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Akademik Yazma Sürecinde Dijital Araçlar: Yapay Zekâ ve Teknoloji Destekli Araçların Sistematik Analizi

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Özet

Bu çalışma, akademik yazma ve yayın sürecini destekleyen dijital araçların kapsamlı bir analizini sunmakta; yapay zekâ destekli, yapay zekâ tabanlı ve geleneksel teknoloji destekli platformları incelemektedir. Belge analizi yöntemiyle 46 araç belirlenmiş ve on işlevsel grupta değerlendirilmiştir: beyin fırtınası araçları, araştırma asistanları, yazma asistanları, çeviri araçları, dilbilgisi ve stil denetleyicileri, intihal denetleyicileri, atıf araçları, veri görselleştirme araçları, belge biçimlendirme araçları ve iş birliği platformları. Analiz, teknoloji destekli araçların (%37) yapay zekâ tabanlı (%43) ve yapay zekâ destekli araçlarla (%20) birlikte yaygın olarak kullanıldığını; her kategorinin araştırma sürecinde farklı işlevler gördüğünü ortaya koymaktadır. Bu araçlar verimlilik artışı, dilsel doğruluğun iyileştirilmesi, atıf yönetiminin kolaylaştırılması ve iş birlikli çalışmaların desteklenmesi gibi önemli faydalar sunarken; maliyet engelleri (araçların %87'sinde abonelik modeli), anadili İngilizce olmayan araştırmacıları etkileyen algoritmik önyargı, yapay zekâ üretimli içeriğe aşırı bağımlılık kaygıları ve çoğu kurumda net kullanım kılavuzlarının bulunmaması gibi kritik zorluklar da belirlenmiştir. Çalışma, araştırma sürecinin farklı aşamalarında araç seçimine yönelik pratik öneriler sunmakta; araştırmacıların çıktıları eleştirel değerlendirmesi, uygun açıklama yoluyla şeffaflığı koruması ve teknolojik desteği temel akademik yazma becerilerinin geliştirilmesiyle dengelemesi gerektiğini vurgulamaktadır. Bu bulgular, yapay zekâ destekli akademik yazma araçlarının mevcut durumunu anlamaya katkı sağlamakta ve araştırmacılar, kurumlar ve yayıncılar için yol gösterici, kanıt temelli rehberlik sunmaktadır.

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Digital Tools for Academic Writing: A Systematic Analysis of AI and Traditional Digital Support

Abstract

This study provides a comprehensive analysis of digital tools supporting the academic writing and publication process, examining AI-powered, AI-assisted, and traditional digital tools available to researchers. Using document analysis, 46 tools were identified and evaluated in ten functional groups: brainstorming tools, research assistants, writing assistants, translation tools, grammar and style checkers, plagiarism detectors, citation tools, data visualization tools, document formatting tools, and collaboration platforms. Analysis reveals that traditional digital tools (37%) remain prevalent alongside AI-assisted (43%) and AI-powered tools (20%), with each category serving distinct functions in the research process. While these tools offer significant benefits including enhanced productivity, improved linguistic accuracy, streamlined citation management, and support for collaborative work, critical challenges emerged including cost barriers (subscription models dominating 87% of tools), algorithmic bias affecting non-native English speakers, concerns about over-reliance on AI-generated content, and implementation gaps with most institutions lacking clear usage guidelines. The study provides practical recommendations for tool selection across different research stages, emphasizing the need for researchers to critically evaluate outputs, maintain transparency through appropriate disclosure, and balance technological assistance with development of core academic writing skills. These findings contribute to understanding the current state of AI-powered academic writing tools and provide evidence-based guidance for researchers, institutions, and publishers.

Keywords

Academic writing
Artifical intelligence
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INTRODUCTION

Academic writing is common in universities, research institutions and scientific publications and includes topics such as research communication, knowledge creation and dissemination, credibility and authority, clarity and precision, structure and organization, citation and referencing, objectivity, critical thinking, target audience, revision and correction (Arıcı & Arıcı, 2023). The landscape of academic writing support has undergone dramatic transformation since late 2022 with the proliferation of artificial intelligence tools. Generative AI systems—trained using deep learning and neural networks to process, understand, generate, and transform data (Bozkurt, 2023)—now offer assistance across virtually every stage of the publication process. Following ChatGPT's November 2022 release, research examining AI in academic contexts exploded, with ChatGPT becoming prominent in studies aiming to integrate AI into education (Altıntop, 2023; Dergaa et al., 2023; Karakoç-Keskin, 2023). The empirical evidence demonstrates substantial effectiveness: meta-analyses

document large positive effects on writing quality (g = 0.86, $p < .001$) particularly for post-secondary students and English as a Foreign Language learners (Zhai & Ma, 2023), while intervention studies report significant improvements in academic writing skills with effect sizes exceeding $\eta^2 = 0.90$ (Mahapatra., 2024). Yet this same evidence reveals critical concerns: over-reliance degrading critical thinking in 68.9% of students (Zhai & Wibowo, 2024), algorithmic bias causing AI detectors to falsely flag 61% of non-native English speakers' work as AI-generated (Jiang et al., 2024), and ethical challenges prompting major publishers to establish disclosure requirements (COPE Council, 2024). The field now faces a pivotal question: how can researchers navigate this rapidly expanding technological landscape responsibly while maximizing benefits and minimizing risks? This challenge is especially critical for graduate students and early-career researchers who experience difficulties and pressures in writing for publication processes. Traditional challenges such a as reviewing the literature, managing citations, maintaining disciplinary conventions, and adopting ethical standards (Jordan, 1997; Kan & Gedik, 2016; Koşar, 2021) are still significant. Studies consistently document difficulties in writing papers, combining literature, having access to sources in another language, citing the sources properly, avoiding plagiarism, and employing suitable research methods (Coşkun & Coşkun, 2014; Lestari, 2020). For doctoral students around the world, these challenges have increased as publishing in internationally indexed journals has become a prerequisite for graduation (Bayat, 2014; Hyland, 2009). Into this already demanding context, AI tools have introduced both support and new challenges.

While AI-powered tools have gained significant attention, researchers willing to secure publication require comprehensive understanding of the broader ecosystem of digital support. Following the broad categorization trends in the AI-in-education literature (Deep & Chen, 2025), this ecosystem can be divided into three distinct categories. The first one, AI-powered applications, uses large language models and machine learning algorithms for generative and analytical tasks and are capable of creating novel content from prompts. The second one, AI-assisted platforms, integrates natural language processing and machine learning into traditional functions such as grammar checking, translation, and plagiarism detection. The last one, traditional digital tools, provides essential digital infrastructure for academic system with minimal or no AI integration and represent standard components of contemporary publication processes. Understanding this complete technological environment with clear distinctions is essential for three reasons: (1) appropriate expectations about tool capabilities and limitations, (2) informed cost-benefit decisions when choosing tools, and (3) ethical disclosure requirements. Moreover, the lines between AI and traditional digital tools are shifting since most of traditional platforms gradually integrate AI features. For example, Grammarly integrated a generative AI writing assistance and Microsoft integrated Copilot across its Office programs. Although there is a large body of research on AI tools and their educational applications, they tend to focus narrowly on single tools or single functions. They fail to provide researchers a comprehensive outlook of available tools that can be used in writing for publication processes (Bond et al., 2024;). While meta-analyses revealed AI tool effectiveness (Fleckenstein et al., 2023; Zhai & Ma, 2023), comparative analyses on strengths and appropriate use across multiple tools are still limited. Critical evaluations of ethical implications — particularly algorithmic bias (Chinta et al., 2024; Baker & Hawn, 2021), over-reliance effects (Zhai et al., 2024), and institutional implementation gaps (Yan et. Al, 2025) — have emerged, but rarely appear integrated with practical tool guidance. Perhaps most problematically, the disconnect between near-universal publisher policies requiring AI disclosure and institutional

reality (Bond et al., 2024) creates confusion about appropriate AI use boundaries. Novice researchers thus face a landscape where powerful tools proliferate rapidly, effectiveness evidence accumulates, ethical concerns intensify, yet practical guidance synthesizing these dimensions across the complete publication process remains fragmented.

This study addresses these gaps through systematic analysis providing researchers comprehensive, evidence-based guidance for navigating AI-supported academic writing tools. Through document analysis of 46 tools identified and categorized across 10 functional stages of the publication workflow—brainstorming, research assistance, writing, translation, grammar and style checking, plagiarism detection, citation management, data visualization, document formatting, and collaboration—we provide detailed descriptions of capabilities, cost structures, and platform requirements. Critically, we move beyond mere description to integrate empirical evidence on tool effectiveness, comparative analyses identifying appropriate use cases, and substantive examination of ethical considerations including academic integrity boundaries, algorithmic bias concerns, and over-reliance risks. By synthesizing publisher policy requirements from major academic publishers alongside practical tool guidance, we bridge the implementation gap between institutional requirements and researcher practice. The answers to the following questions will be sought in this study:

RQ1: What digital tools are available to support academic writing and publication processes, and how can they be categorized by function and AI integration level?
RQ2: What does empirical evidence reveal about the effectiveness, benefits, and limitations of these tools?

RQ3: What are the ethical implications and practical considerations for responsible use of AI-supported writing tools?

METHOD

In the study, document analysis, a qualitative research method, was used. Document analysis is suitable for systematic examination of digital materials, software documentation, and online platforms (Bowen, 2009). It allows researchers to collect, review, and analyze textual data such as websites, technical documentation, and user guides in order to get a detailed evidence about tools and their capabilities (Merriam, 2009; Ekiz, 2015). Therefore, it was considered appropriate for examining digital tools where systematic comparison across multiple platforms provides the primary data source.

Scope and Definitions

This study examined digital tools that can be used by researchers in writing for publication processes. The tools were divided into three categories: AI-powered applications, AI-assisted platforms, and traditional digital tools. AI-powered tools were defined as applications which are built on large language models or advanced machine learning algorithms and which can generate, transform, or analyze content. AI-assisted tools were considered as those which incorporate natural language processing or machine learning to improve traditional functions such as grammar checking, plagiarism detection, or citation. Traditional digital tools were identified as the tools which provide digital structure for academic publication processes and which use minimal or no AI integration. This inclusive approach recognizes that researchers use a wide variety of tools with a leg on each side of these categories. The categorization by AI integration level allows readers to distinguish

genuine AI capabilities from established digital functions, supporting informed decision-making about tool selection, appropriate expectations, and ethical disclosure requirements (COPE Council, 2024).

Data Collection

Data collection occurred between January–April 2025 through systematic examination of multiple sources. Academic databases were searched using terms including "AI writing tools," "academic writing software," "automated writing evaluation," and "citation management." AI tool directories and comparison websites were examined, filtering for tools marketed toward academic or educational writing. Publisher policy documents from major academic were reviewed to identify tools mentioned in AI use policies or author support resources. Snowball sampling identified additional tools through references in initial sources and comparative reviews. Tools were included if they: (a) provided functionality relevant to one or more stages of the academic writing or publication process, (b) were actively maintained and accessible as of April 2025, (c) had sufficient publicly available documentation for analysis, and (d) represented tools commonly encountered by researchers. Tools were excluded if they were discontinued, unavailable without specialized institutional access, lacked clear documentation of primary functions, or were highly specialized for single disciplines with limited broader applicability. This process yielded 46 tools for inclusion in the final analysis. For each identified tool, researchers systematically examined official websites, feature documentation, user guides, terms of service, pricing information, and available third-party reviews. Data extracted included tool name, primary functions, level of AI integration, supported languages, accessibility, platform support, integration capabilities, and documented limitations. Where possible, researchers accessed free trial versions to verify documented capabilities, though comprehensive evaluation was constrained by subscription requirements for premium features.

Data Analysis

The 46 identified tools underwent systematic categorization based on their primary functions within the academic publication workflow. Drawing on established models of the writing process (Flower & Hayes, 1981) and frameworks for academic publication stages (Hyland, 2009), two expert researchers independently categorized each tool, establishing 10 functional categories: brainstorming tools, research assistants, writing assistants, translation tools, grammar and style checkers, plagiarism checkers, citation tools, data visualization tools, document formatting tools, and collaboration platforms. These categories reflect distinct stages and support needs throughout the publication process rather than technological characteristics. Inter-rater reliability was calculated using Miles and Huberman's (1994) formula: Reliability = Agreement / (Agreement + Disagreement). The two coders independently categorized all 46 tools, then met to compare categorizations and resolve discrepancies through discussion. Initial agreement was achieved for 42 tools, with 4 tools requiring discussion to reach consensus on primary categorization (tools offering multiple functions were categorized by their primary or most distinctive capability). The final reliability coefficient was 0.91, exceeding the commonly accepted threshold of 0.70 for exploratory research (Miles & Huberman, 1994) and indicating substantial agreement between coders. For each functional category, researchers synthesized information across tools to identify common features, typical use cases in academic writing contexts, documented benefits, recognized limitations, and varying levels of AI integration. This synthesis drew on tool documentation,

published research examining specific tools where available, and comparative analysis across similar tools within categories. Researchers noted cost structures, accessibility considerations, and potential ethical implications relevant to responsible use. Tool descriptions were enhanced with empirical research findings where available, including effectiveness studies, comparative analyses, and ethical considerations documented in peer-reviewed literature examining AI-supported academic writing.

Ethics Committee Approval

As this research was conducted using the document analysis method, ethics committee approval was not required.

FINDINGS AND DISCUSSION

The systematic analysis identified 46 digital tools across 10 functional categories spanning the complete academic publication workflow. This section presents findings organized by functional category following the typical sequence researchers encounter from initial conceptualization through final manuscript submission. For each category, we provide: (1) comprehensive tool descriptions with features, costs, and platform requirements; (2) comparative analysis grounded in empirical research evidence; and (3) practical recommendations for appropriate use considering effectiveness, ethical implications, and publisher disclosure requirements. We begin by examining the overall distribution of tools by AI integration level, then proceed through each functional category in workflow order. Figure 1 presents the distribution of tools by AI integration level, revealing that traditional digital tools without AI capabilities (n=17, 37%) remain prevalent alongside AI-assisted (n=20, 43%) and AI-powered tools (n=9, 20%). The distribution reveals notable patterns: traditional digital tools dominate document formatting (5/5 tools) and collaboration (4/4 tools), reflecting these functions' reliance on established digital infrastructure rather than recent AI innovations. AI-assisted tools concentrate in detection and analysis functions—grammar checking (4/5), plagiarism detection (5/5)—where machine learning enhances rule-based algorithms. AI-powered tools appear primarily in generative and synthesis functions—brainstorming (1/5), research assistants (3/5), writing assistants (3/5)—where large language models enable novel content creation. This distribution suggests AI adoption follows functional requirements rather than wholesale technological replacement.

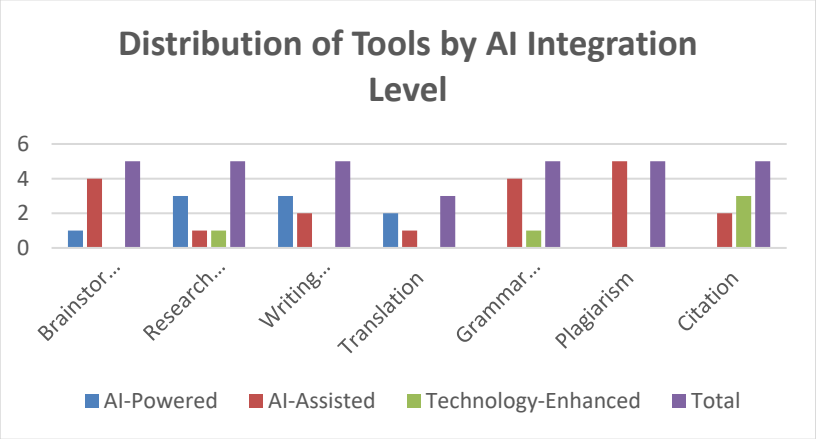

Figure 1. Distribution of Tools by AI Integration Level

Before examining specific tools, understanding publisher disclosure requirements provides essential context. All major academic publishers released comprehensive AI policies in 2023-2024 with striking convergence: AI tools cannot be listed as authors, authors must disclose AI use in manuscripts, and authors remain responsible for accuracy of all content including AI-generated portions (COPE Council, 2024; Elsevier, n.d.; Springer Nature, n.d.). Critically, these policies distinguish assistive tools (grammar checkers, translation, citation management) requiring no disclosure from generative tools (text generation, image creation) requiring explicit acknowledgment. This distinction informs evaluation of each tool category.

Brainstorming Tools

Brainstorming tools assist researchers in generating and organizing ideas during initial conceptualization stages, providing features including mind mapping, idea clustering, and visual organization of concepts.

Table 1. Brainstorming Tools for Academic Writing

Tool	AI Integration	Core Functionality	Templates	Collaboration	Cost Model
HyperWrite	AI-powered	Idea generation from prompts	N/A	Individual use	Freemium
Whimsical	AI-assisted	Flowcharts, wireframes, mind maps	Pre-built templates available	Real-time collaboration	Freemium
Context Minds	AI-assisted	Mind mapping with contextual suggestions	User-created only	Team sharing	Freemium
Ayoa	AI-assisted	Mind mapping, task management	30+ templates	Real-time collaboration	Freemium
Wondershare EdrawMind	AI-assisted	Mind mapping with AI features	700+ cliparts, multiple templates	Simultaneous collaboration	Freemium

The tools divide into two distinct approaches: HyperWrite employs generative AI (GPT-4) to produce ideas based on user-provided topics, functioning as an idea generation assistant, while the remaining four tools focus on visual organization through mind mapping and diagramming. Context Minds differentiates itself by providing AI-powered contextual suggestions recommending related concepts users might explore. Ayoa combines mind mapping with task management, allowing users to convert brainstormed ideas into actionable tasks with assignments and deadlines. EdrawMind emphasizes visual richness with extensive template libraries (700+ cliparts) and collaboration capabilities. Research indicates AI tools facilitate brainstorming through 24/7 accessibility and rapid idea generation (Bozkurt, 2023; Yiğit et al., 2023), with applications spanning academic planning to creative ideation in diverse fields (Gazaz & Gazaz, 2024; Çeken & Şen, 2023). For pure idea generation without organizational structure, HyperWrite provides AI-powered suggestions useful for overcoming conceptual blocks, though free tier limits usage volume requiring premium subscriptions for unlimited access. For researchers preferring visual organization of existing ideas, Whimsical offers simplicity for rapid brainstorming, while Ayoa and EdrawMind provide extensive features requiring training investment but supporting real-time collaboration valuable for team projects. Template availability varies significantly—EdrawMind's hundreds of templates accelerate work, while Context Minds requires building

structures from scratch. These tools require no disclosure under current publisher policies as they support pre-writing conceptualization rather than manuscript generation.

Research Assistants

Research assistant tools help researchers discover, organize, and synthesize scholarly literature, employing technologies ranging from traditional citation management to AI-powered literature analysis.

Table 2. Research Assistant Tools

Tool	AI Integration	Primary Function	Database Coverage	Key Features	Cost Model	Notable Limitations
ZoteroBib	Traditional digital	Citation generation	Web, library catalogs	10,000+ citation styles, no account required	Free	No reference management; citation-only
EndNote	AI-assisted	Reference management	7,000+ citation styles, PDF management	Library organization, in-document citation, cloud sync	Subscription	Commercial tool; occasional performance issues
Elicit	AI-powered	Literature search and summarization	Academic databases	Question-based search, paper summaries	Freemium	Limited database access; lacks full-text for some papers
Consensus	AI-powered	Consensus identification	Scientific literature	Evidence-supported conclusions, identifies agreement/divergence	Freemium	More effective in established fields; doesn't explain reasons
Research Rabbit	AI-powered	Citation network exploration	Academic papers	Visual citation networks, co-author maps	Free	Visual interface may not suit all users

The tools can be grouped into two categories: traditional reference management systems (ZoteroBib, EndNote) and AI-powered discovery platforms (Elicit, Consensus, ResearchRabbit). ZoteroBib operates as a simple web-based citation generator requiring no account, accepting URLs, DOIs, or ISBNs and producing formatted citations in 10,000+ styles without storing citations between sessions—suitable for simple citation generation without ongoing reference management needs. EndNote offers comprehensive reference management including library organization, PDF annotation, cloud synchronization, and word processor integration. Krishnamurthy and Tejas (2024) reveal that each reference manager has unique advantages: Zotero excels in browser integration and open-source flexibility, EndNote offers advanced customization and institutional support, and Mendeley provides strong PDF management. For comprehensive reference management across long-term projects, EndNote or alternatives (Zotero, Mendeley) become necessary despite subscription costs or learning curves. In this sense, Rafi'i et al. (2025) indicated that Zotero users reported effectiveness in supporting academic needs and benefits streamlining the writing process. AI-powered platforms serve different functions. For example, Elicit accepts research questions in natural language, provides AI-generated summaries of findings suitable for exploring unfamiliar fields. However, since it does not have access to all databases, some papers appear without

full-text access. In addition, Consensus identifies agreement and disagreement across scientific literature. Research Rabbit visualizes citation networks and co-author relationships supporting exploratory discovery. However, it may not be appealing for researchers preferring text-based results or requiring quick searches. These tools generally require no disclosure under publisher policies as they support literature review and organization rather than content generation. Nevertheless, researchers should verify AI-generated summaries when they use this function.

Writing Assistants

Writing assistant tools support writing process and content generation. These tools can be used for several reasons such as generating text by using AI-powered platforms and improving the text written by the researchers by using AI-assisted tools.

Table 3. Writing Assistant Tools

Tool	AI Integration	Primary Function	Content Types	Language Support	Cost Model	Key Constraints
Sciwheel	AI-assisted	Reference management with writing support	Academic papers, books	Multiple languages	Freemium	Requires internet; learning curve for full features
Jasper	AI-powered	Content generation	50+ templates for various content	25+ languages	Subscription	Premium required for advanced features; accuracy verification needed
Copymatic	AI-powered	Long-form content generation	Articles, blog posts, marketing	25+ languages	Subscription	Subscription required; fact-checking necessary
Writerly	AI-powered	Team-based content creation	Multiple content types	25+ languages	Subscription	Subscription-based; potential over-reliance on AI
QuillBot	AI-assisted	Paraphrasing, summarizing, grammar	Sentences, paragraphs	Multiple languages	Freemium	Free version limits word count; internet required

Writing assistants employ diverse approaches with substantial effectiveness evidence alongside serious over-reliance concerns. Sciwheel combines reference management with writing support, integrating with Microsoft Word and Google Docs. AI-powered content generation tools produce text based on user prompts and templates and often require subscriptions. However, their outputs demand rigorous fact-checking: a recent study found that ChatGPT-generated manuscripts contained approximately 40 % inaccurate or fabricated references and limited citation relevance (Cheng et al., 2025). QuillBot focuses on paraphrasing and summarizing rather than generating original content, with free tier (125 words per use) providing limited functionality and premium removing restrictions. Latifah et al. (2024) found that QuillBot significantly enhances writing quality and efficiency, though concerns about

overreliance emerged. Meta-analyses document large positive effects on writing quality (g=0.86, p<.001) particularly for post-secondary students and EFL learners (Zhai & Ma, 2023), with intervention studies reporting improvements with effect sizes exceeding η^2=0.90 (Mahapatra et al., 2024). However, Zhai and Wibowo's (2024) systematic review found over-reliance significantly impairs decision-making and critical thinking. Chen and Gong's (2025) study revealed the paradox: while students improved significantly, all interviewed participants reported over-reliance concerns with statements like "without the tool, I would write nothing correctly." Critically, all writing assistants producing substantive text require disclosure under publisher policies (COPE Council, 2024). Taylor & Francis (n.d.) permits "language improvement" but prohibits text generation without rigorous revision; Springer Nature requires disclosure of any large language model use in Methods sections. Researchers must verify AI-generated content accuracy and maintain active engagement rather than passive acceptance to avoid cognitive skill degradation documented in empirical studies.

Translation Tools

Translation tools enable researchers to access international literature and prepare manuscripts for multilingual audiences. These tools use different approaches such as neural machine translation and large language model architectures.

Table 4. Translation Tools for Academic Writing

Tool	AI Integration	Technical Approach	Languages	Cost Model	Key Features	Constraints
DeepL	AI-powered	Neural machine translation	30+	Freemium	Dictionary suggestions, document upload (premium), privacy protection	5,000 character limit (free)
ChatGPT	AI-powered	Large language model	50+	Freemium	Conversational interface, translation explanations, idiomatic expressions	Not specialized for translation
Smartling	AI-assisted	Machine translation + human review	150+	Enterprise	Translation management, real-time editing, quality assurance	Enterprise pricing only

The studies in the literature shows DeepL's lead over other machine translation tools in academic and formal writing contexts. In a recent study, Poláková and Klimová (2023) found that students using DeepL significantly improved their written English proficiency and perceived language accuracy after revising translations generated by the tool. Learners also reported that DeepL enhanced vocabulary range, grammatical accuracy, and overall writing quality in formal tasks. In addition, comparative studies also revealed DeepL's accuracy. For example, Yulianto and Supriatnaningsih 2021 used the SAE J2450 translation quality metric and reported that DeepL achieved a score of 99.04 compared to Google Translate's 84. Furthermore, Sabrina et al. (2025) showed that 58.1 % of users rated DeepL as more accurate, 68.8 % as more natural, and 67.7 % preferred it for future academic use. Together, these findings highlight DeepL as one of the most reliable tools for academic translation and for accessing foreign-language scholarly literature. The free tier (5,000 characters) accommodates

abstracts and article sections; premium becomes necessary for full manuscripts or dissertations. ChatGPT offers complementary capabilities including translation explanations and cultural context but lacks specialized translation architecture and consistency for technical terminology across long documents. Smartling's enterprise focus makes it typically inaccessible to individual researchers without institutional subscriptions. Researchers must verify translation accuracy regardless of tool quality—misrepresenting sources through poor translation constitutes misattribution. While translation tools are generally considered assistive technology not requiring disclosure (Taylor & Francis, n.d.; Springer Nature, n.d.), researchers should consult specific journal guidelines. Cost barriers create access disparities, particularly for researchers in under-resourced institutions where subscription costs may represent substantial portions of research budgets (An et al., 2024).

Grammar and Style Checkers

Grammar and style checkers provide automated feedback on linguistic accuracy and stylistic appropriateness, employing natural language processing and machine learning to identify potential errors and suggest improvements.

Table 5. Grammar and Style Checking Tools

Tool	AI Integration	Scope	Free Tier	Premium Cost	Platform Support	Integration Options
Linguix	AI-assisted	Grammar, spelling, style, paraphrasing	Basic corrections only	$8/month	Web, browser extension, mobile (iOS/Android)	Browser add-on for real-time writing
WhiteSmoke	AI-assisted	Grammar, punctuation, style, translation	Trial only	$5-$11.50/month	Web, desktop, mobile	Desktop application, no free plan
Ginger Software	AI-assisted	Grammar, paraphrasing, translation	Limited corrections	$13.99/month	Web, some browsers	Extension available for Chrome, Safari
Language Tool	AI-assisted	Grammar, style, punctuation	Basic checking	$20/month	Browser, MS Word, LibreOffice	Multiple integration options
Slick Write	Traditional digital	Grammar, structure, readability	Fully free	N/A	Web-based	No integrations; standalone web tool

Perdana et al. (2021) found that university academics viewed Grammarly as useful for identifying and tracking surface-level errors, though they emphasized it should complement rather than replace instructor feedback in academic writing. Conversely, a recent study by Qub'a (2024) highlighted significant limitations: Grammarly frequently over-flags issues, generating numerous false positives and failing to account for rhetorical appropriateness in high-level academic texts. While some intervention studies (e.g., Musyarofah et al., 2025) show that integrating Grammarly into writing courses can enhance students' self-editing and confidence. Grammar checkers work best for surface-level errors (spelling, punctuation, basic grammar) but struggle with higher-order concerns (organization, argumentation, disciplinary conventions). For basic grammar and spelling with no cost, Slick Write provides full functionality requiring only copy-paste workflow. For comprehensive checking with browser

integration enabling real-time feedback, Linguix represents the lowest-cost option among premium tools, though free tiers across multiple tools provide basic checking sufficient for many needs. LanguageTool's multilingual support and optional offline processing make it valuable for non-English manuscripts or confidential documents addressing privacy concerns. WhiteSmoke and Ginger offer translation features beyond grammar checking but represent secondary functionality. Users should critically evaluate suggestions rather than automatically accepting all corrections, as over-flagging and false positives occur particularly in academic writing with discipline-specific terminology. Under current publisher policies, grammar checkers represent assistive technology requiring no disclosure—analogous to spell-check functions in word processors (Springer Nature, n.d.).

Plagiarism Checkers

Plagiarism detection tools compare submitted documents against extensive databases to identify potential textual similarities requiring proper attribution. All reviewed plagiarism checkers employ AI-assisted technology.

Table 6. Plagiarism Detection Tools

Tool	AI Integration	Database Coverage	Report Features	File Formats	Cost Model	Key Limitations
Grammarly Plagiarism Checker	AI-assisted	Billions of web pages, ProQuest databases	Similarity percentage, matched sources	Multiple formats	Premium feature	Requires premium subscription; internet-dependent
Plagscan	AI-assisted	Web, uploaded documents, institutional repositories	Detailed reports, AI-assisted Engram Pool	Multiple formats	Freemium	Internet required; may flag common phrases; premium for advanced features
Unicheck	AI-assisted	Billions of web pages, institutional databases	Comprehensive reports	Multiple formats	Subscription	Internet required; potentially expensive
Viper	AI-assisted	10+ billion documents, articles, websites	Detailed similarity reports	50+ languages, multiple formats	Freemium	Free plan has limited checks; credits required for premium
Plagiarism Checker X	AI-assisted	Billions of indexed web pages	Side-by-side comparison, color-coded highlights	Multiple formats	Freemium	Windows only; no browser extensions; premium for full features

Plagiarism detection tools generate similarity reports indicating percentage of text matching existing sources and identifying specific matched passages with source attribution, enabling users to review potential plagiarism and determine whether similarities require citation. However, critical research reveals serious limitations. Weber-Wulff et al. (2023) conducted a large-scale empirical evaluation of 14 AI detection tools, including both publicly available and commercial systems such as Turnitin. Their findings revealed that none of the tested tools were consistently reliable: all exhibited serious limitations, with substantial false

positives and false negatives, contradicting vendor claims of accuracy. The authors concluded that current AI detection systems cannot be depended upon to make fair or accurate determinations about text authorship. In a landmark study, Liang et al. (2023) evaluated seven GPT detection tools using essays from both non-native and native English writers. They found a stark discrepancy: 61.3 % of non-native TOEFL essays were misclassified as AI-generated, compared to ~5 % for native English samples. These results indicate significant algorithmic bias against non-native speakers and cast doubt on vendor claims of high detection accuracy. In light of such findings, universities have begun reconsidering the use of AI-detection technology. For instance, the University of British Columbia (UBC) publicly announced in April 2023—and reaffirmed in August 2023—that it would not enable Turnitin's AI-detection feature, citing reliability concerns and the absence of institutional validation. Similarly, the University of Waterloo announced plans to discontinue the AI-detection component of Turnitin by September 2025, while continuing to use the platform's originality-checking services. These institutional responses reflect a growing recognition that AI-detection technologies, though well-intentioned, currently pose risks of false accusation and inequitable assessment, particularly when used for high-stakes academic integrity decisions. Plagiarism checkers serve as screening tools requiring human judgment rather than definitive determinations. Free tiers typically limit checks per month (e.g., 20 pages for Viper) or document length, with premium subscriptions removing restrictions and adding features like faster processing, bulk checking, and LMS integration. Grammarly includes plagiarism checking only in premium subscriptions. Users must critically evaluate flagged content to distinguish genuine plagiarism from common phrases, technical terminology, properly cited content, or standard disciplinary language. While plagiarism checkers themselves represent assistive technology, their documented bias and high false positive rates mean results require critical interpretation rather than automated decision-making about academic integrity violations.

Citation Tools

Citation tools automate the creation and formatting of bibliographic references, ranging from AI-assisted platforms extracting reference data using machine learning to traditional form-based generators.

Table 7. Citation and Reference Management Tools

Tool	AI Integration	Supported Styles	Core Features	Cost Model	Platform Support	Key Constraints
EasyBib	Traditional digital	7,000+ styles	Citation generation, plagiarism checker, grammar checker	Freemium	Web, mobile apps	Premium required for plagiarism/grammar features
Cite This For Me	Traditional digital	Multiple styles	Auto-generation, plagiarism detection, bibliography export	Freemium	Web-based	Free tier has limited storage and features
Scite	AI-assisted	Standard academic	Smart citations (supporting/contrasting	Freemium	Web, browser extensions,	Database limited to partnered publishers

			classification), citation reports		Zotero integration	
Paperpile	AI-assisted	Multiple styles	Google Docs/Drive integration, PDF annotation, reference organization	Subscription ($3/month)	Google ecosystem exclusively	Requires Google account; subscription mandatory
PERRLA	Traditional digital	APA, MLA	Automated formatting, DOI/ISBN lookup, templates	One-time purchase ($79)	Microsoft Word only	Windows-only; APA/MLA only

Citation tools divide into two architectural approaches: traditional citation generators employ form-based data entry where users manually input bibliographic information—time-consuming but ensuring output accuracy depends entirely on input accuracy—while AI-assisted tools attempt automatic metadata extraction from DOIs, URLs, ISBNs, or PDF files using machine learning, reducing manual effort but potentially extracting incomplete or incorrect metadata requiring user verification. Scite introduces distinctive functionality classifying citation relationships as supporting, mentioning, or contrasting based on textual context, enabling users to distinguish between citations providing empirical support versus contradictory findings, though database coverage remains limited to partnered publishers creating gaps for books, conference proceedings, and smaller publishers. For platform-independent citation generation without cost, EasyBib and Cite This For Me provide unlimited basic citation generation free, with plagiarism detection and bibliography storage requiring subscriptions. For Google Docs users, Paperpile's direct integration enables in-document citation insertion while writing, representing the lowest-cost subscription option but requiring Google account and excluding Microsoft Office users. PERRLA operates only on Windows with Microsoft Word supporting exclusively APA and MLA styles, employing one-time purchase appealing for multi-year academic writing but creating higher initial barrier and excluding Mac/Linux users. For researchers needing citation context analysis, Scite's classification provides valuable insight for literature synthesis despite database limitations and freemium restrictions. All citation tools require verification of generated citations against original sources as automated systems produce errors requiring correction. Under publisher policies, citation management tools represent assistive technology requiring no disclosure, analogous to manually creating citations using style guides (COPE Council, 2024).

Data Visualization Tools

Data visualization tools enable researchers to create charts, graphs, and visual representations of research findings, ranging from simple chart creators to advanced analytics platforms.

Table 8. Data Visualization Tools

Tool	AI Integration	Chart Types	Data Import	Interactivity	Cost Model	Technical Requirements
ChartBlocks	Traditional digital	Bar, line, pie, scatter	Spreadsheets, databases	Basic	Freemium	Web-based; no advanced analytics
Datawrapper	Traditional digital	Charts, maps, tables	CSV, Excel, Google Sheets	Interactive charts	Freemium	Web-based; focuses on

						simple visualizations
Infogram	AI-assisted	Charts, infographics, maps, reports	Dynamic data linking	Interactive	Freemium	Web-based; limited chart types on free plan
Tableau Public	Traditional digital	Comprehensive chart types	Multiple file formats	Highly interactive	Free	All work publicly visible; learning curve

Data visualization tools vary in complexity and suitability depending on research needs. ChartBlocks enables straightforward chart creation through a drag-and-drop interface that supports standard chart types (bar, line, pie, scatter) but lacks advanced analytical capabilities—making it appropriate for simple visualizations without subscription costs. Datawrapper specializes in producing interactive charts, maps, and tables through an intuitive, code-free interface. It emphasizes accessibility, offering automatic screen-size adaptation and disability-friendly features, which makes it suitable for visualizations intended for diverse audiences. Infogram supports charts, infographics, maps, and reports with dynamic data linking, allowing visualizations to update automatically when underlying datasets change. This functionality is particularly useful for presentations requiring current data and can justify its premium subscription for researchers who regularly update materials. Tableau Public offers powerful visualization and analytical capabilities suitable for exploratory data analysis and complex visualizations. However, it requires considerable training and, critically, mandates that all published visualizations be publicly accessible, with no option for private data storage. Researchers handling confidential data, unpublished results, or proprietary information therefore cannot ethically or legally use Tableau Public. ChartBlocks, Datawrapper, and Infogram require internet connectivity but no installation, while Tableau Public requires desktop software installation. Importantly, these visualization tools do not require disclosure under publisher policies, as they serve to visualize researchers' own data rather than generate or analyze it.

Document Formatting Tools

Document formatting tools assist researchers in structuring manuscripts according to specific style guidelines and publisher requirements, primarily employing traditional technology with some AI-assisted features.

Table 9. Document Formatting Tools

Tool	AI Integration	Supported Styles	Platform	Key Features	Cost Model	Primary Constraints
EazyPaper	Traditional digital	APA, MLA, Turabia, Chicago, AMA	Microsoft Word	Auto-formatting, glossary management, EazyImporter	Freemium	MS Word only; time-limited free version
Dr Paper Software	Traditional digital	APA, MLA, Turabian	Microsoft Word, Google Docs	Auto-formatting, citation/bibliography, templates	Subscription	Subscription required; limited platform support

StyleEase	Traditional digital	APA, MLA, Chicago	Microsoft Word	Auto-formatting, margin/font/heading control	Subscription	MS Word only; requires subscription
Reference Point Software	Traditional digital	APA, MLA	Microsoft Word, Office 365	Auto-formatting, templates, data input interface	One-time purchase	Windows only; APA/MLA only; purchase required
Miro	Traditional digital	N/A (collaboration focus)	Web-based	Digital whiteboard, brainstorming, templates	Freemium	New users require training; performance issues with large projects

Document formatting tools primarily target compliance with academic style guidelines, automatically formatting manuscripts according to specified citation styles while managing margins, fonts, headings, pagination, title pages, and reference lists through word processor integration. EazyPaper supports five major styles (APA, MLA, Turabian, Chicago, AMA) plus glossary management and writing guidance, making it suitable for researchers needing multiple style support with Microsoft Word on Windows, though time-limited free version creates pressure for subscription decisions. Dr Paper Software provides the only Google Docs compatibility among reviewed tools, valuable for users in that ecosystem though requiring subscription for full functionality. Reference Point Software's one-time purchase for APA and MLA formatting on Windows appeals to multi-year users avoiding recurring fees but excludes Mac/Linux users and disciplines requiring other citation styles. StyleEase's Microsoft Word-only limitation without distinguishing features makes it less competitive. Miro differs fundamentally, focusing on visual collaboration and brainstorming through digital whiteboards rather than citation style compliance, supporting real-time teamwork but requiring training investment. Common constraints include platform dependency, style coverage limitations, and lack of LaTeX support for STEM fields. These tools require no disclosure under publisher policies as they format researcher-created content rather than generating content.

Collaboration Platforms

Collaboration platforms facilitate teamwork among researchers by providing shared workspaces, communication tools, and project management capabilities. All reviewed collaboration platforms employ traditional traditional digital approaches.

Table 10. Collaboration Platforms for Writing Projects

Tool	**AI Integration**	**Core Functionality**	**Communication Features**	**Integration Options**	**Cost Model**	**Platform Support**
Trello	Traditional digital	Project management via boards/cards	Comments, mentions	Google Drive, Slack, and 100+ apps	Freemium	Web, mobile, desktop
Slack	Traditional digital	Team messaging and communication	Channels, direct messages, voice/video	Google Drive, MS	Freemium	Web, mobile, desktop

				Office, 2,000+ apps		
Asana	Traditional digital	Task and project management	Comments, team inbox, messaging	Google Drive, Slack, MS Teams, 100+ apps	Freemium	Web, mobile, desktop
Microsoft Teams	Traditional digital	Unified communication and collaboration	Chat, voice, video, meetings	Microsoft 365 suite integration	Freemium	Web, mobile, desktop

Collaboration platforms support multi-author research by integrating communication, task management, and document coordination. Trello offers visual project tracking through customizable boards and cards, suitable for managing manuscript workflows though advanced automation requires paid upgrades. Slack emphasizes real-time communication through topic-based channels with file sharing and integrations, but message volume and subscription limits can reduce usability. Asana provides structured task and project management with deadlines, assignments, and editorial calendars, though its feature complexity may overwhelm new users. Microsoft Teams combines chat, video, and file-sharing functions within the Microsoft ecosystem, enabling real-time co-authoring yet limiting compatibility outside it. Empirical research also highlights the value of Google Docs for collaborative writing. Dehghanzadeh et al. (2024) found that frequent document interactions—edits, comments, and revisions—correlate with improved scientific writing, while Hoang and Hoang (2022) reported significant gains in EFL learners' academic writing, particularly in task response and lexical resource use. Across platforms, common features include real-time collaboration, integration with external tools to streamline workflow, freemium access models, and reliance on internet connectivity. As these tools primarily facilitate coordination rather than content generation, they do not require disclosure under publisher policies

Cross-Cutting Findings and Implications

Analysis across ten tool categories reveals five major patterns with implications for researchers, institutions, and publishers. First, the ecosystem is dominated by freemium and subscription models, creating access inequities. Only about 13 % of the 46 tools examined—such as ZoteroBib, Research Rabbit, and limited versions of Trello and Slack—offer unrestricted use, while most charge $3–30 per month. For users relying on multiple tools, annual costs can exceed $1,000, disproportionately affecting early-career researchers and scholars in low-resource contexts (An et al., 2024). Second, research confirms both effectiveness and emerging risks. Meta-analyses report large improvements in writing quality ($g = 0.86$, $p < .001$) among postsecondary and EFL learners (Zhai & Ma, 2023), and specific tools such as DeepL show substantial gains in accuracy and learner confidence (Poláková & Klimová, 2023). Yet concerns about over-reliance and algorithmic bias persist: detectors misclassify 61 % of non-native essays as AI-generated (Liang et al., 2023), while reviews show over-dependence on AI dialogue systems can impair critical thinking (Zhai et al., 2024). In a mixed-methods study, students improved markedly using AI support but reported dependence—"without the tool, I would write nothing correctly" (Chen & Gong, 2025). Third, publisher policies are largely consistent but poorly implemented. Major publishers agree that AI cannot be credited as an author, its use must be disclosed, and authors remain accountable (COPE Council, 2024). However, surveys indicate that 78–96 % of educators lack institutional guidelines (Bond et al., 2024), leaving uncertainty about appropriate boundaries. Fourth, tool effectiveness is context-

dependent: grammar checkers perform best on surface errors (Perdana et al., 2021), translation tools favor European languages, and writing-support gains vary by learner level and linguistic background. Effective use thus requires aligning tools with user needs and task demands. Finally, the field evolves rapidly—features, pricing, and policies shift monthly. Data collected through April 2025 already precede major developments such as Turnitin's decision to discontinue AI-detection features in September 2025. Continuous learning and periodic reevaluation are therefore essential as technologies and ethical standards advance.

Implications for Practice and Policy

The findings of this study carry several implications for researchers, institutions, and publishers seeking to promote responsible AI integration in academic writing. For individual researchers, responsible practice involves selecting open-access or low-cost tools when feasible (e.g., Zotero, DeepL free tier), maintaining a critical stance toward AI outputs, and verifying generated content, references, and factual claims. Empirical evidence shows that large language models can produce 38–46 % inaccurate or fabricated references (Cheng et al., 2025), underscoring the importance of human verification. Researchers should employ AI systems as supplements rather than substitutes for reasoning and critical reflection, given documented risks of over-reliance and cognitive degradation (Zhai et al., 2024). Transparent disclosure of AI use in line with publisher policies and awareness of algorithmic bias—particularly affecting non-native writers (Liang et al., 2023)—remain essential. At the institutional level, universities should develop clear policies delineating acceptable and unacceptable uses of AI in coursework, theses, and publications. Recent studies indicate that up to 96 % of educators lack formal guidelines (Bond et al., 2024), revealing an urgent need for coherent frameworks and training. Integrating AI literacy into research-methods and writing curricula, while sustaining human mentoring and writing-center support, can help balance automation with academic judgment. For publishers and journal editors, the priority lies in refining existing disclosure policies through explicit examples and standardized templates, avoiding unreliable AI-detection tools prone to false positives (Liang et al., 2023), and supporting the development of discipline-specific, ethically aligned AI resources. Collectively, these measures promote equity, integrity, and informed adaptation as AI tools continue to transform the scholarly writing landscape.

CONCLUSION

This study offers the first comprehensive, evidence-based categorization of AI-supported tools spanning the entire academic publication process. Analyzing 46 tools across 10 functional categories—from brainstorming to collaboration—revealed both the transformative potential and systemic challenges of AI-assisted academic writing. The ecosystem comprises AI-powered tools (20%), AI-assisted platforms (43%), and traditional digital infrastructure (37%), with AI concentrated in generative and synthesis stages and traditional technologies supporting structural and collaborative tasks. Five key patterns characterize this landscape. First, the dominance of freemium and subscription models (87%) imposes financial barriers, with annual costs potentially exceeding $1,000, reinforcing inequalities for under-resourced scholars. Second, while meta-analyses confirm substantial benefits for writing quality (g = 0.86) and EFL learners, risks such as over-reliance reducing critical thinking, algorithmic bias misclassifying 61% of non-native texts, and citation inaccuracies in large language models remain significant. Third, although major publishers

agree on AI use disclosure statement and prohibiting AI authorship, institutional implementation policies and lack of formal guidelines leave researchers uncertain about appropriate AI use and compliance requirements. Fourth, effective use of AI in writing for publication processes depends on user context, task, and purpose, operational guidance instead of broad recommendations. Finally, the rapid evaluation of tools requires constant learning and reevaluation is essential. These findings indicate the need for evidence-based, context-sensitive integration of AI in academic writing. Researchers should critically verify outputs and disclose use transparently; institutions must establish clear policies, equitable access, and AI literacy initiatives; and publishers should refine disclosure practices and monitor long-term impacts. The future of scholarly communication depends not on wholesale adoption or rejection of AI but on thoughtful alignment between technological innovation, cognitive development, and academic integrity in order to ensure that AI serves, rather than supplants, human judgment in knowledge creation.

This study's findings should be interpreted based on several constraints. First, the rapid evolution of AI technologies means the analysis represents a snapshot as of April 2025; tool capabilities, pricing, and policies change frequently. Future research should establish dynamic monitoring systems rather than static catalogs to address this volatility. Second, access barriers limited full evaluation of subscription-only features. While free tiers and documentation were analyzed, premium functionalities were assessed through secondary sources, potentially overlooking nuances of extended use. Third, English-language search strategies likely introduced geographic and linguistic bias, overrepresenting tools marketed to Anglophone researchers and underrepresenting those developed in non-English or low-resource contexts. Fourth, the functional categorization—while grounded in writing-process models—necessarily simplified overlapping tool capabilities, as many platforms serve multiple purposes and the boundaries between AI-powered, AI-assisted, and traditional digital tools are increasingly fluid. Fifth, the study lacked primary user data regarding adoption patterns, satisfaction, and workflow integration, precluding conclusions about real-world effectiveness. Finally, although ethical and equity concerns such as algorithmic bias and cost barriers were analyzed conceptually, empirical evidence on their actual impact remains limited.

Despite these constraints, the study provides a valuable, evidence-based mapping of the AI-supported academic writing ecosystem. Future research should pursue multilingual, longitudinal, and user-centered approaches to examine practical outcomes, equity implications, and evolving patterns of responsible AI use in scholarly communication.

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