Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4, 889-906
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i4.6128

Generative artificial intelligence in academic writing in higher education: A systematic review

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Abstract: The growing integration of generative artificial intelligence tools in higher education has not met with comprehensive guidelines regarding the use of GenAI in academic writing, especially in English language teaching and learning. This review seeks to fill this gap by identifying and synthesizing research that examines the roles, benefits, challenges, and ethical considerations of GenAI published between 2023 and 2024. The PRISMA procedure was used to identify research articles that resulted in 30 studies selected for the review. The findings of the review identified the significant role that generative AI plays in enhancing the cohesion, precision, clarity, and engagement of academic writing, offering improved creativity, fluency, and proficiency. However, it also identified challenges, including the risks of plagiarism, over-reliance on AI tools and their generated text, diminished creativity, ethical misconduct, and limitations in interpreting nuanced information and producing authentic content. Issues such as hallucinations, biases, cultural insensitivity, unequal access to AI technologies, and inadequate AI literacy further complicate the integration of GenAI. Ethical considerations, particularly institutional guidelines and transparent data management, are critical to ensuring the responsible use of AI. Human oversight and institutional support, including structured training and equitable access, are also necessary to address these challenges.

Keywords: *Academic writing, English learning and teaching, GenAI, Higher education.*

1. Introduction

Academic writing is produced from a complex process of pre-writing, drafting, revising, editing, and submitting [1]. It requires advanced cognitive and linguistic abilities, especially at the doctoral level [2, 3]. The emergence of generative artificial intelligence (GenAI) is a topic of discussion for teachers and researchers. GenAI tools such as ChatGPT, Sudowrite, and Chibi are being increasingly used to assist people with written, auditory, and visual products for use in academic settings, providing advantages such as enhanced productivity, language support, and immediate feedback [4-6]. In addition, these tools complement traditional academic writing courses by allowing students to enhance their grammar and style while preserving their core writing skills [7, 8] fostering a shift from rote learning to analytical and creative thinking [9].

However, ethical concerns and issues of plagiarism, academic integrity, accuracy, authenticity, and over-reliance on AI-generated content have been raised in academic writing [6, 10, 11]. It is undeniable that GenAI tools present both opportunities and challenges in ethical and practical dimensions [7, 11, 12]. These ethical issues must be properly addressed to help prevent any form of misconduct or misuse of GenAI tools in academic writing [13, 14]. In spite of the AI policies and guidelines that are formulated by institutions, publishers, and journals (e.g., [15-17]). Specific information on the current use of GenAI tools in academic writing in English language teaching and learning settings in higher education is unclear and insufficient.

Thus, the aim of this review is to identify and synthesize qualitative data on the use of GenAI in

History: Received: 5 February 2025; Revised: 21 March 2025; Accepted: 25 March 2025; Published: 10 April 2025
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academic writing in higher education through systematically reviewing earlier research published between 2023 and 2024. In particular, this study is addressed to the following research questions:

1. What roles can GenAI play in academic writing instruction, including with reference to the roles of human teachers and their students in higher education?
2. What are the pedagogical implications of novel practices in the age of GenAI?
3. What are the benefits and challenges of using GenAI tools in academic writing?
4. What ethical considerations arise regarding the use GenAI in academic writing?

2. Literature Review

In academic writing, GenAI tools have emerged as an important development in the educational landscape. Several previous studies (e.g., [7, 10, 18-26]) have focused on GenAI applications, benefits, challenges, concerns, and recommendations on the use of GenAI in different educational contexts. Setting aside the positive aspects of GenAI in academic writing, one significant idea raised by several scholars and researchers pertains to the accuracy and quality of the content generated.

Sallam, et al. [26] indicate that AI-generated text can disseminate misinformation and undermine the credibility of academic work if it is not carefully proofread and checked. Ethical concerns are also paramount, in particular with respect to plagiarism, with Misra and Chandwar [27] emphasizing the risk that students could misuse AI-generated content, which could lead to academic dishonesty and disciplinary action. For example, a cross- sectional descriptive study conducted by Gasaymeh, et al. [28] showed that university students had moderate familiarity with generative AI writing tools, indicating engagement but little technical knowledge. Their moderate concerns regarding these tools were based on ethical issues such as misinformation and data security.

AI-generated tools can perpetuate bias in their algorithms, marginalizing certain perspectives and compromising fairness and inclusivity in academic discourse [29]. In addition, over-reliance on AI tools can impede the development of critical thinking and analytical skills through reducing students' engagement with the learning process, limiting their ability to generate original ideas and effectively solve problems [30]. In particular, AI-powered writing tools, including machine translators (MTs), digital writing assistants (DWAs), and automated paraphrasing tools (APTs), alongside large language models such as ChatGPT have important implications for academic integrity in the digital learning landscape [31]. MTs such as Google Translate, DWAs such as Grammarly, and APTs enhance foreign language learning but pose the risk of plagiarism and misrepresentation of skills.

Prior studies of GenAI tools in academic writing (e.g., [5, 32-35]) have expressed concerns regarding reliability, quality, accuracy, authorship, academic misconduct, and ethical implications. For instance, Ozfidan, et al. [34] examined undergraduate students' perceptions of AI tools in academic writing using a survey and exploratory factor analysis to identify two key factors: 1) instructional support of AI tools and 2) the instructional practices of AI tools. The findings of the study highlighted the benefits of AI tools, including idea generation, outline preparation, grammar- and spell-checking, and time-saving.

However, the reliability, contextual accuracy, and ethical implications of the use of AI tools in academic writing are issues of concern. Regarding the ethical and practical issues that have been mentioned, clear and transparent policies remain essential [36-38]. The lack of robust evidence on GenAI in academic writing highlights the need for the study of its role and impact on writing quality, academic integrity, student engagement, and teachers' and students' perceptions to develop best practices and guidelines [39, 40].

3. Methods

This study used a systematic review method. This involved the synthesis of data in meta-analysis, assessing the reliability of research evidence Brignardello-Petersen and Guyatt [41] of the context of GenAI in academic writing in higher education. This review focused on studies published between 2023 and 2024. Literature searches were conducted in 2024 with the use of the following databases: ERIC,

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ISSN: 2576-8484
Vol. 9, No. 4: 889-906, 2025
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Scopus, Google Scholar, SAGE Online Journal, Springer, ResearchGate, and Sciendo. The searches were restricted to relevant earlier research in peer-reviewed and English language journal articles that are published between 2023 and 2024. In the literature search process, metadata were obtained using the following keywords: AI in academic writing, GenAI writing tools in higher education, the use of AI in academic writing, and AI-assisted writing tools.

3.1. Inclusion and Exclusion Criteria

The reviewed studies adhered to the following inclusion and exclusion criteria:

1. Participants: the studies were focused on student teachers, students, and faculty members who utilized GenAI for their academic writing in higher education. Studies that involved participants outside of this scope were excluded.
2. Research setting: the studies examined the use of GenAI in academic writing in the context of universities and higher education institutions. The specific settings included academic writing courses, classrooms, or workshops in higher education. Studies that were conducted outside of the higher education sector were excluded.
3. Methods: the studies used quantitative, qualitative, and mixed-methods approaches to ensure the reliability and validity of the data collection, analysis, and results with respect to the objects of this study.
4. Publication standards: only studies published in peer-reviewed academic journals were examined, to ensure their quality, reliability, and validity. Other forms of literature, such as conference proceedings, review articles, dissertations, and non-peer-reviewed sources, were excluded.
5. Language of publication: the studies were written in English to ensure their accessibility and analytical consistency.
6. Publication period: studies published between 2023 and 2024 were selected to emphasize novelty and advancements. This ensured that the research would address current issues, challenges, and opportunities in academic writing in the adoption of GenAI.

3.2. Screening Process

The screening of this review followed the PRISMA flowchart Moher, et al. [42] as illustrated in Figure 1. The PRISMA method is composed of the stages of identification, screening, eligibility, and inclusion.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
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DOI: 10.55214/25768484.v9i4.6128

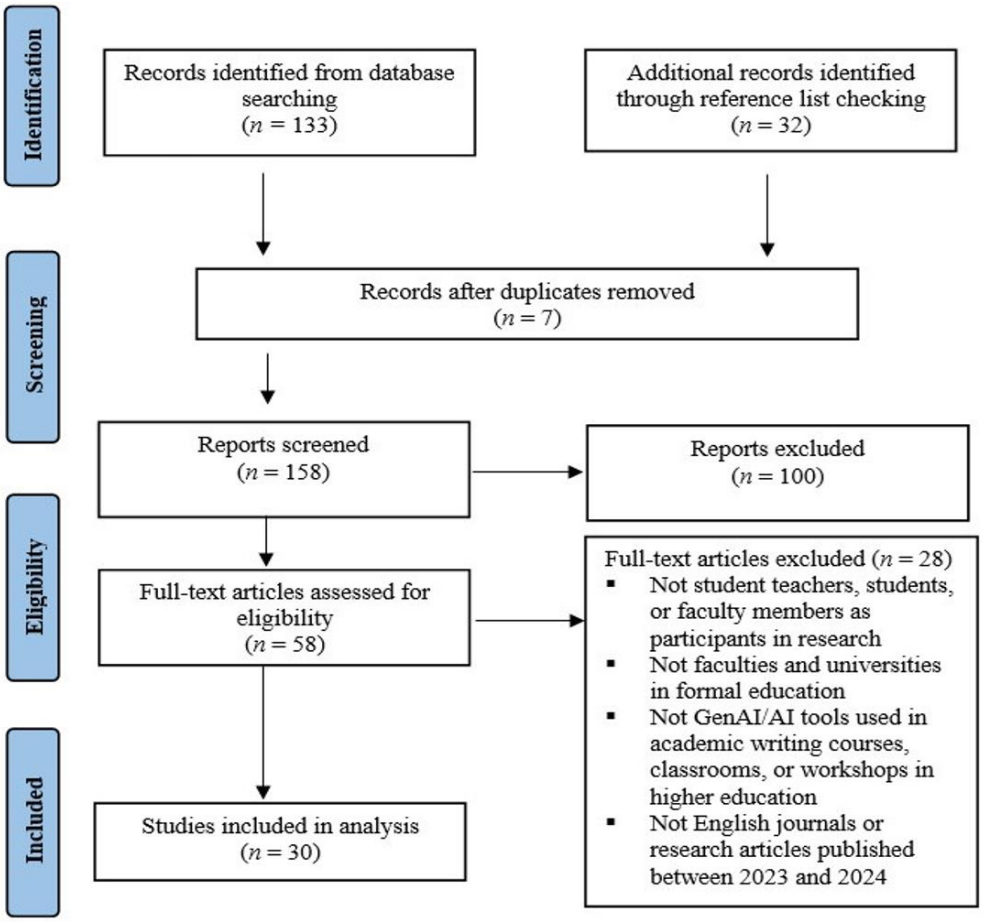

Figure 1.
PRISMA flowchart.

The initial search was conducted using the keywords in the *search process* section, yielding 133 studies. Additional search strategies, such as reference list checking and citation searching, were employed to ensure the identification of high-quality studies during the electronic search. With this aim, the reference lists of all the retrieved studies were examined, resulting in the addition of 32 studies to the initial 133 identified through electronic databases. After seven duplicates were removed, 158 studies were obtained, which underwent a two-step screening process. First, the titles and abstracts of all the identified studies were assessed for quality, using the framework described by Jesson, et al. [43] and 58 studies were selected. Then, these studies proceeded to a second screening for a full-text eligibility assessment based on the predetermined inclusion criteria. From this, 30 studies were included in this review, and 28 studies were excluded, in accordance with the exclusion criteria.

3.3. Data Analysis

A thematic analysis following Braun and Clarke [44] was employed to identify key themes. The selected studies were grouped into clusters based on the research scope and focus. The analysis began with in-depth reading and rereading of the full-length texts of the selected studies to reach a more thoroughgoing understanding of the contents. Notes were taken during the familiarization stage to document the initial observations. Next, the keywords, phrases, and sentences that aligned with the research questions were systematically coded. These codes were organized into related categories, used to construct the initial themes. Following this, the themes went through a detailed examination to

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 889-906, 2025
DOI: 10.55214/25768484.v9i4.6128

ensure that they were coherent, distinct, and adequately represented the data. Themes that did not meet these criteria were refined, integrated, or discarded. Once the themes were finalized, each was defined and named. Finally, all of the codes and the extracts that characterized the themes that had been identified were tabulated. The resulting data were gathered for analysis, and findings that were derived from the analysis were refined and consolidated.

4. Results

4.1. Characteristics of the Reviewed Studies

All of the reviewed studies (n = 30) adopted one of three types of research design: qualitative, quantitative, and mixed methods. The majority of the studies (n = 16) used a qualitative design, including case studies, surveys, interviews, observations, and documentary analyses. Five quantitative studies involved sample sizes ranging from 8 to 92. In addition, nine studies adopted a mixed-methods approach, with sample sizes ranging from 40 to 505. Seven studies were conducted in Indonesia and five in China. The next largest study groups were conducted in the United States (n = 2) and the Philippines (n = 2). The remaining studies took place in the United Kingdom, Finland, Vietnam, Germany, Saudi Arabia, Ethiopia, Turkey, Canada, Oman, Sweden, Australia, Thailand, and Poland. Almost all (n = 26) involved only students as participants. The remaining ones (n = 4) involved faculty members (including students), teachers, and student teachers. Table 1 provides an overview of the reviewed studies.

4.2. Roles of Generative Artificial Intelligence in Academic Writing

The roles that GenAI can play in academic writing instruction at the tertiary level are multifaceted, and they offer the potential for significant advancements for the experiences of both the teacher and the student. GenAI tools can enhance creativity, increase fluency, and stimulate narrative originality through the application of human creativity, emphasizing the importance that balanced integration has for educational settings [45-48]. These tools streamline teaching processes, providing personalized and adaptive feedback, improving writing proficiency, and fostering student engagement and confidence [49-51]. GenAI tools, including multi-tasking assistants, virtual tutors, and digital peers, provide support for the entire writing process from ideation to refinement, while also promoting critical thinking and enabling self-regulated learning [52-55].

Among the GenAI tools, automated writing evaluation (AWE) systems merge AI feedback with human teacher guidance to strengthen students' writing skills, increasing their motivation, and improve their academic performance, in EFL contexts in particular [52, 55-58]. Recent research that was conducted by Nguyen, et al. [59] indicated that AI played a critical role in shaping writing processes, although it highlighted the need for adaptable AI tools and self- regulated learning skills to foster effective human-AI collaboration in academic writing. It is clear that GenAI tools are used in writing tasks, such as in grammar checks, plagiarism detection, and content improvements [24, 54, 60].

In addition, these tools improve linguistic accuracy, confidence, and motivation in supportive learning environments [24]. However, there is still a need for careful integration to prevent over-reliance on AI tools and to ensure the preservation of creativity, authenticity, and critical thinking [24, 61]. Several recent studies (e.g., [50, 54, 60, 62, 63]) have raised concerns such as these regarding the over-reliance on AI tools, the potential for academic misconduct, the tools' occasional ineffectiveness, the potential resulting diminished human interaction, increasing overdependence on technology, and possible adverse effects on creativity, critical thinking, and ethical writing practices.

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Table 1.
Overview of the reviewed studies.

No	Author(s) and Publication Date	Number of Participants	Research Design	Themes	Key Findings
1	de Vicente-Yagüe-Jara, et al. [46]	20 AI systems and 193 university students	Descriptive and comparative non-experimental quantitative research, and quasi-experimental pretest-posttest study	Creative potential of AI in education AI and human creativity AI assistance on student performance Role of AI in language teaching	AI applications, such as ChatGPT, enhanced student creativity in areas such as fluency, flexibility, and narrative originality. They serve as a complement to human creativity, highlighting the importance of a balanced approach to its use in education.
2	Dong [52]	60 students	Pre-test and posttest design, surveys, and interviews	AI-powered pedagogy in education Impact on writing skills Teaching process and assessment Challenges and bias in AI systems Adaptation to AI feedback	The AI-powered writing tool used in the study demonstrated a positive impact on students' writing proficiency, resulting in notable improvements. Furthermore, the tool enhanced the teaching process through delivering timely and individualized feedback, fostering student engagement, and streamlining grading efficiency.
3	Rabbianty, et al. [54]	68 faculty members	Online survey, closed-ended questions, and open-ended questions	AI integration in academic writing Impact on teaching and learning Authorship and authenticity concerns Ethical considerations	The study identified widespread adoption of AI tools among faculty members for various purposes, such as grammar checks, reference management, writing assistance, and plagiarism detection. It also highlighted the efficiency, productivity, and accuracy benefits offered by AI integration in academic writing.
4	Malik, et al. [24]	245 undergraduate students	Case study	Perceptions of AI usage in academic essay writing Reception of the AI-powered writing tools Ethical writing practices Concerns about the potential impacts on creativity	Students showed a positive reception of the AI-powered writing tools, recognizing their benefits in areas such as grammar checks, plagiarism detection, language translation, and essay outlines. The tools were found to improve students' writing skills, boost their self-confidence, and enhance their understanding of academic integrity. However, some students voiced concerns regarding the potential effects of the tools on creativity, critical thinking, and ethical writing practices.

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ISSN: 2576-8484
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5	Song and Song [57]	50 Chinese English as a Foreign Language (EFL) students	Mixed-methods approach	AI-assisted language learning Impact on writing skills Perceptions of AI in education Practical implications for educators and researchers	The study showed improvements in writing skills and motivation among EFL students who received AI-assisted instruction through ChatGPT compared with the control group. The experimental group showed proficiency in writing organization, coherence, grammar, and vocabulary, demonstrating the effectiveness of AI in supporting language learning outcomes.
6	Tran [55]	5 teachers and 60 students	Tests, questionnaires, and interviews	Application of AI in education Improvement in the writing skills Coherence and cohesion in writing	Teachers and students involved in the study showed positive attitudes toward AI tools. The application of AI-powered writing tools significantly benefited the participants in terms of cohesion and coherence, lexical resources, grammatical range, and accuracy in English academic writing skills.
7	Suwadi [64]	29 students	In-depth interviews	Integration of AI in writing education Student experiences and perceptions Benefits of AI tools Challenges and concerns	Students found the AI tools helpful for identifying and correcting grammar and spelling errors and building stronger arguments. However, some felt that they could be replaced by the technology, expressing the concern that the lack of human interaction might hinder their learning process.
8	Geçkin, et al. [62]	43 first-year college students	Correlational research design	Assessment of second-language writing proficiency Role of AI in writing assessment Potential of AI in educational assessment	The study found a small to moderate correlation between two human raters' scores (averages: 86.51 and 73.49) in evaluating L2 writing. ChatGPT-3.5 showed slight agreement with one rater (κ=.124), indicating potential support for human assessments.
9	Zhao, et al. [65]	257 participants	Survey	Digitization of writing in higher education Automatic written corrective feedback Complementary use of writing tools Pedagogical implications	Wordtune users benefited from improved rephrasing and grammar (low-order) and overcoming mental blocks and learning opportunities (high-order). Users reported minimal drawbacks, and the study offered pedagogical suggestions for integrating AI writing tools into higher education.
10	Aladini [49]	32 senior students majoring in English teaching	Quasi experimental approach Survey	Impact of AI on academic writing Use of AI tools in education Awareness and utilization of AI in academic writing	AI applications such as Grammarly, Jasper, Quillbot, Sudowrite, and Chibi were found to be effective in improving the academic writing skills of senior students majoring in English language teaching at Dhofar University.

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11	Junio and Bandala [63]	255 Undergraduate students		Benefits of AI in academic writing Impact on learning outcomes Concerns and challenges	Students showed strong awareness of and positive Attitudes toward AI-powered tools for academic writing, valuing their efficiency and support in idea generation. However, they also voiced concerns with respect to potential drawbacks, such as reduced critical thinking, plagiarism risks, and overdependence on technology.
12	Hostetter, et al. [50]	83 students and 82 faculty members	Survey	Detection of AI-generated writing Perceptions of AI in education Impact on pedagogical practices Ethical considerations	Both faculty and students were unable to detect AI-generated writing at the above chance levels based on the study's findings. The faculty expressed a high level of concern about the potential impact of AI on their teaching practices, with prior experience with ChatGPT-3 and analyzing response structures improving the detection ability of faculty members.
13	Utami and Winarni [66]	58 students	Case study approach	Role of the AI-based learning tools Recognition of the AI tools Integration of AI into educational practices	AI-based learning tools supported students in academic research, especially in planning topics and drafting paper outlines. The tools were appreciated for their flexibility and accessibility although they did not meet all the writing process requirements. In addition, students expressed enthusiasm for the use of AI in academic writing classes, as it made learning more engaging and enjoyable.
14	Hong, et al. [67]	20 Chinese students	In-depth interviews	Generative AI in academic writing Student perspectives and experiences Roles of AI in writing Benefits of GenAI-assisted writing Challenges in AI-assisted writing Implications for educational AI	Students expected generative AI to play multiple roles in their academic writing, including acting as a multi-tasking writing assistant, a virtual tutor, and a digital peer. Students noted that GenAI-assisted writing improved the writing process, their performance, and their affective domain, but they also highlighted challenges involving AI, personal factors, and task complexity.
15	Nguyen, et al. [59]	21 doctoral and master's students	Online observational study using a process-oriented learning analytics approach	AI in academic writing Self-regulated learning strategies Educational technology and pedagogical interventions Role of AI in education	The study identified two distinct behavioral clusters in graduate students' use of AI-assisted writing tools. Cluster 1 engaged in a more iterative process, focusing on reviewing, adopting, and revising AI-generated content with longer interactions. Cluster 2 followed a more streamlined and efficient approach that emphasized word count monitoring and instruction review. These patterns highlighted differences in engagement styles, with Cluster 1 favoring thorough iteration and Cluster 2 prioritizing efficiency.

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16	He [56]	86 intermediate English as a foreign language (EFL) students	Automated writing evaluation (AWE) approach	Role of AI in education Impact of the automated writing evaluation (AWE) Implications for EFL education	The experimental group, which received teacher instruction, feedback, and automated writing evaluation (AWE), showed significantly greater Motivation, Enjoyment, Academic Buoyancy, and writing success than the control group with only teacher instruction. A one-way multivariate analysis of variance confirmed that integrating AWE significantly improved the writing skills and overall academic performance of EFL learners.
17	Helm and Hesse [53]	505 student teachers	Survey and regression model	Generative AI in academic writing Usage of the AI tools Beliefs about AI in education Factors influencing AI usage	ChatGPT was the most frequently used AI application among student teachers for writing. Although knowledge of AI does not directly correlate with regular usage, most participants believed that AI tools were crucial for writing in educational settings.
18	Selim [68]	50 first-year female students	Mixed-methods approach	Perceptions of the AI writing tools The transformative impact of AI-powered writing tools Integration of AI writing tools into EFL education	EFL university students used AI writing tools in their coursework despite varying levels of support from instructors. In addition, students favored tools like Grammarly and ChatGPT due to their adaptability and cost-free nature, highlighting the positive impact of AI tools on writing quality, time efficiency, and academic integrity.
19	Hutson, et al. [8]	28 students	Mixed-method study	Integration of AI tools into writing processes Impact of the AI writing tools Perceptions and adaptation Ethical and instructional considerations Pedagogical innovation and challenges	Students expressed anxiety and mistrust toward the AI writing tools but gradually incorporated them into their writing routines, reflecting a transition from skepticism to practical use. Analysis of their writing artifacts revealed distinct patterns in AI tool utilization, with some students effectively leveraging these tools to refine arguments and develop ideas at the paragraph level.
20	Wale [58]	92 students	Quasi-experimental pretest-posttest two- group design	Impact of automated writing evaluation (AWE) on academic writing instruction Perceptions of AI in education Recommendations for educational stakeholders	Automated writing evaluation (AWE) programs significantly enhanced academic writing instruction, enabling students to produce higher-quality essays with improved task achievement, coherence, lexical resource, and grammatical accuracy compared to traditional feedback methods.

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21	Gustilo, et al. [69]	100 graduate students	Cross-sectional survey research design	Interface between algorithmically driven writing tools (ADWTs) and academic integrity Educators' perspectives on ADWTs Potential benefits of AI in education Ethical considerations and stakeholder collaboration	Teachers valued the ways in which algorithmically driven writing tools (ADWTs) supported their educational objectives, demonstrating a strong perception of their usefulness. However, educators faced challenges including limited access to ADWTs, insufficient knowledge of their use, and concerns regarding their impact on academic integrity and creativity.
22	Bakri, et al. [45]	40 students	Case study, questionnaire, and semi-structured interviews	Perception of AI tools in education Enhancement of writing skills Integration of technology into higher education Student engagement with digital tools	AI tools enhanced writing skills in business management students by aiding in idea generation and fostering creativity and critical thinking in their writing processes. This study indicated that integrating AI into higher education improved the quality of academic writing and aligned educational practices with advancements in the digital era.
23	Rahayu, et al. [61]	9 participants aged between 20 and 50 years	Qualitative case study design	Role of AI in writing instruction Efficiency and quality improvement Balanced approach to AI use Potential drawbacks and risks	AI-based writing tools improved writing competence while meeting psychological needs such as autonomy, relatedness, and integrity. The tools offered immediate feedback that enhanced their skills and promoted a sense of efficacy and empowerment. However, potential downsides were also noted, including diminished creativity, uniform writing styles, and a perceived loss of control.
24	Utami and Karnedi [70]	8 English literature students	Pre-experimental one-group pretest-posttest design	Impact of AI on writing quality Educational tool effectiveness Implications for educational practices	The study showed significant improvements in students' writing quality after having used Canva Magic AI ($p = 0.012$), with better organization, idea development, and grammar. Students provided positive feedback, with mean ratings above 4.0. Students acknowledged its effectiveness in enhancing writing and content creation, although some students noted occasional errors requiring refinement.

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25	Kumar and Mindzak [60]	135 participants	Survey	Impact of AI on education Authenticity and assessment concerns Human and AI text distinction Technological influence on education	Participants showed moderate accuracy (63%) in identifying human-generated texts, but they struggled to recognize AI-generated content, with an accuracy rate of 24%. This underscored the difficulty of distinguishing AI-produced texts from human writing.
26	Stöhr, et al. [51]	5,894 students	Survey	Widespread ChatGPT usage Demographic differences Educational implications	ChatGPT was the most familiar and frequently used AI chatbot among the students, with 95% recognizing it and 35.4% using it regularly, where other chatbots saw limited usage. While 55.9% of students had a positive view of the use of chatbots in education, a similar proportion (54.2%) expressed concerns about their future impact on learning.
27	Smerdon [48]	187 students	Survey	Adoption and usage of the AI tools Impact on academic performance AI academic integrity	The AI-based tools did not increase or decrease academic performance. They were used to support rather than replace student efforts, indicating potential integration into education without compromising academic integrity.
28	Thangthong, et al. [71]	10 Thai undergraduate students	Qualitative research design	Benefits of AI writing assistance tools Challenges of AI writing assistance tools Implications for pedagogy and research	AI writing tools improved linguistic accuracy, motivation, and confidence and saved time, but concerns were raised about over-reliance on the product of AI tools, academic misconduct, and occasional ineffectiveness. The study emphasized the implications of AI tools for pedagogy and research.
29	Krajka and Olszak [23]	30 students	Survey	AI tools in academic writing Pedagogical implications Challenges in AI content detection AI-generated and human Writing	Students identified AI-generated essays using unnatural patterns and repetitive structures. AI training improved sentence complexity but reduced diversity and creativity. The study emphasized integrating AI to balance its benefits and limitations in writing education.
30	Gozali, et al. [72]	18 students	Qualitative case study	AWE tools in academic writing Roles of ChatGPT in writing Benefits of GenAI-assisted writing Challenges in GenAI-assisted writing Implications for educational and instructional design	AWE tools supported almost all aspects of feedback literacy. ChatGPT was highlighted for its capacity to either augment or hinder feedback processing, depending on students' engagement strategies. An AWE Tools Integration Framework was proposed to enhance digital literacy, address technological access inequalities, and promote the ethical use of AI in education.

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4.3. Pedagogical Implications and Practices

Several recent studies (e.g., [24, 50, 56, 57, 70-72]) have examined the pedagogical implications and practices of academic writing at the tertiary level. Most of these studies have highlighted the importance of the transformative potential of GenAI tools, in particular AWE tools such as ChatGPT, Grammarly, and Quillbot, for the enhancement of writing instruction and the provision of feedback literacy across diverse educational contexts. For example, a study conducted by Gozali, et al. [72] identified the ability of these tools to improve writing proficiency in terms of functionalities such as grammar correction and paraphrasing. An *AWE Tools Integration Framework* was introduced into the study to foster self-regulated learning, creativity, and authenticity in balanced AI- human interaction.

Likewise, He [56] and Zhao, et al. [65] underscored the importance of integrating AWE and automatic written corrective feedback tools into EFL instruction, and they noted their positive impact on learners' writing skills, motivation, and academic buoyancy. That study incorporated the use of AI-based feedback tasks to foster engagement with the promotion of metacognitive strategies, ethical practices, and equitable access. In spite of the benefits of these tools, Hostetter, et al. [50] and Malik, et al. [24] expressed concern in their research on this, cautioning novice writers and AI users against potential threats to academic integrity, creativity, and critical thinking, indicating the need for institutional guidelines to optimize AI's benefits.

Further research conducted by Song and Song [57] suggested that AI tools could enhance various aspects of writing, including organization and coherence. Furthermore, these tools were also shown capable of promoting motivation and self-regulated learning. However, that study stressed the importance of immediate feedback, ethical practices, and the ongoing development of AI tools to enable sustainable outcomes. This is in line with two studies, conducted by Thangthong, et al. [71] and Utami and Karnedi [70] that identified benefits such as improved grammatical accuracy and confidence while also noting challenges like over-reliance on AI tools and the risks of academic misconduct.

Thus, these studies share a similar notion of advocacy for structured guidance in using AI, ethical considerations, and the addressing of gaps in digital literacy to maximize pedagogical potential. A balanced, ethical, and strategic integration of AI tools for the enhancement of learning outcomes and for fostering soft skills (e.g., creativity, critical thinking, independent writing, etc.) is required.

4.4. Benefits and Challenges of AI Tools in Academic Writing

Several prior studies (e.g., [24, 54, 63, 64, 67, 69, 71]) have focused on the benefits and challenges that are attendant on the use of AI tools in academic writing, as described below. With respect to the use of AI tools in academic writing, similarities and differences of emphasis are noted in the reviewed studies. Most agreed that AI significantly enhances the efficiency of the production of academic writing through supporting the key stages of the writing process. It supports the ideation, planning, drafting, and revision of a text by providing structural feedback, content suggestions, and immediate error corrections [24, 54, 67, 69]. AI-assisted tools such as ChatGPT and Grammarly can streamline workflow with the application of grammar checks, proofreading, and citation management [63, 64, 71]. Generative AI tools have consistently demonstrated an ability to elevate the quality of academic writing. These tools enhance clarity, coherence, and vocabulary while also ensuring grammatical precision. The features of personalized feedback and adherence to academic standards, including citation management, contribute to the production of high-quality, polished outputs [24, 63, 69, 71].

In addition to the technical improvements, AI tools can provide significant emotional and affective benefits. Such tools help make the writing process more engaging and less intimidating, helping foster a sense of companionship to aid users in overcoming their fear of making mistakes, transforming writing into a more enjoyable task [24, 54, 67]. Further, AI tools excel in their inclusivity and accessibility. They can break language barriers and provide educational support, making them invaluable for diverse learners, non-native English speakers in particular. Through their ability to cater to the unique needs of individual users, AI democratizes access to high-quality writing support, promoting equitable learning opportunities [63, 64, 69, 71]. In relation to the different emphases on AI benefits in academic

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ISSN: 2576-8484
Vol. 9, No. 4: 889-906, 2025
DOI: 10.55214/25768484.v9i4.6128

writing, some studies (e.g., [63, 71]) emphasize the critical role it plays in supporting second-language learners, providing them linguistic and structural assistance, enhancing both writing their proficiency and accessibility of materials to them. In addition, the use of AI tools is essential for the promotion of academic integrity in terms of features like plagiarism detection and citation management. These tools ensure adherence to ethical standards, streamlining the research and writing process; this area of focus is less explored in other studies [24, 63]. Furthermore, Suwadi [64] highlights the potential of AI to democratize learning through tailoring feedback to individuals' needs. This personalized approach enhances inclusivity and supports the development of critical writing skills, enabling learners to track and improve their progress effectively. Thangthong, et al. [71] focused on the practical utility of AI tools, such as their ease of use and time efficiency. Suwadi [64] and Gustilo, et al. [69] share the same notion of AI's value in reducing educators' workloads..

Despite the benefits of generative AI for academic writing, several studies (e.g., [24, 54, 63, 64, 67, 69, 71]) have highlighted critical challenges and limitations that demand attention. First are the technical and functional challenges faced in the use of AI tools. One critical issue is that AI struggles with contextual understanding and higher-order thinking, due to its limited ability to grasp nuance, generate innovative ideas, and maintain authenticity in its effectiveness in producing complex and meaningful content [24, 54, 67]. Further, hallucinations, or the generation of plausible-sounding but inaccurate information, coupled with biases and misrepresentations, undermine the reliability of AI outputs [63, 67]. These deficiencies in terms of cultural sensitivity and tone adjustment complicate its use, in particular wide-ranging, diverse educational contexts.

Second, ethical issues, in particular plagiarism and academic integrity, have been emphasized in several studies (e.g., [63, 69, 71]). The potential misuse of AI-generated content and the risk of inadvertent plagiarism that has been flagged by detection systems such as Turnitin underscore the need for comprehensive institutional guidelines to shape responsible uses. In addition, privacy and data security are also critical; Suwadi [64] highlights the importance of transparent data management practices for the mitigation of risk. Third, the dangers of over-reliance on AI are a common theme. Studies (e.g., [63, 69, 71]) have argued that overdependence on AI tools can erode critical thinking, creativity, and originality, which reduces learner confidence in their independent writing abilities. This dependency hampers skills development and affects users' ability to engage deeply with contents to apply critical judgment.

Fourth, insufficient AI literacy a lack of limited resources are significant obstacles to effective AI integration. Many students and educators lack sufficient training to use AI tools effectively, which constrains meaningful collaboration and application [49, 67, 69]. In addition, unequal access to AI technologies exacerbates educational disparities, leaving some learners at a disadvantage [64, 69]. Institutional support, including the provision of structured training and equitable access, is essential to address these gaps. Finally, human oversight is essential if AI's limitations are to be mitigated. Teachers play a pivotal role in guiding students in the use of AI tools as supplementary aids instead of as replacements for critical thinking and creativity [64, 71]. Structured activities, ethical discussion, and continuous feedback are essential to ensure that AI enhances learning without also compromising academic integrity or intrinsic skills development.

4.5. Ethical Considerations Regarding GenAI in Academic Writing

Despite their advantages and their advancements, there are critical ethical considerations and concerns in the use of GenAI tools, including questions of academic integrity, over-reliance on one tool, privacy, bias, equitable access, and transparency [54]. The misuse of AI tools can produce academic dishonesty, plagiarism, authorship, overdependency, and a decline in critical thinking and creativity [69, 72]. Privacy risks can arise from data handled by AI systems, and biases in AI-generated content can perpetuate inequalities in a way that particularly affects nonnative speakers and underrepresented groups [50]. Unequal access to AI tools exacerbates educational disparities, undermining trust. Therefore, teachers are essential to fostering responsible AI usage by ensuring it enhances rather than

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 889-906, 2025
DOI: 10.55214/25768484.v9i4.6128

substitutes for intellectual effort [64, 71]. This requires the development of institutional guidelines, transparent data management practices, and ongoing discussion of ethical implementation to safeguard the foundational values of education [39].

5. Discussion

GenAI tools have an important role to play in cohesion, precision, clarity, accuracy, and engagement in writing process [24, 71, 73]. These advantages have been met with the findings of the reviewed studies, which indicate the GenAI enhancement of academic writing instruction, impacting its creativity, fluency, proficiency, personalized feedback, and critical thinking throughout the writing process [45, 52, 55, 67]. However, many of the reviewed studies (e.g., [50, 54, 62-64, 69, 71]) highlighted key challenges and concerns regarding the risks of plagiarism, over-reliance on the products of AI tools, ethical misconduct, diminished creativity, technological overdependence, and potential inequities.

As an example, AI tools struggle to interpret nuanced information, create innovative ideas, or produce authentic and meaningful content [24, 54, 67]. This deficiency is all the more evident in tasks requiring complex reasoning or creative problem-solving. In addition, hallucinations pose a significant concern. These inaccuracies, along with the biases and misrepresentations that are embedded within AI-generated content, undermine the reliability of AI outputs [63, 67]. For writing assessment and feedback, the use of AI tools can be essential for students who have received institutional guidelines for its responsible use, with the support of teachers [55-58]. Furthermore, its lack of cultural sensitivity and its inability to appropriately adjust tone make AI less effective in diverse educational contexts, which complicates its integration into academic settings.

The potential for the misuse of AI-generated content is considered an issue (e.g., [63, 69, 71]). For example, students may plagiarize material that is generated by AI, which could then be flagged by detection systems like Turnitin. These concerns underscore the need for comprehensive institutional guidelines that promote responsible AI usage. Suwadi [64] prioritized transparent data management practices to mitigate the risks associated with AI use, ensuring the privacy of user data and preventing unauthorized access. In addition, over-reliance on AI tools is a critical challenge, as this can diminish critical thinking, creativity, and originality [63, 69, 71]. Students who rely on AI too heavily may lose confidence in their own ability to write independently, which can hinder their skills development. This overdependence impacts learners' ability to engage deeply with the content while also reducing their capacity to apply critical judgment effectively.

Among the additional barriers to effective AI integration are the lack of AI literacy and limited access to resources. Several teachers and students lack sufficient training to use AI tools effectively, restricting their ability to collaborate meaningfully using these technologies [24, 49, 67, 69]. Further, unequal access to AI technologies exacerbates educational disparities, leaving some learners at a disadvantage [64, 69]. To address these gaps necessitates institutional support, including structured training and initiatives to ensure equitable access. Human oversight is needed to mitigate the limitations of AI, with teachers in particular playing a vital role, guiding students in the use of AI as a supplementary tool rather than as a replacement for critical thinking and creativity [64, 71]. Structured activities, ethical discussion, and continuous feedback are essential in ensuring that AI enhances learning while preserving academic integrity and intrinsic skills development.

6. Conclusion

It is concluded that GenAI plays a significant role in enhancing the cohesion, precision, clarity, and engagement of academic writing. Its benefits also include fostering creativity, fluency, proficiency, personalized feedback, and critical thinking in the writing process. However, this review identifies several challenges, such as risks of plagiarism, over-reliance on the products of AI tools, diminished creativity, and ethical misconduct. GenAI's limitations for the interpretation of nuanced information and the production of innovative or authentic content remain critical concerns. Hallucinations and embedded biases further undermine the reliability of AI-generated outputs. In addition, issues of cultural

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 889-906, 2025
DOI: 10.55214/25768484.v9i4.6128

insensitivity, tone adjustment, and unequal access to AI technologies exacerbate disparities in its application, while the inadequate level of AI literacy among educators and students restricts its meaningful use. The ethical considerations are paramount, with studies emphasizing the importance of institutional guidelines, responsible use, and transparent data management practices in safeguarding user privacy. Over-reliance on AI tools poses risks to critical thinking, creativity, and originality, such that it can hinder skills development and critical judgment. To address these challenges, human oversight remains essential, and teachers must play a pivotal role in guiding the responsible and supplementary use of AI tools. Institutional support through structured training programs and equitable access to AI resources is crucial for effective integration, ensuring that AI's benefits are maximized, while preserving academic integrity and fostering intrinsic skills development.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgements:

The author would like to thank the lecturers at the Department of Language Sciences and Cultures, Kasetsart University, for their valuable guidance.

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Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 889-906, 2025
DOI: 10.55214/25768484.v9i4.6128