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Enhancing Academic Writing through Digital Tools: A Systematic Review

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Abstract

The integration of digital tools in academic writing has significantly enhanced students' writing proficiency across various educational levels. Tools such as grammar checkers, citation managers, plagiarism detectors, and collaborative platforms help students produce more structured, academically compliant writing. These tools support technical skill development while also increasing educational accessibility, providing students from diverse backgrounds with greater opportunities to improve their writing abilities. AI-based writing assistants, in particular, help reduce grammatical errors and expand vocabulary, while multimodal technologies encourage creativity by enabling students to integrate visual and audio elements into their work. This literature review, using PRISMA and bibliometric analysis, synthesizes studies from 2019 to 2024, examining how digital tools impact writing clarity, adherence to academic standards, and structured argumentation. The review reveals that while digital tools significantly enhance writing skills, their overuse can result in a dependency that impairs the development of critical thinking and creativity—key components of strong writing. The implications of these findings stress the importance of digital literacy training within curricula, ensuring that students use digital tools responsibly and complement their writing skills with analytical and creative thinking. Additionally, professional development for educators is essential, enabling them to guide students in effectively integrating these tools. Ultimately, a balanced approach to digital tool use can enhance academic writing while contributing to the broader goal of fostering well-rounded, digitally literate learners.

Keywords: Digital tools; Academic writing, Digital literacy, AI-based writing assistants

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INTRODUCTION

Digital tools have fundamentally reshaped the educational landscape by offering innovative methods that transform teaching and learning, especially in academic writing. As these tools have gained in popularity, students have become more capable of communicating complex ideas, adhering to academic conventions, and enhancing the overall quality of their writing (Zhao, 2024; Pitura, 2023; Link et al., 2023). Studies from 2019 to 2024 emphasize the significant role digital tools play in improving students' language skills, organizing their ideas effectively, and providing instant feedback, which are all crucial elements in academic writing (Wu & Murti, 2024; Wang, 2024). Specifically, tools such as advanced grammar checkers, citation managers, plagiarism

detection software, and collaborative platforms offer tailored support that enables students to refine their language and structure arguments coherently and logically.

Beyond these immediate benefits, digital tools also facilitate learning outside traditional classroom settings, granting students continuous access to resources, feedback, and guidance at every stage of the writing process (Dja'far & Hamidah, 2024; Garcés-Manzanera, 2024). This accessibility is particularly valuable as it allows students to engage with their writing, progressively developing their skills continuously. Research shows that students who use digital tools for writing produce work that is more structured and grammatically accurate than those who rely solely on traditional methods (Wang & Bonk, 2024; Guo & Li, 2024). This integration of digital technology into education plays a critical role in supporting students' writing skills, making it essential to understand the broader impact of these tools on fundamental academic skills.

Academic writing remains a vital component of higher education, as it cultivates critical thinking, analytical reasoning, and structured argumentation (Purser et al., 2020; Perkins et al., 2024). Integrating technology in this field provides an opportunity to make quality writing support more accessible, particularly for students from diverse backgrounds who may require additional assistance in developing academic communication skills. Studies on digital literacy from 2020 to 2024 highlight how digital tools can democratize learning by enabling students from various educational and social contexts to access resources that bolster their academic writing abilities (Burns et al., 2023; Gustilo et al., 2024; Lin, 2024). By identifying the most effective digital tools and best practices, this study contributes to the broader goal of enhancing digital literacy and preparing students for the demands of an increasingly digital society. As educational practices evolve, the need to adapt teaching methods and resources to harness the capabilities of modern digital tools becomes more urgent.

In the broader context of educational technology, the integration of digital tools represents a shift toward more personalized, accessible, and scalable learning experiences (Demïrbaş & Şahïn, 2023). These tools are increasingly seen as integral to fostering critical academic skills, especially in the digital era where technology shapes all aspects of learning and communication. Recent studies highlight the growing role of digital tools in enhancing engagement and facilitating individualized learning experiences, which are essential for academic success in modern education (McNaughton & Jesson, 2023; Odo, 2024). Furthermore, the adoption of these tools is not only improving writing but also enabling the development of other key competencies, such as critical thinking and problem-solving, which are vital in today's knowledge-driven society (Aksela et al., 2024; Benetos, 2023). As the landscape of education becomes more technology-driven, the potential of digital tools to support diverse learning needs and bridge educational gaps continues to expand (Nguyen & Tran, 2024).

This systematic literature review (SLR) aims specifically to analyze the influence of digital tools on academic writing by consolidating and evaluating findings from relevant studies conducted between 2019 and 2024. Through a rigorous review process, the study identifies current trends, research gaps, and areas of impact in this field. The research questions guiding this study are: (1) How do digital tools improve students' writing ability? (2) What are the ethical implications and potential misuse of AI-based tools in academic writing? By systematically assessing the research landscape, this SLR contributes to a deeper understanding of how digital tools can be used to support students' writing development in a rapidly advancing digital era, ultimately informing future practices and research directions in educational technology.

RESEARCH METHOD

Research Design

This study employed a systematic literature review (SLR) approach to explore the impact of digital tools on academic writing skills. The SLR method was selected for its ability to synthesize and analyze existing research in a structured manner, providing an overview of the current trends, innovations, and developments in the field. The review focused on studies published between 2019 and 2024, as this period encapsulates the most recent advancements in digital tools, ensuring that the study reflects contemporary changes in educational technology. The review was guided by clear inclusion and exclusion criteria to select peer-reviewed articles directly relevant to the research question.

Research Object

The object of this research is the collection of peer-reviewed academic studies that examine the impact of digital tools on academic writing skills. Specifically, the study focuses on identifying and analyzing articles that discuss the use of digital tools, such as grammar checkers, plagiarism detection software, and AI-powered writing assistants, and their influence on writing quality, critical thinking, and argumentation. By focusing on both undergraduate and graduate-level studies, the research aims to offer a comprehensive understanding of how digital tools shape writing skills at various stages of higher education.

Research Instruments and Data Collection Technique

The data collection for this study involved a comprehensive search conducted across multiple academic databases, including Scopus, Google Scholar, PubMed, and Web of Science. The search was performed using relevant keywords such as "digital tools in academic writing" and "influence on writing skills." Only articles published in English or Indonesian were included to ensure linguistic relevance. The search period was limited to the years 2019 to 2024 to focus on the most current and relevant studies. Studies that were not peer-reviewed or were unrelated to the research question were excluded from the final selection. The selection process was visualized using the PRISMA diagram, which clearly outlines the steps from article identification to final inclusion, ensuring transparency and systematic methodology. In addition, a pilot search and expert feedback were used to refine the search strategy, ensuring its accuracy and comprehensiveness.

Data Analysis

Data analysis was conducted through a bibliometric analysis, which mapped the research trends related to digital tools in academic writing. The analysis focused on key aspects such as citations, researcher collaborations, and key terms to identify dominant themes and emerging trends. Citation networks were utilized to visualize the influence of key studies, while thematic clusters revealed areas of growth in the research, such as the integration of AI tools like grammar checkers and plagiarism detection software in academic writing. Thematic coding was further enhanced through inter-coder agreement, ensuring consistent and reliable categorization of studies. This collaborative coding process involved refining thematic categories to confirm the validity and robustness of the findings. The bibliometric analysis provided valuable insights into the evolution of research on digital tools and highlighted the role of these tools in supporting critical thinking and structured argumentation (Smith & Lee, 2020; Hernandez et al., 2023).

RESEARCH RESULTS AND DISCUSSION

Research Results

Bibliometric Analysis on Co-Authorship Connection

Figure 1 shows the bibliometric of co-authorship in research, illustrating the collaboration between authors to combine knowledge, share workload, and enhance the trustworthiness of the work. Co-authorship expands professional networks and provides skill development opportunities, resulting in more comprehensive work.

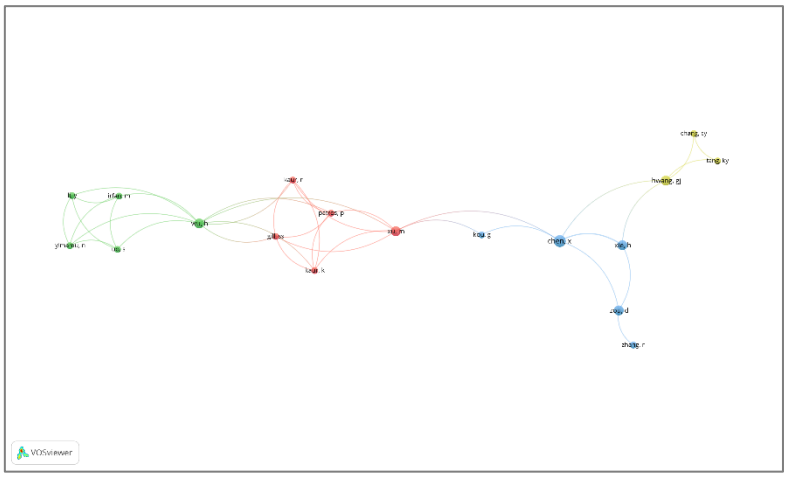

Figure 1. Connection among Co-Authorships

The picture displays a bibliometric co-authorship network, illustrating collaborative relationships between authors based on joint publications. Each node in the image represents an author, with the size of the node indicating the level of involvement or influence of that author within the collaboration network. The color of the nodes signifies clusters or collaborative communities, indicating that authors within the same color tend to collaborate more frequently with each other than with authors of different colors. Through the use of color, this image reveals that the collaboration network is divided into several main groups or clusters, each with its own dynamics and internal collaboration patterns.

The image shows several interconnected main clusters. For example, the green cluster is centered around the author "wu h," who has many collaborations with authors such as "irfan m," "liu," and "yimam u n." The red cluster focuses on the author "xu m," who works closely with "kaur r," "patros p," and "gill ss," forming a solid collaborative group around this author. Meanwhile, the blue cluster is centered on "chen x," who is connected to several other researchers, including "kou g" and "xie h," while the yellow cluster is a smaller group led by "hwang gj," who collaborating with colleagues such as "chang cy" and "tang ky." Some authors, such as "xu m," have cross-cluster connections, acting as "bridges" that link various collaboration groups. This visualization provides a clear understanding of the structure of collaborative networks among researchers, showing existing collaborative communities and the role of central authors in building connections across research groups.

Analysis of Co-Occurrence

Figure 2 shows the bibliometric co-occurrence of keywords that frequently appear together in related literature. This co-occurrence helps identify key themes and the relationships between topics in research, providing insights into trends and the conceptual network in the field.

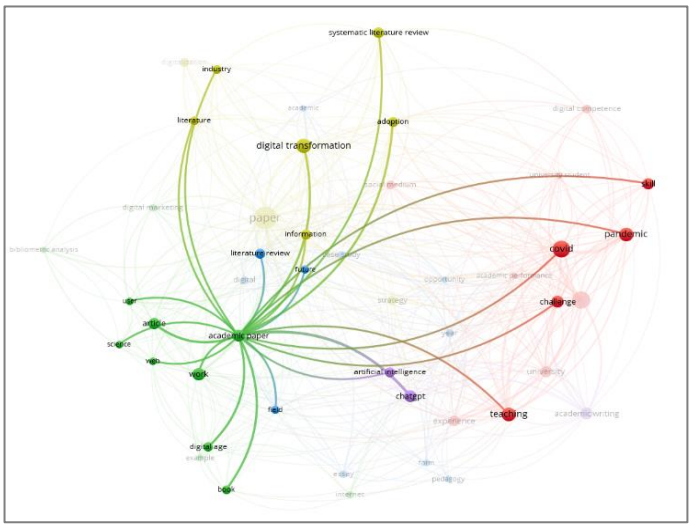

Figure 2. *Bibliometric of Co-Occurrences*

This image illustrates the relationships between various main topics in a collection of documents or research, with several key terms such as "paper," "research," "student," "teaching," "digital transformation," and "artificial intelligence" standing out as central themes. The topics "paper" and "research" have many connections with other terms like "analysis" and "process," indicating a focus on research activities and scientific analysis. This highlights an interest in the methodologies and processes of academic publishing, where these topics serve as essential foundations in academic activities and scientific publications.

Additionally, the themes of education and digital transformation are also prominent in the relationships between these topics. Terms like "student," "university," "teaching," and "teacher" are closely related to "challenge," "experience," and "pandemic," reflecting the impact of the pandemic on the educational process, particularly the challenges faced by students and educators. Meanwhile, terms like "digital transformation" and "digital competence," connected to "social medium" and "digital marketing," indicate the growing importance of digital competence in the modern era. Technology-related topics such as "artificial intelligence" and "ChatGPT" illustrate an interest in the application of artificial intelligence in an academic context, highlighting technology's role in supporting research and education. Overall, this image shows how education, digital transformation, and technology act as central themes in contemporary research and literature, providing insights into current trends and challenges within the academic environment.

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)

This PRISMA flow diagram illustrates the study selection process for a systematic review conducted in several stages. Out of a total of 435 records identified (430 from databases and 5 from registers), 195 records were removed due to duplication, ineligibility by automation tools, or other reasons. Subsequently, the remaining 195 records were screened, with 45 records excluded for not meeting the criteria, leaving 150 reports sought for further assessment. Of these, 50 reports could not be accessed, while the remaining 100 reports were evaluated for eligibility. During this assessment, 70 reports were excluded: 40 due to theoretical irrelevance, 20 for lack of focus, and 10 for insufficient data. Finally, 30 studies met the eligibility criteria and were included in the final review. This selection process aims to ensure that only the most relevant and high-quality studies are analyzed in the review. The results are shown in the following figure.

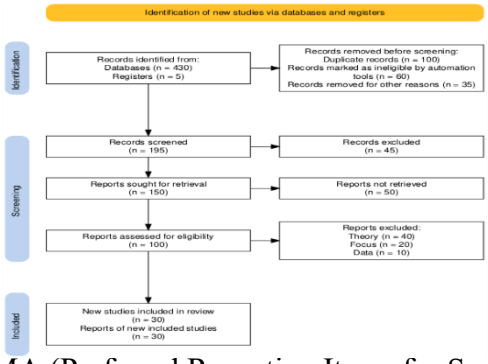

Figure 3. Diagram of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)

From the 30 selected articles, an additional selection process identified 10 articles for in-depth analysis. This selection was based on more specific criteria, such as data quality, direct relevance to the research questions, the most cited articles, and significant contributions to understanding the topic. The focus on data quality ensured that only studies with robust methodologies, reliable data sources, and rigorous analysis were included. The selected articles demonstrated high credibility and contained relevant, accurate information, essential for generating reliable insights. Additionally, aligning these articles with the research questions enabled a more focused examination of core themes, ensuring that each chosen piece contributed directly to the research objectives. This selectivity in filtering the articles enhances the coherence and depth of the literature review.

Conducting an in-depth analysis of these 10 articles allows researchers to obtain more detailed and applicable insights from the available findings. By concentrating on studies with substantial contributions, the analysis delves into nuanced discussions, innovative findings, and influential theories that advance understanding in the field. This selective approach also prevents the dilution of insights when too many sources of varying relevance are considered. Thus, the final review becomes more substantial, providing a strong foundation for the conclusions drawn and ensuring high validity in the research conducted. The analysis results of these 10 selected articles are displayed in the following table.

Table 1. Articles based on PRISMA Analysis

No	Writer/s	Title	Cited By	Publisher
1	Dergaa, I., Chamari, K., Zmijewski, P., & Saad, H. B. (2023)	From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing	421	Biology of sport
2	Strobl, C., Ailhaud, E., Benetos, K., Devitt, A., Kruse, O., Proske, A., & Rapp, C (2019)	Digital support for academic writing: A review of technologies and pedagogies	288	Computers & Education
3	Nazari, N., Shabbir, M. S., & Setiawan, R. (2021)	Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial	284	Heliyon
4	Williams, C., & Beam, S. (2019)	Technology and writing: Review of research	257	Computers & Education
5	Gayed, J. M., Carlon,	Exploring an AI-based writing	230	Computers and

No	Writer/s	Title	Cited By	Publisher
	M. K. J., Oriola, A. M., & Cross, J. S. (2022)	Assistant's impact on English language learners		Education: Artificial Intelligence
6	Hafner, C. A., & Ho, W. Y. J. (2020)	Assessing digital multimodal composing in second language7writing: Towards a process-b9sed model.	181	Journal of Second Language Writing
7	Camacho, A., Alves, R. A., & Boscolo, P. (2021)	Writing motivation in school: A systematic review of empirical research in the early twenty-first century	168	Educational Psychology Review
8	Guerin, C., Aitchison, C., & Carter, S. (2020)	Digital and distributed: learning and teaching doctoral writing through social media.	48	Teaching in Higher Education
9	Paltridge, B. (2020)	Writing for academic journals in the digital era	37	RELC Journal
10	Kim, Y., Kang, S., Nam, Y., & Skalicky, S. (2022)	Peer interaction, writing proficiency, and the quality of collaborative digital multimodal composing task: Comparing guided and unguided planning	20	System

Impacts of Digital Tools on Writing Ability

Digital tools have significantly transformed academic writing by enhancing speed, clarity, and structure. Tools like AI writing assistants, grammar checkers, plagiarism detectors, and collaborative platforms help streamline the writing process, improve language accuracy, and support idea organization. While these tools offer valuable benefits, such as speeding up writing and ensuring originality, they also present challenges. Over-reliance on technology can reduce creativity, hinder critical thinking, and lead to dependency on automated feedback. Balancing the use of these tools with traditional writing skills is crucial for maintaining intellectual engagement and creativity in the writing process. The following table summarizes the impacts of these tools on writing ability, highlighting both their benefits and risks.

Table 2. Impacts of Digital Tools on Writing Ability

Type of Digital Tool	Main Impacts	Benefits	Risks and Challenges
ChatGPT (AI Writing Assistant)	Speeds up the writing process, helps organize ideas, and supports effective argument formulation.	Improves language quality and writing structure, especially for novice or non-native writers.	The risk of plagiarism reduced creativity due to over-reliance on technology, and the potential for inaccurate information.
AI-based Writing Assistants	Helps improve sentence structure, reduce grammatical errors, and expand vocabulary.	Supports independent learning, improves writing quality, and enhances grammar.	Over-reliance may hinder the development of analytical skills and critical thinking.
Grammar Checkers	Provides instant feedback on grammar and sentence structure.	Improves grammatical accuracy, and helps identify and correct	Over-dependence may weaken understanding of grammar rules, and

Type of Digital Tool	Main Impacts	Benefits	Risks and Challenges
		errors quickly.	some complex structures may be overlooked.
Plagiarism Detectors	Detects copied or unoriginal content by comparing the text to databases of previously published works.	Ensures academic integrity by preventing plagiarism, and supports ethical writing practices.	May flag non-plagiarized but similarly worded content, potentially leading to unnecessary revisions.
Digital Multimodal Composition	Integrates text with visual, audio, and interactive elements in writing tasks.	Enhances creativity and writing skills by incorporating diverse media elements.	Challenges in managing different media elements, and difficulty in assessing the overall writing process.
Collaborative Writing Platforms	Facilitates collaboration and real-time feedback between writers and peers/reviewers.	Improves writing quality through peer interaction and collaborative input.	Over-reliance on external feedback may hinder writer autonomy, and feedback inconsistency could be a challenge.
Social Media for Academic Writing	Supports broad collaboration and interaction among academic writers at the doctoral level.	Expands professional networks and fosters collaboration, enabling open discussions about writing.	Time management challenges and potential distractions from the core writing task.
Automated Assessment Applications	Provides automated feedback on the quality of student writing.	Speeds up the grading process and offers more frequent, transparent feedback.	Risk of inaccurate assessments, especially with complex or nuanced writing styles.

Discussion

Risk of Digital-ChatGPT Writing on Creativity and Naturalness of Writing

Using ChatGPT for writing offers several benefits, but certain risks may impact a person's writing abilities. The article by Dergaa et al (2023) discusses the potential impact of ChatGPT in the realm of academic writing, both in terms of the benefits and the threats it poses. This article, which has been cited 421 times, explains that ChatGPT offers various conveniences, such as speeding up the writing process, helping to organize ideas, and supporting researchers in effectively formulating arguments. This technology, particularly for novice or non-native writers, can improve language quality and writing structure. However, the writers also highlight risks that need to be watched, including the potential for plagiarism, reduced creativity due to dependence on technology, and occasionally questionable information accuracy. The authors caution that ChatGPT should be used ethically and with clear guidelines to avoid diminishing the intellectual value and originality of academic work.

Leveraging Technologies in Academic Writing

The research conducted by Strobl et al. (2019) discusses how digital technology can be utilized to assist students in developing academic writing skills. The various tools and platforms covered include automated assessment applications, collaborative writing

aids, and AI-supported feedback systems. They not only examine specific software or tools but also emphasize the importance of appropriate pedagogical methods to optimize the use of these technologies. Strobl and colleagues highlight the challenges faced by learners and educators in leveraging this technology, including ethical issues, technical limitations, and the educator's role in providing proper guidance. In line with this study, the findings of the study by Nazari et al (2021) indicated that the use of the AI tool not only significantly improved the quality of academic writing but also helped students develop critical thinking and independent learning skills. This study contributes to understanding how AI technology can be effectively implemented to support learning in higher education, providing insights into its potential to optimize modern education. The study concludes that while digital technology offers substantial potential to enhance academic writing, its impact will be more effective when combined with wise and contextually appropriate teaching strategies.

Digital Multimodal in Writing

The articles by Hafner & Ho (2020) and Kim et al. (2022) share a similar theme, focusing on digital multimodal composition in language learning contexts, though with different emphases and approaches. Hafner & Ho (2020) investigate the process of digital multimodal composition within second language learning, developing a process-based model to assess students' ability to create compositions that incorporate not only text but also visual, audio, and interactive elements. Their main focus is on evaluating the process of creating multimodal works that integrate various types of digital media. In contrast, Kim et al. (2022) also examines digital multimodal composition tasks but concentrate on the influence of peer interaction and guided planning. They compare guided and unguided approaches in collaborative tasks and assess how peer interaction and writing proficiency impact the quality of collaborative digital multimodal compositions. While both articles explore multimodal digital learning to enhance students' writing skills and creativity, Hafner & Ho emphasize a process-based assessment model, whereas Kim et al. focus on the effects of peer interaction and planning methods on task quality.

Challenges and Innovation

The articles by Williams and Beam (2019), Gayed et al. (2022), Camacho et al. (2021), Guerin et al. (2020), and Paltridge (2020) highlight the role of technology in teaching, motivation, and academic writing across different educational levels, from school to doctoral studies. The first article by Williams and Beam (2019), titled "Technology and Writing: Review of Research," examines the impact of technology on writing instruction. Based on a literature review, technology has been shown to enrich students' writing experiences through features like automatic correction and online collaboration tools, though it also presents challenges, particularly in terms of students' potential dependence on technology. The study recommends that technology in writing instruction be implemented in a balanced way to encourage critical and creative thinking skills in students.

The next article by Gayed, Carlon, Oriola, and Cross (2022), titled "Exploring an AI-based Writing Assistant's Impact on English Language Learners," investigates how using an AI-based writing assistant can support English language learners. The study shows that AI-based writing assistants help learners improve sentence structure, reduce grammatical errors, and expand their vocabulary. However, researchers also found risks associated with over-reliance on this technology, which could hinder the development of learners' analytical skills. The recommendation from this research is to use AI writing

assistants as a supplement in the writing learning process so that learners can still develop their language skills independently.

The third article by Camacho, Alves, and Boscolo (2021), titled "Writing Motivation in School: A Systematic Review of Empirical Research in the Early Twenty-First Century," presents a systematic review related to students' writing motivation in school settings. This research found that writing motivation is influenced by internal factors such as interest and self-confidence, as well as external factors like feedback from teachers and the classroom environment. Camacho and colleagues suggest teaching approaches that can encourage student autonomy and create a collaborative classroom environment to increase writing motivation. Research by Guerin, Aitchison, and Carter (2020) in "Digital and Distributed: Learning and Teaching Doctoral Writing through Social Media" discusses the benefits of social media in the doctoral-level academic writing learning process. This study identified that social media can support broad interaction and collaboration, though challenges such as time management exist. Finally, Paltridge's (2020) article, titled "Writing for Academic Journals in the Digital Era," discusses changes in writing for scholarly journals due to digitalization, such as new skills needed for navigating digital platforms and data management. The researcher recommends that academic writers use digital opportunities wisely, maintaining the quality of scholarly writing while adapting to changes in the digital era.

Addressing the Risk of Digital Tolls in Academic Writing

The discussion of the risks associated with digital tools in academic writing, particularly the reduced creativity stemming from over-reliance on tools like ChatGPT, is crucial in understanding how to balance the benefits and challenges of technology. While digital tools such as AI writing assistants can speed up the writing process, improve language quality, and help organize ideas, they also have the potential to limit a writer's engagement with the creative aspects of writing. As highlighted in the findings by Dergaa et al. (2023), reduced creativity due to dependence on technology is a significant concern, particularly when students begin to rely too heavily on AI-generated content.

To address these risks, several targeted educational interventions can be implemented. One approach is to incorporate active writing exercises that encourage students to engage in the writing process without the aid of digital tools at the outset. For example, students could be tasked with writing drafts manually before using tools like ChatGPT for revision, thus allowing them to develop their own ideas and creativity before relying on external assistance. This can ensure that the technology is used as a supplementary tool rather than a replacement for original thought.

Furthermore, collaborative learning can be an effective strategy to combat the loss of creativity. Research by Kim et al. (2022) emphasizes the role of peer interaction in enhancing creativity and improving writing quality. By incorporating collaborative platforms and group writing tasks, students can be encouraged to share ideas, discuss concepts, and provide feedback to one another, which fosters creative engagement and reduces the tendency to rely solely on technology. Peer feedback can also promote independent thinking, as students are exposed to diverse perspectives that challenge their ideas and force them to engage critically with the content they are producing.

Another intervention is the use of blended learning approaches, combining traditional teaching methods with digital tools in a balanced manner. According to Strobl et al. (2019), while technology can provide substantial support in improving writing quality, it is essential to ensure that critical thinking skills are developed

alongside digital literacy. Educators can design assignments where students first engage in critical discussions and brainstorming sessions before turning to digital tools for assistance. This process encourages students to take ownership of their ideas while leveraging technology to refine and improve their arguments, rather than depending on it to generate content.

Lastly, a focus on ethics and originality in writing is crucial. By integrating discussions on academic integrity and the ethical use of digital tools, educators can help students understand the importance of maintaining originality in their work. Encouraging students to cite sources properly, even when using AI writing assistants, and teaching them how to generate new ideas while using technology as a tool for enhancement rather than a shortcut, can mitigate the risks of plagiarism and over-reliance. In conclusion, while the use of digital tools like ChatGPT can undeniably enhance the writing process, it is essential to implement targeted educational interventions to mitigate the risks of reduced creativity and over-reliance.

CONCLUSION

The integration of digital tools in academic writing has proven to significantly enhance students' writing skills across various educational levels. Tools like automatic grammar checkers, reference managers, plagiarism detection software, and collaboration platforms help students create more structured, academically compliant writing. This digitalization not only supports the technical development of writing skills but also increases educational accessibility, offering broader opportunities for students from diverse backgrounds to improve their abilities. Moreover, AI technologies, such as AI-based digital writing assistants, further enhance the quality of writing by reducing grammatical errors and expanding vocabulary. Multimodal digital technologies also contribute by allowing students to incorporate visual and audio elements into their work, fostering creativity and providing a more engaging learning experience. However, while digital tools offer significant advantages, there are potential risks. Overreliance on technology can hinder the development of natural analytical skills and creativity, essential components of strong writing.

Therefore, the broader implications for digital literacy curricula emphasize the need for a balanced approach. Digital tools should be incorporated thoughtfully, with clear guidance to ensure they complement rather than replace critical thinking and creative writing skills. Additionally, professional development for educators is crucial to ensure they are well-equipped to guide students in using these tools effectively, fostering both technical proficiency and independent, creative thought. By addressing these concerns, we can ensure that digital tools not only enhance academic writing but also contribute to the broader goal of developing well-rounded, digitally competent learners.

RECOMMENDATION

The research recommends a balanced use of digital tools, ensuring that these tools complement fundamental academic writing skills rather than replacing them. Digital literacy training is also essential, especially for students with limited access to technology. Educational institutions are required to provide digital literacy training so that students can effectively leverage digital tools to develop their academic writing skills. Contextual pedagogy integration is also recommended, where leveraging technology in academic writing is accompanied by appropriate guidance, such as in the use of AI-based writing assistants and the ethics of using digital tools. The use of multimodal writing methods that combine visual, audio, and interactive elements, particularly in language learning, can increase students' creativity.

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