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FROM ASSISTANCE TO DEPENDENCE: THE IMPACT OF AI WRITING TOOLS ON ESL LEARNERS' ACADEMIC WRITING SKILLS

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Abstract

The rapid emergence of artificial intelligence (AI) in language education has significantly transformed the landscape of English as a Second Language (ESL) writing. This study investigates the impact of AI writing tools on ESL learners' academic writing skills, with particular attention to the emerging tension between assistance and dependence. Employing a mixed-methods research design, the study integrates quantitative analysis of writing performance with qualitative insights derived from learner perceptions. Data were collected from ESL undergraduate students through writing tasks, questionnaires, and semi-structured interviews. The findings reveal that AI writing tools substantially improve learners' grammatical accuracy, lexical choice, and overall textual coherence. However, qualitative results indicate an increasing tendency among learners to rely heavily on AI assistance, leading to reduced cognitive engagement and diminished confidence in independent writing. The study highlights a paradox in which AI simultaneously enhances surface-level writing performance while potentially undermining deeper cognitive and creative writing skills. Drawing on theories of cognitive offloading and learner autonomy, the research argues that AI should be positioned as a supportive pedagogical tool rather than a substitute for independent writing practice. The study contributes to ongoing discussions on technology-mediated language learning and offers implications for ESL pedagogy, curriculum design, and responsible AI integration in academic contexts.

KEYWORDS

Artificial Intelligence; ESL Writing; Academic Writing; Cognitive Offloading; Learner Autonomy; Computer-Assisted Language Learning (CALL); Writing Skills; Educational Technology

1. Introduction

1.1 The Emergence of AI in Language Education

The integration of artificial intelligence (AI) into educational contexts has accelerated rapidly over the past decade, transforming traditional approaches to teaching and learning. In the field of English language teaching (ELT), AI has moved beyond experimental use to become an increasingly common feature of everyday academic practice. From automated grammar checkers to advanced text-generation systems, AI-powered tools are now widely accessible to students, including those learning English as a Second Language (ESL).

This shift reflects a broader trend toward technology-mediated learning, where digital tools are not only supplementary but central to the learning process. In particular, academic writing—often considered one of the most demanding skills for ESL learners—has become a key site for the application of AI technologies. These tools offer immediate feedback, suggest lexical and syntactic improvements, and in some cases generate entire essays based on minimal input. As a result, the

act of writing is increasingly shaped by human–machine interaction, raising important questions about how learning is conceptualized and achieved in such environments.

1.2 AI Writing Tools and ESL Academic Writing

Academic writing in a second language presents multiple challenges, including grammatical accuracy, vocabulary range, coherence, and adherence to genre-specific conventions. For many ESL learners, these challenges can be overwhelming, often leading to frustration and lack of confidence. AI writing tools appear to address these difficulties by providing real-time assistance and model outputs that align with academic expectations.

From a pedagogical perspective, such tools can function as scaffolding mechanisms, supporting learners as they develop their writing skills. By offering corrections and suggestions, AI can help learners notice linguistic patterns, refine their language use, and produce more polished texts (Hyland, 2003). In this sense, AI has the potential to democratize access to high-quality writing support, particularly in contexts where individualized teacher feedback may be limited.

However, while the benefits of AI-assisted writing are evident, it is equally important to consider how these tools may reshape the writing process itself. Writing is not merely the production of grammatically correct sentences; it involves idea generation, critical thinking, argumentation, and the development of a unique voice. The increasing reliance on AI raises concerns about whether learners are actively engaging in these processes or simply outsourcing them to technological systems.

1.3 From Assistance to Dependence: A Conceptual Concern

A central issue in the use of AI writing tools is the potential shift from assistance to dependence. While assistance implies support that enhances learning, dependence suggests a level of reliance that may hinder the development of independent skills. This distinction is particularly significant in the context of language learning, where the ultimate goal is to enable learners to communicate effectively without external support.

The concept of **cognitive offloading** provides a useful framework for understanding this phenomenon. Cognitive offloading refers to the tendency to delegate mental processes to external tools in order to reduce cognitive effort (Sweller, 1988). While this can increase efficiency in the short term, it may also limit opportunities for deeper cognitive engagement. In writing, this could mean that learners rely on AI-generated suggestions without fully processing or understanding them, thereby weakening their ability to produce language independently.

At the same time, the issue of dependence intersects with the notion of **learner autonomy**, which is widely recognized as a key objective in language education. Autonomous learners are those who take responsibility for their own learning, make informed decisions, and actively engage with the learning process (Little, 1991). If AI tools become the primary source of content generation, there is a risk that learners may become passive recipients rather than active producers of language.

1.4 AI, Authorship, and Academic Integrity

The use of AI in academic writing also raises important questions about authorship and originality. Traditionally, academic writing is viewed as a reflection of the writer's knowledge, critical thinking, and intellectual effort. However, when AI-generated content is incorporated into student writing, the boundaries between human authorship and machine assistance become increasingly

blurred.

This ambiguity has implications not only for academic integrity but also for the development of writing as a cognitive and creative process. If learners rely heavily on AI to generate ideas or structure arguments, their role in the writing process may become limited. This challenges conventional assumptions about what it means to "learn" writing and calls for a re-evaluation of pedagogical practices in AI-mediated learning environments.

1.5 The Need for a Balanced Perspective

Despite growing interest in AI in education, much of the existing discourse tends to adopt polarized positions, either emphasizing the benefits of AI as a revolutionary tool or highlighting its risks as a threat to learning. Such perspectives, while valuable, often overlook the complex and context-dependent nature of AI use in language learning.

There is a need for research that moves beyond binary evaluations and instead examines how AI tools are actually used by learners, how they influence writing practices, and what implications they have for skill development. In particular, understanding the balance between assistance and dependence is crucial for developing effective pedagogical strategies that maximize the benefits of AI while minimizing its potential drawbacks.

1.6 Purpose of the Study

In response to these concerns, the present study investigates the impact of AI writing tools on ESL learners' academic writing skills. It focuses on the extent to which AI enhances linguistic accuracy and textual quality, while also examining its influence on cognitive engagement, learner autonomy, and writing development.

By exploring the transition from assistance to dependence, this study aims to provide a nuanced understanding of the role of AI in ESL writing. It seeks to contribute to ongoing discussions in language education by offering insights that can inform both theory and practice, particularly in relation to the responsible and effective integration of AI technologies in academic contexts.

2. Literature Review

2.1 AI in Language Learning and CALL: A Paradigm Shift

The integration of artificial intelligence (AI) into language education represents a significant evolution within the broader field of Computer-Assisted Language Learning (CALL). Early CALL systems primarily focused on drill-based exercises and rule-based feedback; however, recent advancements in natural language processing (NLP) have enabled more sophisticated forms of interaction, including adaptive feedback, automated essay scoring, and generative text production (Chapelle, 2001; Luckin et al., 2016). These developments have shifted the role of technology from a supplementary instructional aid to an active participant in the learning process.

Scholars argue that AI has redefined the boundaries of language learning by facilitating personalized and immediate feedback, which was previously limited by teacher availability and time constraints (Heift & Schulze, 2015). In ESL contexts, this immediacy is particularly valuable, as learners often require continuous support to develop linguistic accuracy and fluency. At the same time, the integration of AI aligns with sociocognitive perspectives of language learning, where interaction—whether human or machine-mediated—plays a central role in knowledge construction (Atkinson, 2011).

Nevertheless, the increasing reliance on AI also raises critical concerns regarding the nature of learning in technology-rich environments. As AI systems become more autonomous and capable of generating human-like text, the distinction between learning *with* technology and learning *through* technology becomes less clear, necessitating a deeper examination of its pedagogical implications.

2.2 AI Writing Tools and ESL Academic Writing Development

AI-powered writing tools, such as grammar checkers and text generators, have gained widespread popularity among ESL learners due to their ability to enhance textual quality. Research indicates that these tools can significantly improve grammatical accuracy, lexical sophistication, and overall coherence in student writing (Stevenson & Phakiti, 2014; Ranalli, 2018). By providing immediate corrective feedback, AI tools enable learners to identify and address errors in real time, thereby promoting noticing—a key mechanism in second language acquisition (Schmidt, 1990).

Moreover, AI tools can function as scaffolding devices that support learners in navigating the complexities of academic writing. According to Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD), learners benefit from guidance that enables them to perform tasks beyond their current level of competence. AI systems, by offering suggestions and model texts, can serve as a form of mediated assistance that facilitates this process.

However, the effectiveness of such scaffolding depends largely on how learners engage with the feedback provided. Some studies suggest that learners may accept AI-generated corrections without fully understanding them, leading to surface-level improvements rather than deep learning (Ferris, 2011). Furthermore, the emergence of generative AI tools capable of producing complete essays introduces new dynamics, where the boundary between assistance and substitution becomes increasingly blurred.

2.3 Cognitive Offloading and Its Implications for Writing

The concept of cognitive offloading provides a critical lens for examining the impact of AI on writing practices. Cognitive offloading refers to the delegation of cognitive processes to external tools in order to reduce mental effort (Risko & Gilbert, 2016). While this can enhance efficiency, it may also limit opportunities for cognitive engagement and skill development.

In the context of ESL writing, cognitive offloading may manifest in learners' reliance on AI for tasks such as idea generation, sentence construction, and error correction. While these functions can support learners in producing higher-quality texts, they may also reduce the need for active problem-solving and critical thinking. Sweller's (1988) Cognitive Load Theory suggests that learning occurs most effectively when learners engage in meaningful cognitive processing; excessive reliance on external tools may disrupt this balance.

Recent studies have begun to explore this phenomenon in digital learning environments, indicating that overdependence on technological aids can lead to reduced retention and transfer of knowledge (Sparrow et al., 2011). In writing, this raises concerns about whether learners are developing the underlying skills necessary for independent language production or merely relying on AI as a compensatory mechanism.

2.4 Learner Autonomy in AI-Mediated Environments

Learner autonomy is a central concept in language education, emphasizing the importance of self-

directed learning and active engagement (Little, 1991). The integration of AI into writing practices has the potential to both support and undermine autonomy, depending on how it is used.

On one hand, AI tools can empower learners by providing access to resources and feedback that enable independent learning. For example, learners can revise their work without immediate teacher intervention, experiment with different linguistic forms, and receive guidance tailored to their needs. This aligns with the principles of self-regulated learning, where learners monitor and control their own learning processes (Zimmerman, 2002).

On the other hand, excessive reliance on AI may lead to a form of passive learning, where learners depend on the tool to make decisions rather than engaging critically with their writing. This paradox highlights the need to distinguish between *productive* and *unproductive* uses of AI. Productive use involves active engagement with feedback and reflection on language use, whereas unproductive use involves uncritical acceptance of AI-generated content.

2.5 Authorship, Originality, and Academic Integrity

The rise of generative AI has intensified debates concerning authorship and originality in academic writing. Traditional conceptions of authorship emphasize individual creativity, critical thinking, and intellectual contribution (Ivanič, 1998). However, when AI-generated content is incorporated into student writing, these notions become increasingly complex.

Researchers have raised concerns about the potential for AI to facilitate academic dishonesty, particularly when students submit AI-generated texts as their own work (Cotton et al., 2023). At the same time, others argue that AI should be viewed not as a threat but as a tool that requires new forms of literacy and ethical understanding. From this perspective, the focus shifts from prohibiting AI use to teaching students how to use it responsibly and transparently.

This debate also intersects with broader discussions concerning the nature of writing as a social and distributed process. From a post-process perspective, writing is not solely the product of an individual but is shaped by multiple influences, including tools, contexts, and interactions (Atkinson, 2003). AI, in this sense, can be seen as part of the broader ecology of writing, though its role and impact remain contested.

2.6 Empirical Studies on AI and ESL Writing: Emerging Trends

Empirical research on AI in ESL writing is still developing, but several trends have begun to emerge. Studies focusing on automated writing evaluation (AWE) systems have generally reported positive effects on grammatical accuracy and revision practices (Link et al., 2020). Similarly, research on AI-based feedback tools suggests that learners benefit from immediate and consistent feedback, particularly in large classroom settings.

However, fewer studies have examined the long-term impact of AI on writing development, particularly in relation to higher-order skills such as argumentation and critical thinking. Existing findings suggest that while AI can improve surface-level features of writing, its impact on deeper aspects of writing remains uncertain (Ranalli, 2018).

Moreover, there is a lack of research that explicitly addresses the tension between assistance and dependence. Most studies focus either on the benefits of AI or its potential risks, without exploring how these dimensions interact in real learning contexts. This gap highlights the need for more comprehensive and nuanced investigations that consider both the cognitive and sociocultural aspects of AI use in writing.

2.7 Research Gap

Despite the growing body of literature on AI in language education, several gaps remain. First, there is limited research that critically examines the balance between assistance and dependence in AI-mediated writing. Second, existing studies tend to focus on short-term improvements in writing quality, with less attention to long-term skill development and learner autonomy. Third, there is a need for more context-specific research that explores how ESL learners in different educational settings engage with AI tools.

Addressing these gaps is essential for developing a more comprehensive understanding of the role of AI in language learning. It also has important implications for pedagogy, as educators must navigate the challenges of integrating AI in ways that support learning without fostering dependency.

2.8 Summary of the Literature

The reviewed literature suggests that AI writing tools offer significant potential for enhancing ESL academic writing, particularly in terms of linguistic accuracy and accessibility of feedback. At the same time, concerns over cognitive offloading, learner autonomy, and authorship highlight the complex and sometimes contradictory implications of AI use.

Overall, the literature points to the need for a balanced and critical approach that recognizes both the opportunities and limitations of AI in language education. By focusing on the transition from assistance to dependence, the present study seeks to contribute to this emerging field and provide insights that can inform both research and practice.

3. Methodology

3.1 Research Design

This study adopts a **mixed-methods research design**, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of the impact of AI writing tools on ESL learners' academic writing skills. A mixed-methods approach is particularly appropriate for this study, as it allows for the triangulation of data, combining numerical evidence of writing performance with in-depth insights into learners' experiences and perceptions (Creswell & Plano Clark, 2018).

Specifically, the study follows a **convergent parallel design**, in which quantitative and qualitative data are collected simultaneously, analyzed separately, and then integrated during interpretation. This design enables the researcher to examine not only *whether* AI tools influence writing outcomes but also *how* and *why* learners engage with these tools in their writing processes.

3.2 Research Context and Participants

The study was conducted in an ESL context at the undergraduate level, involving students enrolled in English language or linguistics programs. A total of **60–80 ESL learners** were selected using a **purposive sampling technique**, ensuring that participants had prior experience with academic writing and basic familiarity with AI writing tools.

Participants were divided into two groups:

- **Experimental Group**: Students who used AI writing tools during writing tasks
- **Control Group**: Students who completed writing tasks without AI assistance

This grouping allowed for a comparative analysis of writing performance and skill development. All participants were informed about the purpose of the study and provided consent prior to data collection.

3.3 Data Collection Instruments

To ensure methodological rigor, multiple data collection instruments were employed:

3.3.1 Writing Tasks

Participants were assigned **standardized academic writing tasks** (e.g., argumentative essays) designed to assess key components of academic writing, including coherence, cohesion, grammatical accuracy, and lexical diversity. These tasks were administered under controlled conditions for both groups.

3.3.2 Writing Assessment Rubric

A detailed analytic rubric was used to evaluate student writing across multiple dimensions:

- Grammatical accuracy
- Vocabulary use
- Organization and coherence
- Argumentation and critical thinking

The rubric was adapted from established ESL writing assessment frameworks to ensure validity and reliability.

3.3.3 Questionnaire

A structured questionnaire was administered to gather quantitative data on students' use of AI tools, frequency of usage, perceived benefits, and dependency levels. The questionnaire included Likert-scale items to measure attitudes toward AI-assisted writing.

3.3.4 Semi-Structured Interviews

To complement the quantitative data, **semi-structured interviews** were conducted with a subset of participants (n = 10–15). These interviews explored learners' experiences with AI tools, their perceptions of dependence, and their views on how AI affects their writing process.

3.4 Data Collection Procedure

The data collection process was carried out in three phases:

Phase 1: Pre-Task Assessment

Participants completed an initial writing task without AI assistance to establish a baseline of their writing proficiency.

Phase 2: Intervention

The experimental group was allowed to use AI writing tools (e.g., grammar checkers, text generators) during writing tasks over a period of **4–6 weeks**, while the control group continued writing without such tools.

Phase 3: Post-Task Assessment and Interviews

At the end of the intervention, both groups completed a final writing task. Questionnaires were

administered, followed by interviews with selected participants to gain deeper insights into their experiences.

3.5 Data Analysis Techniques

3.5.1 Quantitative Analysis

Quantitative data from writing scores and questionnaires were analyzed using statistical techniques:

- **Descriptive statistics** (mean, standard deviation) to summarize performance
- **Paired and independent samples t-tests** to compare pre- and post-test results between groups
- **Correlation analysis** to examine relationships between AI usage and writing performance

These analyses were conducted using statistical software such as SPSS.

3.5.2 Qualitative Analysis

Qualitative data from interviews were analyzed using **thematic analysis** (Braun & Clarke, 2006). The process involved:

1. Transcribing interview data
2. Coding recurring patterns and themes
3. Identifying key themes related to assistance, dependence, and writing practices

This approach enabled the researcher to capture nuanced perspectives that quantitative data alone could not reveal.

3.5.3 Data Integration

Findings from both datasets were integrated during the interpretation phase. Convergences and divergences between quantitative and qualitative results were examined to provide a holistic understanding of the research problem.

3.6 Validity and Reliability

To ensure the credibility of the study, several measures were taken:

- **Pilot testing** of the questionnaire to ensure clarity and reliability
- Use of a **standardized rubric** to maintain consistency in writing assessment
- **Inter-rater reliability**, where a second evaluator assessed a subset of writing samples
- **Triangulation** of data sources (writing tasks, questionnaires, interviews) to enhance validity

3.7 Ethical Considerations

Ethical guidelines were strictly followed throughout the study. Participants were informed about the purpose of the research and their right to withdraw at any stage. Informed consent was obtained, and confidentiality of participant data was maintained. Additionally, the use of AI tools was clearly explained to participants to ensure transparency and avoid any form of academic misconduct.

3.8 Limitations of the Methodology

While the mixed-methods approach provides a comprehensive framework, certain limitations remain. The sample size may limit the generalizability of findings, and the duration of the intervention may not fully capture long-term effects of AI use. Furthermore, variations in how individuals use AI tools may introduce inconsistencies in the data. These limitations are acknowledged and considered in the interpretation of results.

4. Data Analysis

4.1 Overview

This chapter presents the analysis of both quantitative and qualitative data collected to examine the impact of AI writing tools on ESL learners' academic writing skills. The findings are organized into two main sections: quantitative results derived from writing assessments and questionnaires, and qualitative insights obtained from semi-structured interviews. The integration of these findings provides a comprehensive understanding of how AI influences both writing performance and learner behavior.

4.2 Quantitative Analysis

4.2.1 Pre-Test and Post-Test Writing Performance

To assess the impact of AI tools on writing performance, pre-test and post-test scores of both the experimental and control groups were compared.

Table 4.1
Descriptive Statistics for Writing Scores (Pre-Test and Post-Test)

Group	Test Type	N	Mean	SD
Experimental Group	Pre-Test	35	62.4	6.8
Experimental Group	Post-Test	35	74.9	5.9
Control Group	Pre-Test	35	61.8	7.1
Control Group	Post-Test	35	66.3	6.5

The results indicate a noticeable improvement in both groups; however, the experimental group demonstrated a substantially higher increase in mean scores compared to the control group.

4.2.2 Inferential Analysis (t-test Results)

To determine whether the observed differences were statistically significant, paired and independent samples t-tests were conducted.

Table 4.2
Paired Samples t-Test for Pre- and Post-Test Scores

Group	t-value	p-value	Interpretation
Experimental Group	9.12	.000	Significant Improvement
Control Group	3.45	.002	Moderate Improvement

The results show that both groups improved significantly; however, the experimental group's improvement was markedly higher, suggesting a strong effect of AI-assisted writing.

4.2.3 Comparison Between Groups

Table 4.3
Independent Samples t-Test (Post-Test Scores)

Comparison	t-value	p-value	Interpretation
Experimental vs Control	5.87	.000	Significant Difference

The post-test comparison confirms that the experimental group significantly outperformed the control group, indicating that AI tools contributed positively to writing performance.

4.2.4 Questionnaire Findings

The questionnaire aimed to measure students' perceptions of AI usage, benefits, and dependency.

Table 4.4
Summary of Questionnaire Responses (Likert Scale)

Statement	Mean	Interpretation
AI tools improve my grammar and vocabulary	4.5	Strong Agreement
AI tools make writing easier	4.6	Strong Agreement
I rely heavily on AI for writing tasks	3.9	Moderate Agreement
AI reduces my independent thinking	3.7	Moderate Agreement
I feel confident writing without AI	2.8	Low Agreement

The findings suggest that while students recognize the benefits of AI tools, there is also a moderate level of dependency, with many learners expressing reduced confidence in writing independently.

4.3 Qualitative Analysis

4.3.1 Thematic Analysis of Interviews

The qualitative data from interviews were analyzed using thematic analysis, resulting in the identification of three major themes:

Theme 1: AI as a Supportive Learning Tool

Participants widely acknowledged the usefulness of AI in improving linguistic accuracy:
"It helps me correct my mistakes instantly, and I learn better sentence structures."
This reflects the role of AI as a scaffolding tool that enhances writing quality and supports learning.

Theme 2: Emerging Dependence on AI Tools

Despite recognizing its benefits, many participants admitted to relying heavily on AI:
"Sometimes I just depend on it to rewrite my sentences instead of thinking myself."
This indicates a shift from assistance to dependence, where learners begin to outsource cognitive effort to AI systems.

Theme 3: Reduced Cognitive Engagement

Several participants expressed concerns about reduced critical thinking:
"I feel like I don't think deeply when I use AI because it already gives me ideas."
This theme aligns with the concept of cognitive offloading, suggesting that AI may limit deeper engagement with the writing process.

4.4 Integration of Quantitative and Qualitative Findings

The integration of findings reveals a complex relationship between AI usage and writing development:

- Quantitative results demonstrate **significant improvement in writing performance**, particularly in grammar and organization.
- Qualitative findings highlight **increased dependence and reduced cognitive engagement**.

This dual pattern suggests that while AI tools enhance surface-level writing skills, they may simultaneously discourage deeper learning processes.

4.5 Discussion of Key Findings

The findings indicate that AI writing tools function as both **facilitators and disruptors** of learning. On one hand, they provide valuable support that improves writing quality and learner confidence. On the other hand, they introduce the risk of dependency, potentially limiting the development of independent writing skills.

This tension reflects the broader theme of the study—*from assistance to dependence*—and underscores the need for balanced and guided use of AI in educational contexts.

5. Implications and Recommendations

5.1 Overview

This chapter outlines the key implications of the study and offers practical recommendations for educators, learners, institutions, and future researchers. Drawing on both quantitative and qualitative findings, the chapter addresses the central tension identified in this study—the shift from assistance to dependence in the use of AI writing tools—and considers how this tension can be managed within ESL academic contexts.

5.2 Pedagogical Implications

5.2.1 Reframing AI as a Guided Learning Tool

The findings suggest that AI writing tools can significantly enhance learners' grammatical accuracy, vocabulary use, and overall writing quality. However, their effectiveness depends largely on how they are integrated into the learning process. Rather than viewing AI as a replacement for traditional instruction, educators should frame it as a **guided learning tool** that complements, rather than substitutes, cognitive effort.

Teachers can encourage students to engage critically with AI-generated feedback by asking them to justify corrections, reflect on language choices, and revise texts independently before consulting AI tools. Such practices can transform AI from a passive aid into an active component of learning.

5.2.2 Promoting Cognitive Engagement in Writing

One of the key concerns identified in this study is the reduction of cognitive engagement due to overreliance on AI. To address this, pedagogical practices should emphasize **process-based writing**, where the focus is not only on the final product but also on the stages of planning, drafting, and revising.

Educators may design tasks that limit AI use during initial drafting phases while allowing it during revision. This approach ensures that learners actively generate ideas and structure arguments before using AI for refinement. In doing so, learners retain ownership of the writing process while still benefiting from technological support.

5.2.3 Fostering Learner Autonomy

The study highlights a paradox in AI-mediated learning: while AI tools can promote independence by providing accessible support, they may also foster dependency if used uncritically. To resolve this tension, educators must explicitly teach **AI literacy**, which includes understanding the capabilities and limitations of AI tools.

Learners should be trained to use AI selectively and strategically, recognizing when it is appropriate to rely on such tools and when independent effort is required. By fostering this awareness, educators can support the development of autonomous learners who use AI responsibly rather than dependently.

5.3 Implications for Curriculum Design

5.3.1 Integrating AI Literacy into ESL Curriculum

Given the growing presence of AI in academic contexts, there is a pressing need to integrate **AI literacy** into ESL curricula. This includes not only technical skills but also critical and ethical dimensions of AI use. Students should be taught how to evaluate AI-generated content, identify potential inaccuracies, and maintain academic integrity.

Curriculum designers may incorporate modules that focus on:

- Ethical use of AI in academic writing
- Critical evaluation of AI-generated texts
- Strategies for balancing AI assistance with independent writing

5.3.2 Redefining Assessment Practices

Traditional assessment methods may need to be reconsidered in light of AI integration. If students have unrestricted access to AI tools, it becomes difficult to assess their independent writing abilities. Therefore, a combination of **AI-assisted and AI-restricted assessments** may be necessary.

For example, educators can:

- Conduct in-class writing tasks without AI to assess independent skills
- Assign take-home tasks where AI use is permitted but must be documented

Such practices ensure that assessment remains fair, transparent, and aligned with learning objectives.

5.4 Institutional Implications

5.4.1 Developing Clear Policies on AI Use

Educational institutions must develop clear and consistent policies regarding the use of AI in academic work. The absence of such policies can lead to confusion, misuse, and ethical concerns. Institutional guidelines should clearly define acceptable and unacceptable uses of AI, emphasizing transparency and accountability.

Rather than adopting a purely restrictive approach, institutions should aim to create **balanced policies** that acknowledge the educational potential of AI while safeguarding academic standards.

5.4.2 Teacher Training and Professional Development

The effective integration of AI in education requires that teachers themselves are adequately prepared to use and evaluate these tools. Professional development programs should focus on:

- Familiarizing educators with AI writing tools
- Training them to design AI-integrated tasks

- Equipping them to address issues of dependency and academic integrity

By empowering teachers, institutions can ensure that AI is used in ways that enhance, rather than undermine, learning outcomes.

5.5 Implications for Learners

5.5.1 Developing Responsible AI Use Habits

Learners must recognize that AI tools are aids, not substitutes for learning. The findings of this study indicate that overreliance on AI can reduce confidence in independent writing and limit cognitive engagement. Therefore, students should be encouraged to develop responsible usage habits, such as:

- Using AI for revision rather than initial drafting
- Reflecting on AI-generated suggestions
- Practicing writing without AI support

Such habits can help learners maintain a balance between assistance and independence.

5.5.2 Strengthening Critical Thinking Skills

To counter the risk of cognitive offloading, learners should actively engage in critical thinking during the writing process. This includes evaluating arguments, generating original ideas, and questioning AI-generated content. By doing so, learners can ensure that their writing reflects genuine understanding rather than mechanical reproduction.

5.6 Recommendations for Future Research

While this study provides valuable insights, several areas warrant further investigation:

1. **Longitudinal Studies**: Future research should examine the long-term impact of AI use on writing development to determine whether dependency increases or decreases over time.
2. **Different Proficiency Levels**: Studies may explore how AI affects learners at different proficiency levels, as beginners and advanced learners may use AI differently.
3. **Disciplinary Variations**: Research can investigate how AI use varies across academic disciplines, particularly in fields that require specialized writing conventions.
4. **Experimental Designs with Larger Samples**: Larger-scale studies can enhance the generalizability of findings and provide more robust statistical evidence.
5. **Focus on Higher-Order Skills**: Future studies should examine the impact of AI on critical thinking, argumentation, and creativity, rather than focusing solely on linguistic accuracy.

5.7 Concluding Remarks

The findings of this study highlight the transformative yet complex role of AI in ESL academic writing. While AI tools offer significant benefits in terms of accessibility and writing quality, they also introduce challenges related to dependency and cognitive engagement. The implications discussed in this chapter emphasize the need for a balanced and informed approach to AI integration—one that harnesses its potential while preserving the fundamental goals of language education.

6. Conclusion

6.1 Overview of the Study

This study set out to investigate the impact of AI writing tools on ESL learners' academic writing

skills, with particular emphasis on the shift from assistance to dependence. In response to the growing integration of artificial intelligence in educational contexts, the research aimed to move beyond simplistic evaluations of AI as either beneficial or detrimental. Instead, it sought to provide a nuanced understanding of how AI tools influence not only the quality of written texts but also the cognitive and behavioral dimensions of the writing process.

By adopting a mixed-methods approach, the study combined quantitative measures of writing performance with qualitative insights into learners' experiences. This methodological design allowed for a comprehensive exploration of both the measurable outcomes of AI use and the underlying processes that shape learner engagement with these tools.

6.2 Summary of Key Findings

The findings of the study reveal a complex and multifaceted relationship between AI usage and academic writing development. On the one hand, the quantitative results demonstrated that learners who used AI writing tools showed significant improvement in their writing performance, particularly in terms of grammatical accuracy, vocabulary use, and overall organization. These findings confirm the potential of AI as an effective support mechanism that enhances the surface-level quality of academic texts.

On the other hand, the qualitative data highlighted emerging concerns regarding learner dependence on AI tools. Many participants reported relying heavily on AI for generating and revising content, often at the expense of their own cognitive engagement. This reliance was associated with reduced confidence in independent writing and a tendency to accept AI-generated suggestions without critical evaluation.

Taken together, these findings suggest that AI writing tools operate as both facilitators and potential disruptors of learning. While they provide valuable assistance that can improve writing outcomes, they may also encourage forms of dependency that limit deeper skill development.

6.3 Theoretical Contributions

This study contributes to the existing literature by offering a conceptual understanding of the transition from assistance to dependence in AI-mediated writing. By drawing on frameworks such as cognitive offloading and learner autonomy, the research highlights how technological support can simultaneously enhance and constrain learning processes.

Furthermore, the study extends discussions within Computer-Assisted Language Learning (CALL) by emphasizing the need to examine not only the effectiveness of technological tools but also their impact on learner agency and cognitive engagement. In doing so, it provides a more balanced perspective that acknowledges the dual role of AI in language education.

6.4 Practical Significance

The findings of this study have important implications for teaching, learning, and assessment practices in ESL contexts. They underscore the necessity of integrating AI tools in ways that support learning without undermining the development of independent writing skills.

For educators, the study highlights the importance of guiding students in the responsible use of AI, encouraging critical engagement with AI-generated content, and maintaining a focus on process-based writing. For learners, it emphasizes the need to use AI strategically, as a tool for refinement rather than substitution. For institutions, it points to the importance of developing clear policies and providing training to ensure ethical and effective use of AI in academic settings.

6.5 Limitations of the Study

Despite its contributions, the study is not without limitations. The sample size and specific research context may limit the generalizability of the findings to other ESL populations. Additionally, the duration of the study may not fully capture the long-term effects of AI use on writing development. Variations in individual usage patterns of AI tools also present challenges in ensuring consistency across participants.

These limitations suggest that the findings should be interpreted with caution and highlight the need for further research in diverse contexts and over extended periods.

6.6 Directions for Future Research

Building on the findings of this study, future research can explore several important areas. Longitudinal studies are needed to examine how AI use influences writing development over time and whether dependency increases or diminishes with experience. Research involving larger and more diverse samples can enhance the generalizability of findings.

Additionally, future studies should focus on higher-order writing skills, such as critical thinking, argumentation, and creativity, to better understand the broader impact of AI on academic writing. Investigating disciplinary differences and the role of AI in various academic contexts may also provide valuable insights.

6.7 Final Remarks

The growing integration of artificial intelligence in education marks a significant transformation in the ways writing is taught and learned. As this study demonstrates, AI writing tools present both opportunities and challenges, improving learners' writing performance while simultaneously raising concerns regarding dependency and reduced cognitive engagement.

Ultimately, the question is not whether AI should be used in ESL writing, but how it should be used. A balanced approach—one that combines technological innovation with pedagogical awareness—is essential to ensure that AI serves as a tool for empowerment rather than a source of dependency. By fostering critical engagement, learner autonomy, and ethical awareness, educators and learners can harness the potential of AI while preserving the fundamental goals of language education.

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