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Adoption of Generative Artificial Intelligence in L2 Graduate Academic Writing in Higher Education: A Scoping Review of Current Status and Implications

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Abstract. Recently, there has been growing research interest in the integration of generative artificial intelligence (GenAI) in educational contexts, particularly in academic writing. In multilingual contexts where students struggle with the complexities of academic writing, particularly at the graduate level, the adoption of GenAI may play a critical role in supporting graduate academic writing. This study aimed to conduct a scoping review to determine the benefits, challenges, concerns, and research gaps associated with GenAI adoption in L2 graduate academic writing within higher education. Articles that described the adoption of GenAI in L2 Graduate academic writing were searched across four databases: Scopus, Web of Science, Google Scholar, and EBSCOhost. Articles that were not specific to L2 graduate academic writing, not empirical studies and not written in English were excluded. Eight empirical studies (2024-2025) that focused on L2 graduate academic writing were selected for the review. The results revealed that all eight studies reported notable improvements in students' academic writing, including enhanced grammar, spelling, coherence, and writing style. Tools such as Grammarly and ChatGPT were found to be particularly beneficial for non-native English-speaking graduate students. However, the review also identified key challenges including ethical concerns and the risk of over-reliance on GenAI-generated content. Overall, the review concludes that while GenAI tools show strong potential for enhancing L2 graduate academic writing skills, further research and policy development are needed to guide responsible and effective integration of GenAI within universities.

Keywords: academic writing; artificial intelligence; GenAI adoption; graduate education; L2 writing; scoping review

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1. Introduction

Academic writing is a crucial component of students' learning in higher education. It is a mode of assessment that reflects students' comprehension of the subject matter, critical thinking, analytical skills, and their research capabilities; thus, it plays a vital role in the success of students at both undergraduate and graduate levels (AlMarwani, 2020; Mudawy & Mousa, 2017). Mastery of academic writing skills is even more crucial at graduate level where students are expected to advance knowledge. At this level, synthesis of ideas from various sources and sustaining an argument (Hyland, 2007) to communicate research findings is an indispensable skill. Despite this, L2 graduate academic writing is laden with many challenges and many graduate find it difficult to master the skill.

For instance, students find it difficult to engage in critical thinking, visualise findings, analyse and synthesise complex datasets and viewpoints to derive meaningful insights for their research that require high-level writing skills (Dahri et al., 2024; Hyland, 2007; Thompson, 2025). L2 graduate students face heightened academic writing demands, as they are expected to demonstrate advanced synthesis, sustained argumentation, and discipline-appropriate rhetorical control. At the same time, they must navigate language barriers and unfamiliar academic conventions, which compound these challenges. As a result, many struggle to produce thesis-level, publication-ready writing despite increased time and effort. This persistent difficulty impedes timely degree completion.

The integration of GenAI tools in academic writing seems to provide new opportunities and innovative pedagogical approaches to assist L2 students in overcoming some of these challenges in advancing their academic and professional pursuits. In fact, research indicates that the integration of GenAI in academic writing is transforming higher education globally by improving writing quality and efficiency (De La Vall & Araya, 2023; Guo & Wang, 2024). It addresses some of the writing challenges encountered by graduate students by providing intelligent support tools that assist in academic writing (Lin & Morrison, 2021; Storey, 2023). Although studies increasingly highlight GenAI's potential to support academic writing, existing evidence continues to focus predominantly on undergraduate learners and broad L2 contexts, excluding L2 graduate students who face more advanced rhetorical and methodological demands.

Furthermore, current research rarely distinguishes how GenAI tools are used by L2 graduate students for genre-specific moves such as argument development, methods reporting, or synthesis which are particularly critical at this level, nor does it examine how multilingual settings shape patterns of adoption and outcomes. Consequently, the field still lacks a systematic mapping of the tools, purposes, reported effects, and contextual factors that influence GenAI use in L2 graduate academic writing within higher education. In response to these identified gaps, this scoping review explores how GenAI is currently being adopted in L2 graduate academic writing within higher education, analysing the tools employed, their intended functions, and the associated benefits and challenges to better inform research, policy, and pedagogical practice.

The review was guided by the following research questions:

1. Which GenAI tools have been adopted to support L2 graduate academic writing in higher education, and for what purposes are they being used by students?
2. What are the reported benefits and concerns associated with the adoption of GenAI tools for L2 academic writing at the graduate level?
3. What gaps exist in the literature regarding the adoption of GenAI in L2 graduate academic writing and what are the implications for future research and practice?

2. Literature Review

Globally, research demonstrates the potential benefits as well as the challenges of integrating GenAI as pedagogical tools in higher education settings. Malik et al. (2023) assert that GenAI tools have become valuable as they offer diverse functionalities to support academic writing. For instance, Chan and Hu (2023), Nguyen et al. (2024), and Usher and Amzalag (2025) affirm that GenAI tools have the ability to communicate complex ideas clearly and persuasively, which is a vital skill for graduate writing.

Further, Lin and Chang (2020) demonstrate that AI tools can provide immediate feedback on grammar, style, structure, coherence, content, and suggest improvements to reduce errors. They can also help students to refine their writing in real-time, enabling iterative improvements in writing, which could boost their confidence. This individualised support is especially valuable for graduate students, who are often expected to synthesise sources critically, use specialised vocabulary accurately, and possess excellent writing skills that enable them to construct coherent arguments and produce high-quality academic writing under tight time constraints (Qi & Li, 2023; Zhang & Wu, 2024).

The complexity associated with scholarly writing is more demanding for L2 graduate students owing to language barriers, unfamiliarity with academic norms, and cultural differences in argumentation styles (e.g. Barkar & Mazzocco, 2024; Lin & Morrison, 2021). This is concerning given the importance of thesis completion for graduation. However, in recent years, GenAI tools have offered promising writing support that enhances writing efficiency and provides linguistic support to improve quality and efficiency in research and writing tasks (Song & Song, 2023).

Through the utilisation of GenAI writing support tools, L2 graduate students can access various resources for grammar, style correction, language translation, and plagiarism detection (Cardon et al., 2023; Roe et al., 2023; Yang & Li, 2024). Tools, such as grammar checkers (e.g., Grammarly) and advanced writing assistants (e.g., ChatGPT), have the potential to enhance academic writing by creating a comprehensive support system that addresses various aspects of the writing process (Cotton et al., 2023). Research suggests that by leveraging GenAI tools effectively, postgraduate students can enhance their writing proficiency, improve the quality of their research outputs, and ultimately achieve academic success in their various fields (Borger et al., 2023).

Additionally, GenAI tools have the potential to personalise learning by adapting to individual needs, a feature that supports graduate students tackling complex writing tasks. These tools' ability to provide contextual information and generate alternative viewpoints can stimulate critical thinking and deeper engagement with the subject matter. As a result, they not only enhance the quality of writing but also contribute to the writer's overall development as a more skilled and reflective scholar (Oubibi et al., 2025; Qawqzeh, 2024). Thus, GenAI writing support tools could be viewed as transforming access to high-quality writing support across diverse educational settings.

In multilingual contexts such as Africa, L2 undergraduate and graduate academic writing is complicated by L1 interference and students' diverse linguistic backgrounds (Amiri & Puteh, 2017; Hashim et al., 2024). GenAI tools with multilingual capabilities, such as translation features or multilingual grammar checkers, can bridge academic writing challenges, thereby supporting students in navigating academic writing in a second language (Omodan & Marongwe, 2024). Research indicates that these can enhance academic writing, promote multilingualism and linguistic inclusivity, and dismantle language barriers (Malik et al., 2023) that have historically hindered academic writing and research for graduate students who use English as a second language (ESL).

In this context, GenAI is not simply a tool for overcoming language barriers; it facilitates clearer and more effective expression of ideas for individuals who might otherwise be marginalised owing to linguistic constraints (Jiang & Hyland, 2025; Liu et al., 2024). For L2 graduate students, GenAI tools could assist them in attaining communicative success by providing improved language outputs on lexical, grammatical, and discourse levels. By doing so, GenAI serves as an empowering force within academic discourse, creating space for a broader and more diverse exchange of ideas. It ensures that voices from various linguistic backgrounds are not only included but also fully understood in all their complexities and nuances (Omodan & Marongwe, 2024).

This technological intervention has the potential to level the playing field significantly, enabling students and scholars from diverse language communities to engage more meaningfully in academic conversations. Thus, GenAI is not just an operational aid in the academic setting; it represents a transformative force that can foster a more inclusive and representative scholarly landscape, enriched by various perspectives and experiences (Balta, 2023).

However, the integration of GenAI tools in education has sparked debates around its ethical and societal implications, including concerns about plagiarism, a potential decline in critical thinking, and diminished creativity (Aljuaid, 2024; Chanpradit, 2025; Omodan & Marongwe, 2024). These concerns underscore the need for a more responsible and balanced approach to GenAI tools adoption in educational contexts, that is, one that gives ethical considerations as much importance as technological advancement.

While research in GenAI tools adoption is widespread at the undergraduate level, its application at the graduate-level academic writing remains underexplored. For instance, a systematic review conducted by Crompton and Burke (2023) on the state of GenAI adoption in higher education research highlighted that 72% of the 138 articles reviewed focused on undergraduate students. This suggests that there is a paucity of research in GenAI adoption at graduate level academic writing.

As a result, this scoping review was conducted to examine research done on GenAI adoption systematically in L2 graduate academic writing within higher education institutions, exploring its benefits and concerns, and identifying any existing gaps in research. By exploring these areas, this scoping review seeks to uncover opportunities for enhancing GenAI integration, determine implications for policy and practice, and identify directions for future studies. This scoping review is, to our knowledge, the first to synthesise evidence systematically on GenAI adoption specifically in L2 graduate academic writing within higher education, outlining the tools used, their purposes, reported benefits and concerns, and context-sensitive gaps to inform future research, policy, and pedagogical practice.

To contextualise this review, we draw on key perspectives from L2 graduate academic writing and emerging scholarship on GenAI adoption in higher education. L2 graduate academic writing is widely recognised as a cognitively demanding and rhetorically complex process requiring advanced synthesis, sustained argumentation, discipline-specific discourse competence, and the ability to produce extended, research-driven genres such as theses and dissertations (Hyland, 2007; Jiang & Hyland, 2025). These demands are heightened for L2 writers, who must simultaneously navigate linguistic barriers, limited lexical resources, unfamiliar academic conventions, and culturally shaped rhetorical expectations. These challenges have been shown to persist even among high-proficiency and postgraduate learners (Bakar & Mazzocco, 2024; Lin & Morrison, 2021).

From a technology-integration standpoint, recent research on GenAI use in higher education suggests that AI-assisted writing tools can provide linguistic scaffolding, improve clarity, facilitate genre modelling, and enhance students' confidence in writing, particularly for those operating in an additional language (Cotton et al., 2023; Roe et al., 2023; Yang & Li, 2024). At the same time, scholars emphasise the importance of context-sensitive adoption frameworks, noting that multilingual regions such as Africa require GenAI integration approaches that consider issues of linguistic diversity, access, ethics, and equity (Hashim et al., 2024; Malik et al., 2023; Omodan & Marongwe, 2024). These perspectives together underscore the relevance of examining how L2 graduate students engage with GenAI tools and provide the conceptual grounding for synthesising existing evidence regarding their adoption in academic writing.

3. Methodology

A scoping review was selected owing to the emergent and heterogeneous nature of GenAI research in the area of L2 graduate writing. This section describes the steps taken to select articles for the scoping review.

3.1 Data Collection

To ensure methodological rigour in the design and reporting of the findings, the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) standards were used to guide this review (Pham et al., 2024; Tricco et al., 2018). A scoping review was chosen because, unlike a systematic review, it is designed to map the breadth of existing evidence and identify gaps rather than evaluate the quality or effectiveness of interventions. In this study, a scoping review was chosen because of the rising interest in the use of GenAI tools in L2 graduate level academic writing. Peer reviewed articles were included in the study if they addressed GenAI tools adoption in L2 graduate academic writing and were written in English.

For this review, L2 graduate academic writing refers to the production of scholarly texts in English as a second language, including research proposals, literature reviews, argumentative essays, and thesis or dissertation chapters, involving both disciplinary knowledge and advanced language skills (Hyland, 2003). Generative artificial intelligence (GenAI) tools assist users to generate, refine, or enhance text, supporting higher-order processes (idea generation, organisation, and argumentation) and surface-level processes (grammar correction, paraphrasing, and vocabulary enhancement). Examples include ChatGPT, Google Gemini, Claude, Grammarly, and QuillBot. These tools can scaffold writing, reduce cognitive load, improve clarity and coherence, and enhance writer confidence (Dillon et al., 2024; Lin, 2023).

Additionally, qualitative, quantitative, and mixed-methods studies were considered in order to measure different perspectives on GenAI tools' adoption at L2 graduate level academic writing. Papers were excluded if they did not fit into this conceptual framework. For example, papers were excluded if they did not specifically focus on GenAI tools' adoption at L2 graduate level academic writing (e.g. undergraduate writing). As GenAI is still a relatively new area of research at the graduate student level (Crompton & Burke, 2023), no temporal restrictions were applied to the search strategy; the search period was left open to capture the full scope of relevant literature. To ensure transparency of the methodology, the steps taken are described in detail in the following sections.

3.1.1 Search Strategy

With the assistance of an experienced librarian, a search strategy was developed using key terms with their associated synonyms as indicated in Table 1 below:

Table 1: Key words and synonyms used in data mining

Key words	Synonyms
L2	ESL English second language learners, non-native speakers, EFL, English foreign language learners
Graduate students	Graduate writers, graduate learners, doctoral students/candidates, research students, PhD students, Master's students, postgraduate students
Academic writing	Research writing, thesis writing, dissertation writing
AI	Technology, technology-mediated writing, artificial intelligence, AI-assisted writing, AI-powered writing, AI-based writing, AI usage, AI integration, AI adoption, AI writing assistance, AI tools
Adoption	Implementation, use, integration, application

To select relevant articles for this review, the following databases were searched: Web of Science; Scopus; EBSCOhost and Google Scholar. These databases provided support for a complex and comprehensive search.

3.1.2 Screening

Once the search had been completed, all the team members participated in the identification of duplicate articles. A total of four (N = 4) duplicate articles were identified and removed. Four reviewers working in pairs screened the databases search results using titles and abstracts to select the articles that met the inclusion criteria. The inclusion and exclusion criteria are summarised in Table 2 below:

Table 2: Inclusion and exclusion criteria

Inclusion	Exclusion
Population/participants: L2 graduate students or graduate writers, graduate learners, doctoral students/candidates, research students, PhD students, master's students, postgraduate students, English second language graduate students, ESL graduate students/learners, English non-native speakers graduate students, English foreign language graduate students, EFL graduate students, universities, / higher education/tertiary	Undergraduate students, non- colleges/ secondary schools
Study design: all study designs - qualitative, quantitative, mixed methods, case studies, pilot studies	Systematic reviews, conference presentations, non-peer reviewed articles, conference abstracts
Interventions: graduate academic writing support/ intervention	Undergraduate academic writing support
Studies published from January 2020 to April 2025	Studies published before 2020
Empirical research articles	Non-empirical studies

Upon completion of the screening process, the two pairs met to seek consensus on the selected articles. This process yielded eight (8) articles from a total of 117 as indicated in Figure 1 below:

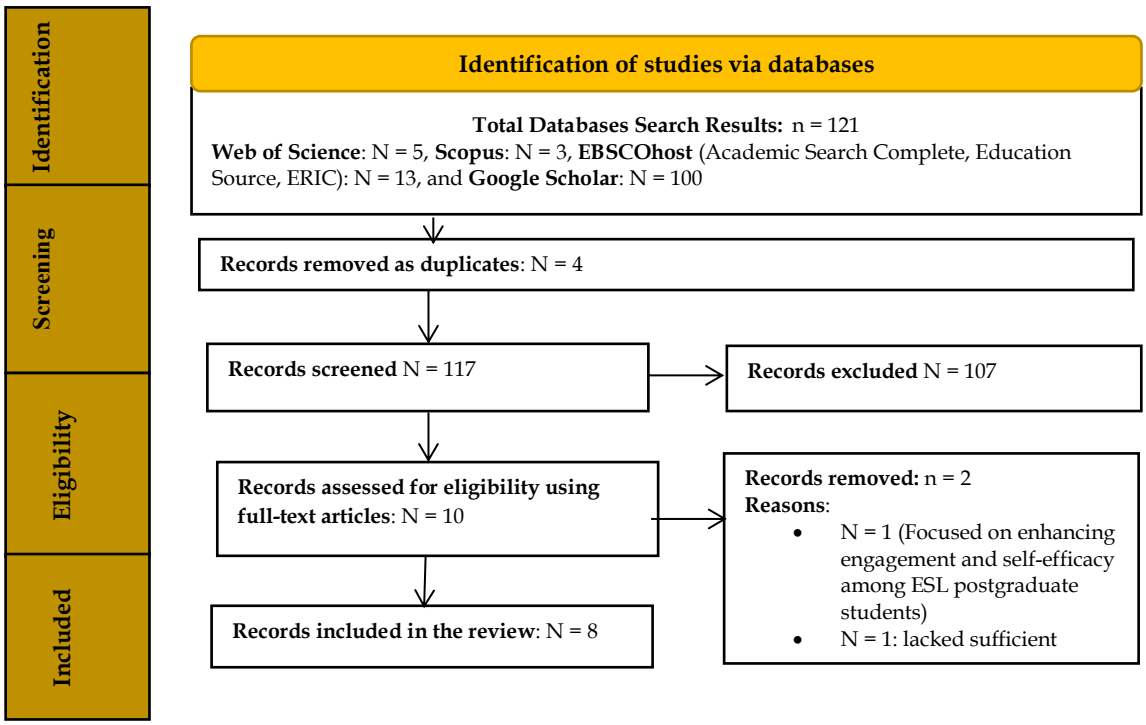

Figure 1: PRISMA flow chart of article identification and screening

3.1.3 Charting the Data

Four reviewers jointly developed a data charting form to determine which variables to extract from the eight articles under review. The following headings were agreed upon: author, year and title, country, study aims/objectives, study design, data collection methods, population characteristics and sample size, GenAI tools adopted and purpose, benefits of using the GenAI tools, students' perceptions and attitudes towards the tool, students' concerns towards the tool, pedagogical interventions on GenAI use, implications (policy and pedagogical), and gaps highlighted for future research. The reviewers split into two pairs, with each pair assigned four articles to review and complete the data extraction matrix independently. The pairs then reconvened to cross-check entries, ensuring consistency and completeness of the extracted data.

Out of the eight articles, only one study was conducted in an English-speaking country i.e. the United States of America; five were in ESL contexts while the remaining two were in EFL contexts. Five of the studies were conducted in Asian countries, two in Europe and one in America (See Appendix 1 for detailed characteristics of the eight articles).

3.2 Data analysis

The team reviewed the matrix thoroughly to ensure that it fully captured the data. A thematic analysis approach was applied to synthesise and interpret the

extracted data in relation to the scoping review research questions. Data from each of the eight studies were coded according to patterns relevant to the adoption and use of generative AI tools for L2 graduate academic writing in higher education. Codes were then organised into themes that addressed: (a) the types of generative AI tools adopted and their purposes; (b) the reported benefits and concerns associated with their adoption; and (c) the gaps in literature and implications for future research and practice. This process allowed for a structured synthesis of findings, ensuring that the analysis remained closely aligned with the aims of the review.

4. Results and Findings

The presentation and discussion of the findings below are guided by the study's research questions.

4.1 GenAI tools adopted to support L2 graduate academic writing in higher education

Data from the reviewed articles revealed that ChatGPT, Grammarly, Quillbot, and Google Translate had been adopted in graduate academic writing. The results indicated that the adoption of ChatGPT was most common, with all the studies highlighting its use in graduate academic writing. Grammarly, Quillbot and Google Translate appeared in two studies (See Appendix 1).

4.2 Purposes for which the tools were used by students

Overall, the results indicate that students used the Gen AI tools for various purposes to enhance their writing performance. The purposes for which they used the tools include the following:

4.2.1 Language Support Tools

The findings indicate that one of the main uses of writing assistant tools such as Grammarly, ChatGPT and online translators was in the area of language support. The students in the reviewed studies indicated that the tools supported them in editing and revision of papers, focusing on refining language to meet academic standards, coherence and clarity. They indicated that they used the tools particularly to assist them in paraphrasing ideas, translation, and error correction. Tools such as ChatGPT were used as a reference to guide students in vocabulary usage, paraphrasing and summarising ideas, generating correctly structured sentences, and providing revision suggestions (Milton et al., 2024; Shen & Chen, 2025). Overall, students used these tools to enhance their writing quality.

4.2.2 Knowledge Inquiry

Results indicate that ChatGPT was most popular for knowledge inquiry and guidance. Students used it as a source of information to generate ideas, seek explanations of theories, seek multiple perspectives on concepts and fill knowledge gaps (Almousa & AbuSa'aleek, 2025). Students also used the tool to seek assistance on documentation regarding adhering to APA referencing guidelines (Cheng et al., 2025). The results indicate that students used the tool throughout the writing process from brainstorming, drafting, revising and editing to overcome challenges in the writing process. This, according to them, saved them a great deal of time.

4.2.3 Research
The findings also revealed that students utilised ChatGPT to provide an extensive range of literature instantly and hence assist them to retrieve relevant information needed for their papers. Furthermore, students indicated that it helped them to summarise and synthesise key information from literature.

4.3 Reported benefits of AI adoption in academic writing
Several benefits associated with the adoption of GenAI tools in graduate academic writing were identified. For instance, students found ChatGPT to be a valuable tool as it offered diverse functionalities that revolutionised their writing processes. This resulted in improved theses' structures. Through the use of this tool, students reported that they were able to refine their language, make alternative word choices, and suitable expressions. They indicated that the use of GenAI tools improved language aspects such as article usage, punctuation and helped in removing redundancies. They found the tool to be more efficient in looking for definitions and explanations compared to traditional methods. Generally, students viewed ChatGPT as an 'expert' editor which facilitated improved writing performance (see Shen & Chen, 2025).

In addition, EFL students reported satisfaction with the use of Google translate as it facilitated meaningful translation of information from one language to another enabling them to write their papers in English (Kramar et al, 2024). Another reported benefit of GenAI tools' adoption in graduate academic writing was the development of critical thinking skills. For instance, the use of ChatGPT developed students' critical thinking skills as they had to decode GenAI generated texts through engagement with the tool in their own writing, exploring how it works, and questioning the quality of its outputs (Ou et al., 2024).

4.4 Concerns with GenAI adoption in graduate academic writing
Despite the benefits associated with GenAI tools adoption in graduate academic writing, students highlighted several concerns with their usage. For instance, one of the concerns with ChatGPT was that in some instances, it did not provide accurate information or authentic references, while it seemed to provide biased information (Almousa & AbuSa'aleek, 2025). With regard to online translators, students were concerned about the accuracy and quality of the information they provided (Kramar et al., 2024).

Academic integrity concerns were prevalent in all the eight studies, especially with ChatGPT use. Students reported that the use of GenAI tools had the potential to increase academic misconduct such as plagiarism. For example, in one of the studies, masters' degree students from an EFL background indicated that they lacked sufficient language proficiency and critical knowledge, and that affected their judgments and assessments of GenAI-generated content (Shen & Chen, 2025).

In addition, other concerns were on issues of overreliance on GenAI tools such as ChatGPT. Students indicated that this was detrimental to their cognitive skills. The results showed that students who did not have sufficient knowledge on ChatGPT's limitations did not pay attention to detail and accepted its suggestions

as they were (Kramar et al., 2024). This hindered their critical thinking skills and the ability to be innovative. Consequently, their academic writing development was negatively affected.

The findings also revealed that while ChatGPT could provide feedback to common writing issues, it had limitations such as the inability to provide suggestions for improving specialised individual needs in academic writing. For example, it could not explain how students could solve language problems. The results further indicated that students were concerned that ChatGPT generated content lacked interpersonal depth (Zhang & An, 2025).

4.5 Intervention measures taken in the adoption of GenAI tools in academic writing

The results indicated that only three out of the eight studies had provided some training or intervention programmes to students on GenAI adoption in academic writing. For instance, in Kramar et al.'s (2024) study, 11 EFL graduate students were introduced to the functionalities of Grammarly, Quillbot and ChatGPT in a workshop conducted by their lecturer before they were asked to use these tools to support their writing. In the workshop, they were also made aware of the risks of over relying on these tools.

In the second study by Cheng et al. (2025), ESL graduate students were offered a comprehensive training session on responsible GenAI tools use using Warschauer et al.'s (2023) AI literacy framework before they were asked to use the tools in their writing. The training provided a foundation on the potential of ChatGPT in research writing and ethical use of GenAI tools. The last study by Ou et al. (2024) provided a comprehensive training on the use of ChatGPT from the initial stages of academic writing to ethical use of the tool. The results indicated that, in these studies, there were minimal challenges regarding the responsible use of GenAI tools.

5. Discussion

The present study sought to explore the current state of GenAI adoption in L2 graduate academic writing within higher education institutions. It further explored which GenAI tools had been adopted to support L2 graduate writing and the purposes for which they were used by students. The review also endeavoured to establish what published research reports regarding the benefits and concerns associated with GenAI adoption at graduate level academic writing. Lastly, the study sought to identify existing gaps in the literature on GenAI adoption at graduate academic writing and implications for future research and practice.

The findings indicated that GenAI tools such ChatGPT, Grammarly, Quill Bot, and Google translate had been adopted in L2 graduate academic writing. ChatGPT was the most popular owing to the fact that it provided a range of features that greatly enhanced students and researchers' writing skills. Its instant responsiveness was also key to enhancing the overall learning experience (Albariqi, 2024) of the graduate students. This is consistent with the findings of

Kasneci et al. (2023), who observed its extensive adoption even at undergraduate level.

In addition, the review highlighted that L2 graduate students used the tools for several purposes. These included language support, translation, and knowledge inquiry. Consequently, the use of these tools helped to break linguistic barriers and enhance inclusivity of students from diverse backgrounds (Malik et al., 2023). Generally, these findings are consistent with studies that discuss the benefits of GenAI adoption in enhancing academic writing (see for example, Oubibi et al., 2025; Qawqzeh, 2024). This has pedagogical implications on how academic writing can be taught in the era of AI, where students seem to collaborate with these tools to enhance their writing skills. In other words, GenAI is reshaping how students approach academic writing processes. Because of this shift, institutions need to provide frameworks or guidelines to ensure that the adoption of GenAI tools by graduate students is done not just as a shortcut but in a pedagogically meaningful way.

Although the findings showed several benefits of GenAI tools usage in supporting graduate academic writing, concerns were also raised about their limitations. The results indicated an overreliance on GenAI-generated content by students leading to a compromise on critical issues in graduate academic writing such as authorship and originality (Gao et al., 2023; Markey et al., 2024). An interesting observation is that the results indicate that students who had received interventions or training prior to the use of the GenAI tools were aware of these limitations and used them with caution in contrast to their untrained counterparts who did not use the tools responsibly. The results provide a picture of how students collaborate with GenAI tools differently depending on whether they were trained or not. This underscores the need to offer training to graduate students on the responsible use of GenAI tools. Thus, the review challenges the assumption that graduate students, as digital natives, inherently know how to use the tools responsibly in academic settings.

Several gaps were identified from the review, providing opportunities for future investigation. Firstly, the study identified eight articles that addressed the adoption of GenAI tools in graduate academic writing across various settings. Five out of the eight studies were conducted in Asian countries, two from Europe and one from the USA with continents such as Africa, South America, Australia and Antarctica not represented at all (see Appendix 1). Of note, is the fact that the eight studies were conducted in either 2024 or 2025, highlighting that GenAI adoption at graduate academic writing is an emerging research area.

This paucity of research on GenAI adoption at graduate level seems to also suggest that scholars have not been paying enough attention to this crucial dimension. Research needs to be conducted to obtain different perspectives from a wide array of contexts on how GenAI tools can be harnessed in graduate academic writing. These results corroborate Crompton and Burke's (2023) systematic review results which highlight a high publication rate of GenAI papers in Asian countries and a paucity of GenAI research at graduate level.

Secondly, a gap in methodology was identified in these studies. Out of the eight studies, five studies employed the qualitative study design, two used the mixed methods, and one was quantitative. The main data gathering methods for the qualitative methods were semi-structured interviews, focus group discussions, and observations while the quantitative study used a questionnaire. Qualitative research studies are context specific and normally deal with small samples; hence results cannot be generalised. Therefore, future research can consider using experimental designs for generalisability of results. Replicating the qualitative studies can be done in different contexts to validate the findings. The use of document analysis can also be considered to advance insights on the actual outcomes on students' writing after adopting GenAI tools in their academic writing.

Thirdly, the review indicated the absence of deliberate pedagogical interventions or training to guide students on how they could use GenAI to enhance their academic writing. This was evident in five out of the eight studies. Only one of the three institutions that had offered some interventions had an AI literacy framework and an AI use policy which provided guidelines to students (See Appendix 1). In these cases, there was evidence of responsible use of the tools by the students. In fact, there seemed to be a correlation between the presence of an institutional AI literacy policy or framework and responsible use of GenAI tools by the students. The evidence shows that formal structures, policies and training are necessary to shape ethical behaviour among students.

The implication of this is that there should be a shift from individual ethics to systematic institutional governance where academic integrity in the AI era is viewed as a shared responsibility between institutions and students. Furthermore, higher education institutions need to rethink their assessment strategies to include personalised and critically reflective assignments to avoid the possibility of students submitting GenAI-generated work. Future research could investigate whether universities have realigned their assessment strategies in the realisation that GenAI is here to stay.

This scoping review extended research on GenAI adoption at graduate level academic writing to identify existing research in the area. However, it had limitations that must be highlighted. Firstly, the research was limited to peer reviewed open access journal articles only. This meant that we could not access subscription-based journal articles. Secondly, grey literature was not considered. Thus, the findings may not be a completely true reflection of the current status of GenAI adoption at graduate level. In spite of these limitations, the strength of this study lies in the use of several databases which offered advanced search tools that facilitated the refinement of the search strategy and enabled us to identify reliable and relevant scholarly articles.

6. Conclusion

This scoping review was a response to a call by Crompton and Burke (2023) who conducted a systematic review. They established that the majority of research on GenAI adoption was at undergraduate level and more research was needed at

graduate level. The findings of this review indicate an underrepresentation of studies on GenAI tools adoption at graduate level academic writing across different contexts as only eight articles were found relevant for this scoping review. Generally, the findings revealed a trend of GenAI tools' adoption at graduate level to support academic writing skills, with ChatGPT being the most popular owing to its many functionalities. However, the findings indicated lack of guidance from most institutions on GenAI usage; this was detrimental to students' academic integrity and critical thinking skills.

Taken together, these findings highlight the need for higher education institutions to develop context-sensitive GenAI policies, provide structured training for graduate students, and reconsider assessment designs to maintain academic integrity in an AI-enabled learning environment. Universities should therefore take the initiative to provide pedagogically grounded GenAI frameworks and policies to ensure that the tools are used, not as replacements, but as assistants to students' academic writing development.

Future research should examine GenAI adoption at graduate level across underrepresented regions such as Africa, South America, and Australia; employ more robust methodological designs, including experimental and longitudinal studies; and explore the impact of GenAI on actual writing outcomes through document analysis. By addressing these gaps, future studies can deepen our understanding of how GenAI can be integrated ethically and effectively to support L2 graduate academic writing.

Conflict of Interest

The authors declare no conflict of interest. The authors acknowledge the assistance offered by Khutsafalo Kadimo, a Senior Librarian at the University of Botswana, in the identification of studies from the databases.

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Appendix 1: Characteristics of the articles reviewed

No	Author & Year	Country	GenAI tools adopted	Purpose of adoption	Reported Benefits and outcomes of GenAI tools adoption	Reported Concerns of GenAI tools adoption	Evidence of AI policy and intervention strategies
1	Kramar, N., Bedrych, Y., & Shelkovnikova, Z. 2024	Ukraine	ChatGPT Grammarly online translators (Google Translate) Quillbot	-revision and editing –translating from L1 to English	-improved language -reduction of redundancies -improved writing performance for the intervention group (11 students) -helped with translation from L1 to English	-issues of academic integrity especially with the use of ChatGPT. - accuracy and quality of Online translators e.g. Google Translate	-no institutional policy -intervention in the form of a workshop with 11 students on how to use GenAI tools
2	Shen, Y., & Chen, L. 2025	Malaysia	ChatGPT	-language editing (paraphrasing, translation & error correction) -knowledge inquiry	-improved grammar, vocabulary and content specific expression -improved idea generation	-lack of sufficient language proficiency and critical knowledge led to overreliance on the tools	-no institutional policy -no interventions

3	Almousa, M. M., & AbuSa'aleek, A. O. 2025	Saudi Arabia	ChatGPT	-students used it throughout all thesis writing stages to overcome challenges in the writing process, e.g. idea generation, as a source of information, as an analysing tool, as a language support tool for proof reading and coherence enhancement	-improve theses structure. -helped with refining language, offered alternative word choices, and suitable expressions.	-accuracy of information provided by ChatGPT	-no institutional policy -no interventions
4	Cheng, D., Li, M., & Lee, T. 2025	United States of America	ChatGPT	-content generation -guidance on APA referencing -language use	- improved clarity, coherence and language use - skilful prompting abilities which enabled them to get the most out of the tool.	-ethical use of ChatGPT and a realisation that the tool had its own limitations.	-institutional AI policy which required them to document AI tool usage. -students were offered a comprehensive training session on responsible AI use using Warschauer et al's (2023) AI literacy framework .
5	Zhang, W., & An, S. 2025	China	ChatGPT	-proofreading of essays -translation assistant	- enabled students to write essays in academic style - assisted with reading providing an extensive range of literature rapidly -gathered and summarised key information from literature -synthesised information from various sources	-hindered students thinking and innovative s- Lacked interpersonal skills -lacked professional knowledge required by graduate students -did not provide suggestions for improving specialised individual needs in academic writing skills	-no institutional policy -no interventions

6	Ou, A. W., Khuder, B., Franzetti, S., & Negretti, R. 2024	Sweden	ChatGPT	-to develop critical skills necessary for employing GenAI tools ethically and effectively in the writing process	-enabled students to develop critical thinking by freely engaging with GAI -enabled them to decipher the quality AI generated content	-non	-training on the ethical use of ChatGPT prior to use
7	Milton, C., Vidhya, L., & Thiruvengadam, G. 2024	India	ChatGPT, Grammarly, Quillbot, Google Translate	-used AIPWT to refine grammar and vocabulary -content generation -fact checking	-improved writing quality -spelling and grammar verification -improved idea generation -reduced time and stress for completing assignments	-could affect independent writing	-no institutional policy -no interventions
8	Dillon, A., Chell, G., Al Ameri, N., Alsayed, N., Salem, Y., Turner, M., & Gallagher, K. 2024	United Arab Emirates	ChatGPT	- -reflected on affordances and challenges of using ChatGPT in academic writing	-ability to democratise academic writing for non-native English speakers - ability to provide new approaches to academic writing	-ethical use of LLMs and issues of academic integrity -issue of authorship - overreliance could lead to loss of essential writing skills.	-no institutional policy -no interventions