in Item 8, showing that the reliance on AI-powered tools for meeting deadlines elicits a wide range of responses. Percentages provide insight into the distribution of responses, with many students agreeing or strongly agreeing with the benefits of AI-powered tools, especially in Items 8, 9, and 10. Ranks highlight the relative positions of items, and the "Result" indicates that, overall, EFL students tend to agree with the advantages of AI writing tools. The Weighted Mean of 4.072 strengthens the consensus of agreement, emphasizing that, on average, students perceive the primary benefits of using AI-powered tools positively in their college assignments, despite some variance in specific aspects of these tools' utility.

4.2 Interviews Results

Twenty students participated in the semi-structured interviews. The students answered the questions related to which AI-powered tools they use in academic writing as shown in the following figure.

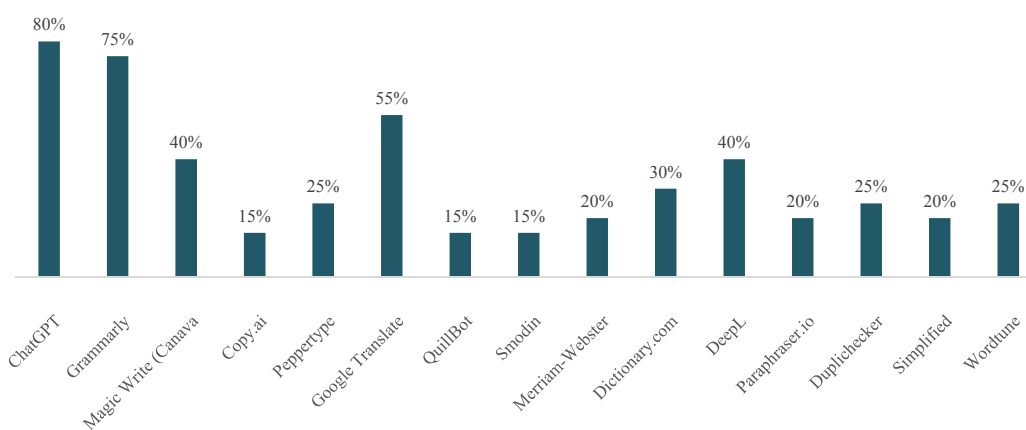


Figure 1. AI-powered tools EFL Students Use in Academic Writing

The above figure illustrates insights derived from interviews with twenty students, shedding light on the usage of AI-powered writing tools. Among the respondents, ChatGPT emerged as the most widely utilized tool, boasting an 80% usage rate. Renowned for its versatile text generation capabilities, ChatGPT was a prominent choice among these students. Following closely, Grammarly held a substantial presence, employed by 75% of the participants for its adeptness in grammar checks and style improvements. Google Translate also gained significant ground, with 55% of students leveraging its translation prowess. Beyond these prominent choices, a spectrum of other tools like Magic Write (Canava), Copy.ai, Peppertype, and more displayed varying degrees of adoption, ranging from 15% to 30% usage rates. While tools like Copy.ai, QuillBot, and Smodin registered lower usage at 15%, others like Merriam-Webster, Paraphraser.io, Simplified, Duplichecker, and Wordtune hovered between 20% and 25%. This diverse landscape of tool usage signifies nuanced preferences among students, likely influenced by factors such as functionality, ease of use, and specific features tailored to different writing needs. The coexistence of various AI writing tools underscores the adaptability of EFL college students in harnessing technology to enhance their writing skills. Their choices reflect the multifaceted nature of the writing process, where different tools cater to diverse needs, whether it's improving grammar and style, generating content, or aiding in translation. This rich variety in tool adoption illustrates the proactive approach of EFL students in utilizing AI technology to excel in their writing assignments and academic pursuits.

The table below shows the characteristics of the AI-powered tools EFL students use in academic writing, showing the criteria by which students choose AI-powered tools.

Table 3. The criteria of using AI-powered tools

Characteristics of AI-powered tools Used by EFL Students in Academic Writing			
#	Name	Website	Access
1	ChatGPT	https://chat.openai.com/	Free
2	Grammarly	https://app.grammarly.com/	Freemium
3	Magic Write (Canava)	https://www.canva.com/magic-write/	Freemium
4	Copy.ai	https://www.copy.ai/	Freemium
5	Dictionary.com	https://www.dictionary.com/	Free
6	Google Translate	https://translate.google.com/	Free/Chrome Extension
7	QuillBot	https://quillbot.com	Freemium
8	Smodin	https://smodin.io/	Free
9	Merriam-Webster	https://www.merriam-webster.com/	Free
10	Peppertype	https://www.peppercontent.io/peppertype-ai/	Paid/ Freemium
11	DeepL	https://www.deepl.com/en/translator	Freemium
12	Paraphraser.io	https://www.paraphraser.io/	Freemium
13	Duplichecker	https://www.duplichecker.com/	Freemium
14	Simplified	https://simplified.com/	Freemium
15	Wordtune	https://www.wordtune.com	Freemium

The above table provides an overview of the characteristics of AI-powered tools frequently used by EFL students in their writing endeavors as revealed from the interviews questions. The table lists these tools along with their respective websites and access types. The access characteristics are categorized as either “Free,” “Freemium,” or “Paid,” indicating the availability and pricing structures associated with each tool. This table serves as a crucial guide for EFL students in their decision-making process, allowing them to choose AI writing tools that align with their financial constraints or preferences. It highlights the accessibility and availability of these tools, offering students a wide spectrum of options to enhance their writing processes.

The table above highlights the preference of EFL students for free online AI writing tools as revealed from the interviews questions. The predominant criteria emphasized in this context are the accessibility options, with the majority of the tools falling under the “Free” category. This categorization reflects the inclination of students to opt for AI-powered tools that do not require payment, making them a cost-effective choice for enhancing their writing tasks. In essence, the table underscores students’ preference for readily available and cost-free AI writing tools to support their writing endeavors.

The table below shows the functions of the AI-powered tools EFL university students use in academic writing as revealed from the interviews questions.

Table 4. The Functions of AI-powered tools

#	Name	Function
1	ChatGPT	ChatGPT is an AI tool used for generating human-like text.
2	Grammarly	Grammarly is a writing assistant tool that helps users improve their writing by checking for grammar, spelling, and punctuation errors, as well as offering style suggestions.
3	Magic Write (Canava)	Magic Write is a feature within Canva, a graphic design platform, that offers AI-powered content suggestions and improvements to help users create compelling visuals and written content.
4	Copy.ai	Copy.ai is a content generation tool that uses AI to assist users in generating written content, including blog posts, marketing copy, and more.
5	Dictionary.com	Dictionary.com is an online dictionary and thesaurus that provides definitions, synonyms, antonyms, and other language-related resources.
6	Google Translate	Google Translate is a widely used AI-powered tool for translating text and even speech between different languages.
7	QuillBot	QuillBot is a writing enhancement tool that can rephrase and reword sentences to improve their quality and clarity.
8	Smodin	Smodin is an AI-powered email subject line and content generator, designed to help users craft effective email marketing messages.
9	Merriam-Webster	Merriam-Webster is a renowned publisher of dictionaries and reference materials, offering language definitions and resources.
10	Peppertype	Peppertype is a content generation tool that uses AI to help users create written content for various purposes, including marketing and creative writing.
11	DeepL	DeepL is a machine translation tool that offers high-quality language translation services, similar to Google Translate but with a focus on accuracy.
12	Paraphraser.io	Paraphraser.io is an online tool for paraphrasing and rephrasing sentences and text to create unique content.
13	Duplichecker	Duplichecker is a plagiarism checker tool that helps users identify duplicated or copied content in their writing.
14	Simplified	Simplified is a content creation tool that uses AI to generate marketing copy, blog posts, and more to assist businesses and content creators.
15	Wordtune	Wordtune is an AI-powered writing assistant that offers suggestions to improve the style, tone, and clarity of written content.

The table above comprehensively delineates the functionalities of AI-powered tools utilized by EFL students, as unveiled through interview inquiries. It elucidates the diverse rationales behind students' selection of these tools for their writing tasks. Notably, Grammarly, prominently featured, operates as a versatile writing assistant adept at resolving common issues like grammar, spelling, and punctuation errors. Its provision of stylistic recommendations offers invaluable guidance to EFL students, markedly enhancing the overall quality of their written compositions. Moreover, the inclusion of DeepL, a tool emphasizing translation precision, underscores the critical necessity for linguistic aid, particularly beneficial for students whose primary language differs from English.

5. Discussion

The analysis of the study results offers a comprehensive understanding of EFL university students' perceptions regarding the use of AI-powered tools in academic writing. Here's the discussion of the findings:

The first dimension of the questionnaire highlights students' awareness and utilization of AI writing tools. The results suggest that a significant majority of EFL college students are aware of these tools, and they actively use them for their writing assignments. This finding aligns with the increasing prevalence of AI-powered tools in educational contexts. EFL university students' familiarity with tools such as Grammarly, GPT-3, Google Translate, and QuillBot may be attributed to the broader accessibility and integration of AI technology in writing processes. However, while awareness and use are high, it's important to recognize that not all students may fully understand the capabilities and limitations of these tools. The effectiveness of AI writing tools can vary depending on the task, and students should be educated about how to make the best use of them.

Moreover, EFL university students believe that AI-powered tools have improved the quality of their academic writing and have a positive influence on their skills and confidence. They also express a desire for AI-powered tools to be integrated into their coursework. However, the data also shows that university instructors do not uniformly encourage the use of AI-powered tools, and while many students plan to continue using them, there is some uncertainty. The positive influence of AI-powered tools on students' writing quality and confidence resonates with previous studies highlighting the benefits of these tools in improving writing skills and providing constructive feedback (Al Mahmud, 2023). Despite this, the uncertainty among students regarding the continued use of these tools emphasizes the need for ongoing support and training to harness their full potential (Kurniati &

Fithriani, 2022).

The second dimension of the questionnaire explores EFL university students' perceptions of the primary benefits of AI writing tools. The results show that students largely agree on the advantages of using these tools, such as improving academic writing quality, saving time, enhancing clarity, and avoiding unintentional plagiarism. They also rely on AI-powered tools to meet deadlines and find value in the suggestions and feedback provided by these tools. This aligns with research highlighting the advantages of AI-powered tools in proofreading, grammar correction, and language enhancement. It's noteworthy that EFL university students also find AI-powered tools valuable in avoiding unintentional plagiarism. This is crucial for academic integrity, as AI-powered tools can help students become more conscious of proper citation and attribution.

The somewhat lower confidence in AI-powered tools significantly boosting their confidence in producing high-quality assignments suggests that students may see AI as a supportive tool rather than a replacement for their academic writing skills. This aligns with the idea that AI should be seen as a complement to human writing abilities. The awareness and utilization of AI tools among students align with the global trend of increased accessibility and integration of AI technology in educational settings (Kurniati & Fithriani, 2022). However, as indicated by the study's findings, not all students might fully comprehend how to maximize these tools' potential. This emphasizes the importance of responsible and thoughtful use of AI as a supplement rather than a replacement for writing skills instruction (Abdullayeva & Musayeva, 2023).

The results reveal mixed feelings regarding students' plans to continue using AI writing tools, with both agreement and uncertainty. This highlights the importance of continued support and training to ensure that students harness the full potential of these tools. Similarly, the varying opinions on recommending AI-powered tools to peers suggest the need for tailored guidance and best practices in integrating AI into writing.

The findings from both dimensions of the questionnaire provide valuable insights into EFL university students' attitudes toward AI writing tools. While there is a general agreement on the benefits and use of these tools, it's important to recognize that students' perceptions are not uniform, and there is some diversity in their opinions. The weighted means in both dimensions indicate an overall positive attitude, but they also highlight that EFL university students may have different levels of confidence and reliance on AI-powered tools for specific aspects of their writing. These findings resonate with recent research, which emphasizes a shift in educational paradigms towards learner-centered approaches facilitated by technology (Ituma, 2011). The study highlights that while a significant majority of students are aware of AI writing tools and actively use them in their assignments, there remains a need for comprehensive understanding regarding the capabilities and limitations of these tools (Abdullayeva & Musayeva, 2023).

These results have implications for educators and institutions, suggesting that there is potential to further integrate AI writing tools into EFL university courses, given the substantial majority of EFL university students see their value. However, it's also important for instructors to address any concerns or uncertainties that students may have and to provide guidance on how to effectively utilize these tools to improve academic writing skills and confidence.

The findings demonstrate the complex and nuanced nature of EFL college students' perceptions regarding the use of AI-powered tools in their writing, highlighting both shared enthusiasm and some diversity of sentiment. These insights can inform educational strategies and curricular decisions to better cater to students' needs and expectations.

The semi-structured interviews conducted with twenty EFL university students provided valuable insights into their usage of AI-powered tools in the context of academic writing. The data, presented in the form of figures and tables, listing characteristics and functions of AI-powered tools, offers a comprehensive view of the diverse landscape of AI tool adoption among these students.

Figure 1 illustrates a wide variety of AI-powered tools being used by EFL university students. Grammarly and ChatGPT emerged as the most frequently used tools, indicating their popularity and the pivotal role they play in supporting students' academic writing. The presence of Magic Write (Canva), Copy.ai, Peppertype, and DeepL, among others, reveals the extensive range of AI-powered tools EFL university students are willing to incorporate into their writing process. This diversity is a testament to students' proactive approach in adopting technology to enhance their academic writing skills.

The findings also emphasize the adaptability of EFL university students in selecting AI-powered tools tailored to their specific needs. Whether it's for grammar and style improvement, content generation, or translation, students opt for tools that cater to their individual requirements. The broad spectrum of AI tool adoption highlights the

importance of personalized choices in optimizing the writing process.

Table 3 provides a valuable guide for EFL students when choosing AI writing tools. The categorization of tools into “Free”, “Freemium”, or “Paid” helps students make informed decisions based on their financial constraints or preferences. The data suggests that EFL students predominantly prefer free online AI writing tools. This preference for freely accessible tools underscores students' inclination toward cost-effective solutions for enhancing their writing tasks. It aligns with the broader trend in education, where the availability of free online resources has become essential for students seeking support outside the classroom. The emphasis on free tools raises questions about the accessibility and affordability of AI-powered tools in the educational context. Educational institutions and AI tool developers should take this into account and ensure that students have access to the tools they need for academic success.

Moreover, the preference for free AI writing tools among students emphasizes the significance of accessibility and affordability in educational contexts, echoing the broader trend where free online resources are crucial for students seeking additional support (Zulfa et al., 2023). This raises concerns about the accessibility of AI tools, suggesting a need for educational institutions and developers to ensure equitable access for all students (Al Mahmud, 2023).

Table 4 delves into the specific functions of the AI-powered tools used by EFL university students in their academic writing. Grammarly's recognition as a versatile writing assistant aligns with its widespread use globally, emphasizing the importance of addressing common writing issues such as grammar, spelling, and punctuation errors. Additionally, it underlines the critical role style recommendations play in improving the quality of written work. The inclusion of DeepL, a tool focusing on translation accuracy, highlights the importance of language support for EFL university students who may require language translation services to bridge communication gaps effectively.

The variety of AI-powered tools with specific functions addresses the multifaceted challenges EFL university students encounter in their academic writing. From content generation to language translation and plagiarism checking, these tools enhance writing quality, efficiency, and originality. Their usage reflects students' efforts to overcome language barriers, improve their academic writing skills, and gain confidence in producing high-quality assignments.

The study's exploration of specific functions of AI-powered tools aligns with research highlighting the various roles of these tools, from grammar correction to language translation, aiding students in overcoming language barriers and enhancing their writing skills (Al Mahmud, 2023; Kurniati & Fithriani, 2022). However, while these tools offer significant benefits, concerns exist regarding their limitations and challenges. The study acknowledges the importance of human guidance in addressing the complex structural and pragmatic issues within writing, emphasizing the irreplaceable role of educators in fostering a comprehensive understanding of writing (Algaraady & Mahyoob, 2023).

In conclusion, the interviews' results provide valuable insights into the dynamic landscape of AI tool adoption among EFL college students. The diversity in tool choices, preference for free tools, and the specific functions they serve collectively emphasize the significant impact of AI-powered tools on students' writing experiences. The data underscores the importance of personalized tool selection, accessibility, and affordability in supporting EFL students' academic writing.

6. Recommendations

The study underscores that while ChatGPT is valuable for identifying basic errors, it cannot replace the expertise and nuanced understanding that human instructors bring to the table when addressing the more intricate aspects of academic writing. The study contributes to the ongoing conversation about the role of AI in education and emphasizes the enduring importance of human guidance and expertise in fostering a comprehensive understanding of writing.

The transformative potential of AI-powered tools in EFL academic writing is noteworthy. The integration of AI-powered tools into the curriculum can empower EFL students to enhance their writing skills, academic integrity, and confidence. Providing comprehensive education, fostering open dialogues, and engaging students as active participants in their learning journeys are imperative. EFL colleges should view AI-powered tools not as a replacement for human ability but as powerful complements that can lead to dynamic, tech-savvy, and academically rigorous learning environments.

As universities navigate this landscape, it is paramount to underscore the collaborative partnership between AI and human educators. AI can enhance surface-level errors and address basic issues, as demonstrated by

Algaraady and Mahyoob (2023), yet it struggles with intricate structural and pragmatic issues that human instructors adeptly manage. This reiterates the irreplaceable role of human guidance and expertise in fostering a comprehensive understanding of academic writing.

To enhance EFL university students' academic writing skills, several key recommendations can be suggested. Firstly, universities should incorporate a comprehensive AI integration curriculum within their academic writing programs. This curriculum must go beyond basic familiarity, encompassing structured training on AI tool utilization and highlighting their benefits. Additionally, embracing interdisciplinary learning is crucial. Exposure to a diverse array of AI-powered tools, each specializing in distinct writing aspects, enables students to recognize the adaptability of AI across various writing tasks.

Moreover, conducting ethical writing workshops is essential. These sessions must emphasize the ethical use of AI-powered tools for citation, paraphrasing, and plagiarism prevention, serving as a pivotal component of AI tool education (Elander et al., 2006). Furthermore, acknowledging the diverse learning needs of students, implementing customized learning paths supported by AI tools is recommended. These personalized paths should cater to individual requirements, whether it's grammar enhancement, vocabulary enrichment, or refining writing styles.

Establishing mechanisms for engagement and continuous feedback is equally critical. EFL colleges should create feedback channels and open forums to allow students to express concerns, offer suggestions, and remain actively engaged in the integration of AI tools, as highlighted. Additionally, fostering student peer support networks is beneficial. Colleges should promote peer-assisted learning networks where proficient students guide their peers in effectively utilizing AI-powered tools, cultivating a supportive learning environment. Finally, ensuring Equitable Access to AI-powered tools is imperative. EFL colleges should collaborate with AI tool developers to make these resources accessible at affordable or free rates for all students, eliminating economic barriers. This aligns with the broader educational trend of providing open-access resources, catering to students seeking additional support beyond the confines of the classroom.

Implementing these recommendations enables universities to unlock the transformative potential of AI-powered tools, empowering students to enhance their academic writing skills, academic integrity, and confidence. This, in turn, fosters dynamic, tech-savvy, and academically rigorous learning environments.

7. Conclusion

The research delved into the perceptions of EFL college students regarding AI writing tools, unveiling a unanimously positive sentiment. These tools were seen as enhancers of academic writing quality, time-saving assets, facilitators of clarity, and safeguards against unintentional plagiarism. This aligns with prior studies emphasizing AI's prowess in proofreading and grammar correction, showcasing the substantial role AI plays in bolstering the writing process.

Overall, the study illuminated students' awareness, utilization, and perceived benefits of AI writing tools. Most students were not only aware of these tools but actively incorporated them into their assignments. While recognizing the advantages, they acknowledged that AI should complement rather than replace human writing skills. There was a collective desire for increased integration of AI tools in coursework, although with varying levels of encouragement from instructors.

In conclusion, integrating AI writing tools into EFL university education offers immense advantages, improving academic writing quality, saving time, and upholding academic integrity. However, a balanced approach is essential; these tools should complement traditional skills rather than overshadow them. The successful incorporation of AI tools requires equitable access, guidance, and collaboration between AI and human educators. By implementing recommended strategies such as comprehensive curriculum integration, ethical writing workshops, and personalized learning paths, colleges can create enriching learning environments. This harmonious synergy between AI and human educators not only enhances academic writing experiences but also cultivates confidence and academic rigor among EFL university students.

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