

DIGITALLY MEDIATED THESIS WRITING AMONG ELT UNDERGRADUATES: STRATEGIC PATTERNS OF MULTI-TOOL INTEGRATION ACROSS WRITING STAGES

¹*Sheila Agustina, ¹Fika Megawati, ¹Sandrina Bilqis, ²Nurkamilah

¹English Language Education, Faculty of Psychology and Education, Universitas Muhammadiyah Sidoarjo, Indonesia

²College of Education, Pennsylvania State University, USA

*Corresponding Author Email: sheilaagustina@umsida.ac.id

Article Info	Abstract
Article History Received: March 2026 Revised: June 2026 Accepted: August 2026 Published: October 2026	<i>The increasing integration of digital tools into academic writing has transformed how students compose, revise, and conceptualize scholarly work. Existing research has examined artificial intelligence and writing support technologies in general classroom contexts, but limited attention has been paid to how undergraduate students employ these tools in high-stakes academic tasks such as thesis writing. This gap is particularly significant in English as a Foreign Language (EFL) settings, where linguistic and rhetorical demands are intensified. Accordingly, this study investigates how Indonesian undergraduate ELT students integrate digital tools into their thesis writing. It focuses on the types of tools used, the stages of writing they support, students' motivations, and patterns of integration. Using a qualitative case study design, data were collected from 38 students through open-ended questionnaires and analyzed thematically. The findings reveal that students engage with a range of generative, translation, and language-refinement tools across multiple stages of thesis writing, particularly during editing, literature review, and discussion development. An iterative draft–consult–revise cycle also emerged as a central integration pattern. It indicates that students maintain agency while coordinating digital mediation. The study concludes that digitally mediated thesis writing reflects emerging forms of academic literacy, which underscore the need for structured digital literacy guidance within ELT writing pedagogy.</i>
Keywords Thesis writing; Digital tool; English language teaching; Undergraduate students; Writing strategy;	
How to cite: Agustina, S., Megawati, F., Bilqis, S., & Nurkamilah, N. (2026). Digitally Mediated Thesis Writing Among ELT Undergraduates: Strategic Patterns of Multi-Tool Integration Across Writing Stages, <i>JOLLT Journal of Languages and Language Teaching</i> , 14(4), 1330-1343. Doi: https://doi.org/10.33394/joltt.v14i4.19911	

Copyright© 2026, Sheila Agustina et al.

This is an open-access article under the [CC-BY-SA](#) License



INTRODUCTION

In English Language Teaching (ELT), writing remains a key academic practice, especially in undergraduate thesis writing (Ariza Pinzón et al., 2019; Prihandoko, 2024; Utami & Kuswandono, 2023). Thesis writing is where students are expected to show both research competence and disciplinary literacy. Traditionally, thesis writing has been understood as an individual cognitive and linguistic effort that involves extensive reading, drafting, revising, and argument development. However, academic writing today increasingly takes place within digitally rich environments (Barton & McCulloch, 2018; Ramadhan et al., 2024; Saugmann, 2024). Students compose while interacting with translation platforms, grammar checkers, plagiarism detection systems, online search engines, citation managers, and generative text technologies. Because of this, academic writing can no longer be

understood purely as an individual mental activity. It is shaped, and sometimes reshaped, through ongoing interaction with digital tools.

This shift calls for a reconsideration of how writing is conceptualized. From a sociomaterial perspective, writing develops through the interaction between writers and the material resources they use (Kervin et al., 2017; Loo, 2022), including technological tools. Digital platforms do not simply neutrally support writers. In fact, they can influence word choice, sentence structure, revision strategies, and even the way arguments are organized (Valerio, 2025; Eragamreddy & Joseph, 2025; Gulamovna, 2025). Grammar checkers may encourage syntactic change, translation tools help mediate meaning across languages, and generative systems can assist writers in starting or expanding their ideas. In this sense, academic texts are shaped not only by students' intentions but also by the digital tools they use. Yet, although such tools are now embedded in everyday academic practice, we still know relatively little about how students negotiate control, authorship, and decision-making in these digitally mediated environments (Deep & Chen, 2025; Xena et al., 2025).

Existing research on technology-assisted writing has often focused on artificial intelligence, highlighting either its efficiency benefits or its ethical risks (Atan et al., 2024; Cladis, 2020; Tusino et al., 2024). Studies have reported improvements in revision quality, time management, and linguistic accuracy through digital tools, while also raising concerns about overreliance, superficial engagement with sources, and academic integrity. However, much of this scholarship examines tools in isolation, particularly generative AI (Deep & Chen, 2025; Graham & Milan, 2025), without looking at the broader ecology in which students combine multiple digital resources during high-stakes writing tasks. As a result, digital mediation is frequently treated as a feature of individual tools rather than as a systemic condition shaping the writing process itself.

This issue is particularly relevant in English as a Foreign Language (EFL) contexts such as Indonesia. In Indonesia, undergraduate ELT students are often required to write research articles in English (Malik & Setiawan, 2025). They often deal with linguistic challenges and institutional expectations. In this situation, digital tools can function as linguistic scaffolds that support grammar, vocabulary, organization, and engagement with academic sources (Azizah et al., 2025; Hanura & Widiarti, 2025; Rafida et al., 2024). At the same time, these tools can also shape how students develop a thesis topic, search and synthesize literature, articulate methodology, construct discussion sections, edit for language accuracy, manage citations, and check originality. Therefore, the central issue is not simply whether digital tools are beneficial or problematic. Rather, it involves understanding how students strategically combine different tools at various stages of thesis writing, and how this process influences their development as academic writers.

Although some studies in Indonesia have started to examine students' perceptions of technology use in academic writing (Azizah et al., 2025; Ginting et al., 2023; Rafida et al., 2024), detailed investigations of digitally mediated writing practices in undergraduate thesis contexts are still limited. Much existing research relies on general surveys of technology acceptance or focuses on individual tools in isolation. As a result, less attention has been given to how students combine different platforms, distribute writing tasks across tools, or maintain authorial control, academic integrity, and critical engagement with sources while doing so. This tension becomes especially pressing as digital tools grow more capable of generating and revising text on students' behalf. The present study addresses this gap by examining thesis writing as embedded within a digital tool ecosystem, focusing on how students strategically integrate multiple tools, rather than relying on any single tool, across the stages of the writing process.

To address this gap, the present study views undergraduate thesis writing as a digitally mediated academic practice and adopts a qualitative case study approach to explore students'

lived writing experiences. Specifically, this study addresses the following research questions: What digital tools do undergraduate ELT students use during thesis writing?; At which stages of the thesis-writing process are these tools used?; What motivates students' choice of particular tools?; and How do students integrate digitally generated or digitally supported outputs into their own writing?

By highlighting students' perspectives and focusing on writing processes rather than final products, this study seeks to show how digital literacy is enacted in a high-stakes academic context. Understanding these practices has important implications for ELT pedagogy. If digital mediation is already embedded in students' writing routines, thesis supervision and academic writing instruction need to address it explicitly. Furthermore, digital tools should not be seen merely as external aids or potential threats. Rather, they form part of the writing environment in which students work. Without proper guidance, students may focus on speed and surface-level corrections rather than engaging more deeply with academic sources. However, with structured support, digital tools can act as scaffolds that support linguistic development, self-regulation, and participation in academic discourse. By documenting how Indonesian ELT undergraduates navigate this digital writing environment, this study provides context-sensitive insights for promoting responsible and strategic digital literacy in higher education.

RESEARCH METHOD

Research Design

This study employed a qualitative research approach using a case study design. A qualitative design was selected because the study aimed to explore students' experiences, strategies, and decision-making processes (Creswell & Poth, 2018; Velez et al., 2023) in integrating digital tools during thesis writing. Rather than measuring causal relationships, the study sought to provide an in-depth understanding of how digitally mediated academic writing practices are enacted within a specific institutional context.

The case study design allowed the researchers to investigate a bounded system, which is one cohort of undergraduate ELT students in a single university program, where thesis writing is a mandatory graduation requirement. This cohort was particularly well-suited to the study's focus because, as final-year students actively engaged in thesis writing within a digitally saturated academic environment, they were positioned to provide direct and reflective accounts of how digital tools shape high-stakes academic writing in practice. The primary analytical focus of the study was on four interconnected dimensions of digitally mediated writing practices: (1) types of digital tools used, (2) stages of thesis writing in which tools were employed, (3) students' rationales for selecting specific tools, and (4) modes of integrating digital outputs into their own writing. These dimensions functioned as guiding analytical categories rather than statistical variables. Although qualitative in orientation, descriptive counts were incorporated to indicate the relative frequency of tool usage and thematic patterns across participants. These counts served to support interpretive analysis rather than to produce statistical generalization.

Research Participants

The participants included the entire population of one cohort of undergraduate students (N = 38) enrolled in the eighth (final) semester of the English Language Teaching (ELT) program at a private university in Indonesia. At the time of data collection, students were either actively completing their undergraduate thesis or had completed it within the past year. This ensured that all participants had direct and recent experience with digitally mediated thesis writing practices. All participants had also completed two writing-related courses in earlier semesters: Essay Writing in the second semester and Academic Writing in the third semester. They also completed the Media and Technology in ELT course in the fourth

semester, which was intended to introduce digital tools relevant to language teaching and learning. This shared academic background provided participants with a comparable foundation in both academic writing conventions and prior exposure to digital tools before undertaking thesis writing.

Participants were selected using a total population sampling technique, as all members of the cohort were invited to take part in the study. Participation was voluntary and anonymous. Among the respondents, 67.6% identified as female, 16.2% as male, and 16.2% chose not to disclose their gender. This distribution reflects the broader demographic composition pattern commonly found in Indonesian ELT programs.

Instruments

The main instrument for data collection was an online questionnaire consisting of four open-ended questions. The questionnaire was designed to gather detailed descriptions of students' digitally mediated writing practices. Its development was guided by the study's conceptual framework and research objectives. Before being distributed, the questionnaire was reviewed by two experts in ELT and educational research to check its clarity, relevance, and alignment with the research focus. Minor revisions were made to the wording based on their feedback. The four questions asked participants to describe the digital tools they used during thesis writing, the stages of the thesis process in which these tools were used, their reasons for choosing particular tools, and how they incorporated digital outputs into their writing process.

The questionnaire was administered through Google Forms. Participants were informed on the form that submitting their responses constituted their consent to be included in the study, and participation remained voluntary throughout. The form was distributed to the cohort and remained open for one week, with responses automatically and securely recorded within Google Forms for subsequent coding and analysis.

Data Analysis

Data analysis followed the six-phase thematic analysis framework proposed by Braun and Clarke (Braun & Clarke, 2006): (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) reporting the findings. First, all responses were read several times to develop familiarity with the dataset. Second, initial codes were generated to capture meaningful segments related to tool use, stages of writing, students' motivations, and strategies for integrating digital outputs into their work. To help organize the textual data systematically, Python programming was used during the early coding stage. Basic preprocessing procedures, such as tokenization, lemmatization, and the removal of common stop words, were applied to identify similar lexical patterns across responses. These computational steps served as analytical support rather than as automated interpretation.

After the initial coding stage, related codes were grouped into broader themes that represented recurring patterns in students' digitally mediated writing practices. The themes were then reviewed and refined through repeated reading to ensure internal coherence and consistency with the dataset. Descriptive counts were also calculated to show how often particular tools or themes appeared in the responses. These counts were used only to illustrate patterns within the cohort, rather than to make statistical generalizations.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

In response to the research questions, the findings reveal four interconnected patterns in how participants engaged with digital tools during thesis writing. First, students drew on a broad ecosystem of tools rather than a single platform (RQ1). Second, tool use was sensitive to the specific stage of the writing process, concentrated most heavily around editing,

literature review, and discussion writing (RQ2). Third, students' reported motivations centered on efficiency, linguistic support, and idea development (RQ3). Fourth, students described a recurring draft–consult–revise cycle through which digital outputs were filtered and adapted rather than adopted verbatim (RQ4). These patterns are presented below as they emerged from participants' self-reported accounts and should be read as reflecting students' perceptions and practices within this case, rather than as evidence that digital tools objectively improve thesis quality.

The Digital Tools that Undergraduate ELT Students Use During Thesis Writing

The findings show that undergraduate ELT students use a wide range of digital tools throughout the thesis writing process. Rather than relying on a single application, students draw on multiple platforms that serve different but complementary functions in their academic work (see Figure 1).

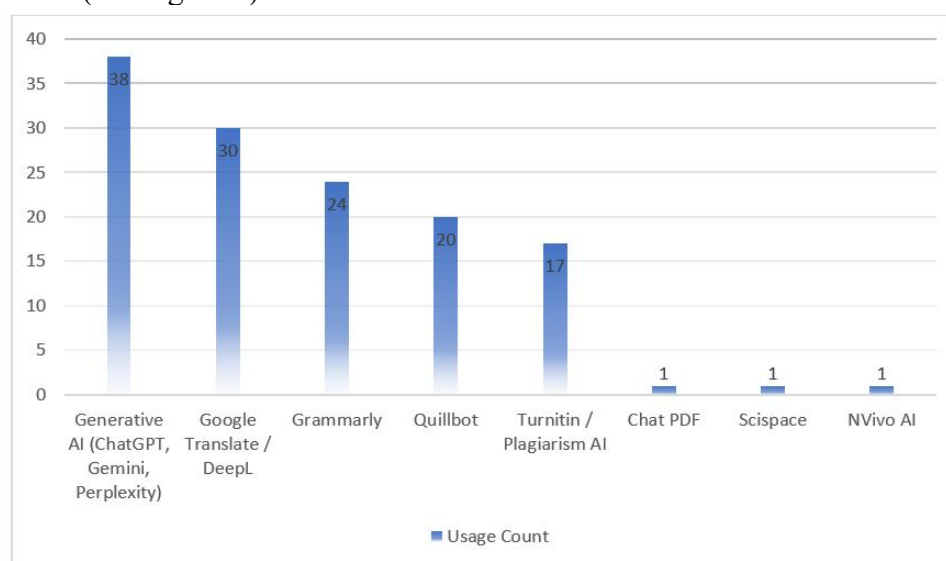


Figure 1. Digital Tool Usage Among Participants

The analysis indicates a strong presence of generative writing tools, particularly ChatGPT, which was mentioned by 38 participants. Students described using this tool for brainstorming, drafting preliminary sections, clarifying theoretical concepts, and reformulating sentences. Its flexibility appears to position it as a central resource within students' digital writing practices. However, its use was rarely isolated; instead, it functioned as one component within a broader network of digital supports. Translation and language-support tools were also frequently mentioned, particularly Google Translate (30 mentions), DeepL (24 mentions), and Grammarly. These tools were commonly used to improve clarity, grammatical accuracy, and lexical choice. For Indonesian EFL students writing in English, such tools appear to function as linguistic scaffolds that help them manage the cognitive demands of academic writing. Rather than replacing their writing efforts, students often used these tools to check and refine their own drafts.

In addition, paraphrasing and originality-checking tools were also widely reported, particularly QuillBot (20 mentions) and Turnitin (17 mentions). Their use suggests that students are attentive to issues of paraphrasing and academic integrity. The integration of these tools also reflects an awareness of institutional expectations related to plagiarism and originality. In this sense, digital tools serve not only linguistic functions but also regulatory and evaluative roles in the academic writing process. Other specialized platforms, including ChatPDF, Gemini, Perplexity, SciSpace, and NVivo AI, were mentioned less frequently. Their limited use may reflect differences in access, familiarity, or perceived relevance to

undergraduate thesis writing. This pattern suggests that students tend to rely more on widely accessible and user-friendly platforms than on specialized research tools.

Importantly, the data show that students often adopt a multi-tool strategy. Many participants reported using three to five digital tools in combination, selecting particular platforms for specific writing tasks. A typical workflow involved generating ideas or clarifying concepts with a generative tool, refining grammar through a language checker, consulting translation tools for lexical confirmation, and checking originality using plagiarism-detection software. This layered approach suggests that students are not simply relying on digital outputs but are actively coordinating multiple technological resources to manage different aspects of academic writing.

The Stages of Thesis Writing in Which Tools Were Employed

The findings also show that students' digitally mediated writing practices vary across different stages of thesis development. Rather than using digital tools in the same way throughout the process, participants reported selective tools depending on the specific demands of each writing stage (see Figure 2).

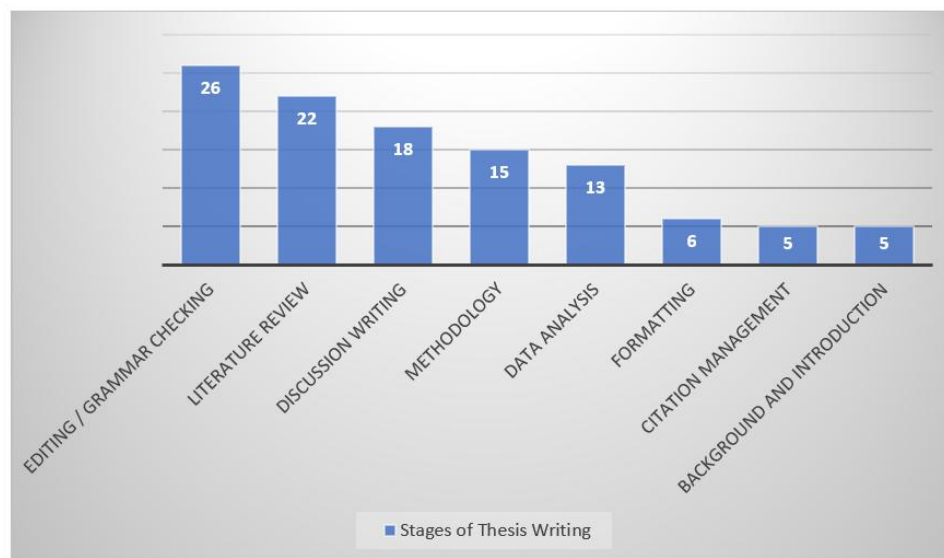


Figure 2. Stages of Thesis Writing Supported by Digital Tools

The highest frequency of tool usage was reported during the editing and language refinement stage. Students frequently relied on grammar-checking, paraphrasing, and generative tools to revise sentence structure, improve clarity, and ensure linguistic accuracy. This pattern suggests that digital tools function primarily as revision supports within students' writing workflows. For many participants, these platforms functioned as tools for checking language choices and improving textual coherence after completing initial drafts.

Beyond editing, digital tools were also widely used during the literature review and discussion stages. Participants reported using different platforms to summarize scholarly articles, reformulate theoretical explanations, and clarify unfamiliar terminology. At these stages, digital tools appeared to help students navigate complex academic texts and organize conceptual arguments. This pattern suggests that digital mediation goes beyond surface-level correction and becomes part of the processes of reading comprehension and knowledge construction.

The use of digital tools during the methodology and data analysis stages was reported less frequently, but it remains noteworthy. Some participants indicated that they used digital platforms to refine research questions, explore methodological terminology, or clarify analytical procedures. In a few cases, specialized software was mentioned for organizing data.

Although these practices were not dominant, they indicate that digital mediation is gradually extending into more technical aspects of research production.

Other stages, including citation management, formatting, introduction writing, and outline development, were mentioned less often. Students reported using digital tools to help maintain referencing consistency and support structural planning. These uses highlight the role of digital platforms in managing the procedural and organizational aspects of thesis writing. While these functions are not directly related to content development, they reduce mechanical workload and help students comply with academic conventions.

Taken together, the stage-based findings suggest that digitally mediated academic writing practices are sensitive to different phases of the writing process. Students appear to match specific tools with particular tasks, indicating an emerging awareness of the functional affordances available in their digital environment. Importantly, digital tools were generally described as supportive resources integrated into students' own drafting and revision processes, rather than as replacements for authorship. This suggests that digital mediation operates as an embedded component of students' academic workflow, shaping how writing is planned, developed, and refined across stages.

The Students' Motivation for Choosing Particular Tools

The findings indicate that students' decisions to integrate digital tools into their thesis writing were primarily driven by considerations of efficiency and time management (see Figure 3).



Figure 3. Students' Motivational Drivers

Many participants explicitly described digital platforms as making their writing process “more efficient” and helping them “manage their time better.” This emphasis reflects the institutional pressure to complete a thesis within limited deadlines. For these students, digital tools functioned as practical resources that helped streamline the processes of drafting, revising, and editing.

“Makes writing more efficient.” (P4, P8)

“Time efficiency.” (P14, P24, P28)

“Using AI makes writing more efficient and organized, improving the quality of your writing.” (P36)

Closely related to efficiency was the perception that digital tools helped improve the overall quality of students' writing. Participants frequently mentioned functions such as grammar correction, sentence restructuring, improved coherence, and support in maintaining

an appropriate academic tone. For many students, these tools helped them align their writing with formal academic conventions, particularly when writing in English.

"Improves the quality of writing because I'm not yet proficient in scientific article language." (P15)

"It can help me structure my words more effectively and improve the quality of the paper I'm working on." (P30)

"I find AI tools like Grammarly helpful for correcting my grammar and DeepL for translating vocabulary I don't understand." (P35)

These responses suggest that digital mediation functions as linguistic scaffolding for EFL students who are navigating the demands of academic English. Rather than replacing students' authorship, the tools were described as supporting them in refining and formalizing their own ideas.

Beyond linguistic support, participants also highlighted the role of digital tools in idea generation and knowledge development. When they encountered writer's block or had difficulty understanding complex material, students reported turning to digital platforms to generate alternative explanations, explore different perspectives, or help organize their conceptual frameworks.

"Can find ideas when stuck due to a lack of reference." (P5)

"AI can help me broaden my ideas while writing." (P20)

"To find ideas and structure sentences clearly and logically." (P3)

This pattern indicates that digital tools are not used solely at the surface level of language correction but also during moments of conceptual uncertainty. In such instances, digital mediation appears to support cognitive processing, particularly in structuring arguments and clarifying theoretical points.

Several students also reported using digital tools to search for references, create outlines, and structure the logical flow of their writing. These practices demonstrate the integration of digital resources into planning and organizational stages of thesis production.

"Makes my writing more efficient and I get more references." (P18)

"I use AI more often when searching for references because it's easier if the prompts are accurate." (P22)

"To help create outlines and paraphrases." (P31)

Language limitations emerged as another important rationale. Some participants explicitly acknowledged their challenges in mastering academic English and described digital tools as helpful in translating vocabulary, adapting informal expressions into formal academic style, and correcting grammatical errors.

"Improves the quality of writing because I'm not yet proficient in scientific article language." (P15)

These statements highlight how digital tools can function as compensatory supports in a multilingual academic context.

In addition, a smaller number of students mentioned accessibility and ease of use as important reasons for using these tools. The availability of free or easily accessible platforms encouraged students to experiment with them and incorporate them into their everyday writing routines.

"Makes optimal use of internet facilities." (P13)

"Because AI is very helpful and really understands what we're looking for." (P17)

The data suggest that students' reasons for using digital tools are multidimensional. Efficiency and improvements in writing quality were the most frequently mentioned motivations. However, cognitive support, linguistic scaffolding, structural organization, and accessibility also influenced their decisions. These findings indicate that digitally mediated academic writing practices do not emerge from a single motivation. Instead, they develop through the interaction of institutional demands, linguistic challenges, and students' evolving digital literacies.

Modes of Integrating Digital Tools into Thesis Writing

Beyond identifying which tools were used and at which stages, the findings also show how students integrated digital tools into their writing practices. The data suggest that students did not simply insert digital outputs into their texts. Instead, they described several integration strategies that influenced how they drafted, revised, and reorganized their work.

Idea Activation and Early-Stage Scaffolding

One common pattern involved using digital tools at the early stage of writing to generate ideas, create outlines, or clarify unclear concepts. Students often reported entering prompts when they experienced writer's block or uncertainty about how to begin a section.

"If I don't have any ideas, I'll include prompts to get ideas." (P2)

"Helping with creating an outline at the beginning." (P20)

"Using AI allows me to unlock ideas from the start." (P33)

In these situations, digital tools functioned as catalysts for idea development. Importantly, several participants explained that they used the generated ideas only as starting points. After producing initial bullet points or rough drafts, they continued developing the content on their own. This suggests that digital input served as an initial scaffold rather than a finished text.

Content Expansion and Conceptual Clarification

Students also described using digital platforms to expand sections such as the introduction and literature review. They reported asking for definitions, identifying differences between previous studies, or clarifying theoretical concepts.

"I use AI in the introduction and literature review... to look for sections I haven't studied before." (P3)

"I input previous articles and ask the AI to derive my novelty." (P31)

These responses indicate that digital mediation becomes part of the process of negotiating and understanding knowledge. Rather than focusing only on language correction, students used digital tools to explore relationships between ideas and develop conceptual arguments. However, many participants emphasized that they reread and reformulated the outputs in their own words, showing active interpretation rather than direct copying.

Linguistic Refinement and Academic Style Alignment

Another dominant pattern involved revising and polishing drafts. Students commonly reported submitting completed paragraphs to digital tools for grammar checking, sentence restructuring, or adjustments in academic tone.

"Arranging the sentences to make them more coherent." (P6)

"I still write the main content... then use AI as a tool for revision and refinement." (P16)

"After writing a paragraph, I sometimes ask the AI for help revising my writing." (P37)

In this stage, digital tools were often used after the drafting process. They functioned mainly as mechanisms for refinement. The integration strategy was typically iterative: students first wrote a draft, then used digital tools for revision, and finally modified the text again based on the suggestions. This pattern reflects a cyclical writing process rather than a simple dependence on generated text.

Reference Navigation and Structural Organization

Some participants also reported using digital tools to organize information and structure their writing. These tools helped them summarize articles, identify key points, and plan section outlines.

"Searching for references in SciSpace... and summarizing the material." (P23)

"I use AI more often when searching for references because it's easier if the prompts are accurate." (P22)

These responses suggest that digital tools support not only text production but also information management. Students appeared to coordinate reading, summarizing, and

outlining through digital mediation and then integrate these outputs into their own structural planning.

Prompt Customization and Authorial Control

A particularly important finding relates to how students described controlling and modifying digital outputs. Many participants highlighted the importance of writing detailed prompts, specifying keywords, and editing the results after they were generated.

"I use precise and detailed prompts, then reread them and translate them into my own writing." (P8)

"I use detailed prompts according to needs." (P18)

"Copying directly is strictly prohibited... rewriting in your own words is essential." (P30)

These responses indicate an awareness of authorship boundaries. Students reported reviewing, editing, and reformulating digital outputs instead of inserting them directly into their texts. This suggests that integration involves negotiation and adaptation, reflecting the development of digital academic literacy.

Multi-Tool Coordination

Finally, participants frequently described using several platforms for different purposes, including idea generation, translation, grammar checking, paraphrasing, and formatting. Instead of relying on a single tool, students coordinated multiple digital resources within one writing cycle. This layered approach shows a strategic alignment between writing tasks and technological affordances. Students appeared to select tools based on their specific functions and shift between platforms as their writing needs evolved.

Iterative Draft–Consult–Revise Integration Pattern

Across participant accounts, a recurring pattern emerged that can be synthesized as an iterative cycle of integration (see Figure 4).

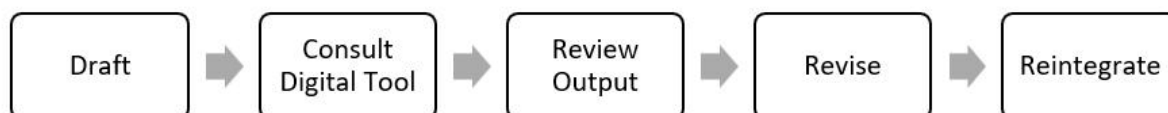


Figure 4. Iterative Cycle of Digitally Mediated Thesis Writing

Participants explained that this cycle did not occur only once in a section. Instead, it was repeated multiple times throughout the writing process. Importantly, digital outputs were rarely accepted verbatim. Students typically filtered, adapted, and incorporated them into their developing drafts. This pattern suggests that digital mediation functions as a recursive process within thesis writing rather than a simple insertion of externally generated text. The emergence of this iterative structure also indicates that students maintain an active decision-making role while drafting and consulting digital tools. In this sense, digital platforms act as mediational resources embedded in the writing process, which shape revision practices without fully determining the final text.

Discussion

The findings of this study illuminate how digitally mediated academic writing practices are enacted by Indonesian undergraduate ELT students in thesis contexts. Consistent with research describing contemporary writing as situated within digitally saturated environments (Barton & McCulloch, 2018; Ramadhan et al., 2024; Saugmann, 2024), the results show that academic writing is no longer an isolated cognitive act but a distributed practice shaped through ongoing interaction with multiple technological resources. Tool selection, stage-

specific deployment, motivational drivers, and integration strategies collectively form a structured pattern of digitally mediated writing.

One of the most notable findings is the emergence of a digital tool ecosystem rather than reliance on a single platform. This extends prior research that has tended to examine generative AI tools in isolation (Deep & Chen, 2025; Graham & Milan, 2025). Instead of depending exclusively on one system, students orchestrate combinations of generative platforms, translation tools, grammar checkers, and plagiarism detection software. This layered integration suggests that digital mediation operates as a systemic writing condition rather than as a feature of a single technology. At the same time, the relatively limited use of specialized research software points to uneven digital research literacy, echoing concerns raised in studies of technology acceptance that familiarity often outweighs disciplinary sophistication.

The stage-based patterns further complicate prevailing assumptions in the literature. While earlier studies have emphasized efficiency gains and linguistic correction (Atan et al., 2024; Tusino et al., 2024), the present findings reveal substantial engagement in literature review and discussion writing, stages that require conceptual synthesis and argument construction. This supports sociomaterial perspectives on writing (Kervin et al., 2017; Loo, 2022), which argue that meaning-making emerges through interaction between writers and material resources. Digital tools in this study were not confined to editing; they participated in idea expansion and argumentative framing, demonstrating that technological mediation intersects with knowledge construction rather than merely surface revision.

Students' motivations, particularly efficiency, quality enhancement, and linguistic support, align with findings from Indonesian EFL contexts (Azizah et al., 2025; Rafida et al., 2024), where digital tools function as scaffolds for language accuracy and organizational clarity. However, this study adds nuance by showing how these motivations translate into structured integration strategies. The coherence between intention and deployment reflects elements of learner agency and self-regulation, supporting emerging discussions of digital academic literacy that emphasize prompt design, selective integration, and reflective adaptation.

A particularly noteworthy contribution lies in the identification of an iterative draft–consult–revise–adapt cycle. While previous studies have reported students' perceptions of AI usefulness (Ginting et al., 2023; Azizah et al., 2025), fewer have examined the process-level dynamics of how digital outputs are negotiated during composition. The iterative cycle observed here illustrates that students draft independently, consult digital tools for expansion or correction, critically evaluate outputs, and reintegrate revised content into their texts. This recursive coordination complicates concerns that AI use results in passive dependence or erosion of authorship (Cladis, 2020). Instead, students' accounts reveal ongoing negotiation of control and ethical boundaries, suggesting that digital mediation can coexist with emerging forms of authorial awareness.

Nevertheless, the findings also reveal tensions consistent with prior cautionary scholarship (Tusino et al., 2024). Heavy reliance on grammar correction and translation tools may risk privileging surface-level accuracy over deeper disciplinary engagement. Moreover, limited exploration of advanced research software suggests that students' digital literacy remains largely functional rather than critically expansive. These tensions underscore the need to move beyond binary narratives of benefit versus risk and toward a more contextual understanding of digitally mediated academic practice.

Taken together, this study contributes to the growing body of research on technology-assisted academic writing by providing context-specific evidence from a high-stakes Indonesian ELT thesis setting. It extends existing literature in three ways: by conceptualizing digital mediation as an ecosystem rather than a single-tool phenomenon, by demonstrating

stage-sensitive integration across cognitively demanding writing phases, and by identifying an iterative integration cycle that foregrounds student agency within technologically supported workflows.

The pedagogical implications resonate with arguments in digital literacy scholarship. If digital mediation is already embedded in students' writing routines, ELT programs must respond with structured guidance rather than prohibition. Explicit instruction in prompt formulation, critical evaluation of generated content, ethical paraphrasing, and responsible citation practices can support more reflective integration. Introducing discipline-specific research tools may also broaden students' engagement beyond accessible mainstream platforms. In this sense, pedagogical intervention should aim not to eliminate digital mediation but to cultivate more sophisticated and critically aware forms of it.

These findings also carry implications beyond the classroom. For academic integrity policy, institutions may need to move from prohibition-based rules toward guidelines that distinguish between using digital tools as scaffolds and using them as substitutes for original work. For thesis supervision, supervisors may benefit from explicitly discussing students' digital workflows rather than assuming these processes are hidden or irrelevant to the supervisory relationship. Writing centers, similarly, could extend their support beyond traditional consultation to include guidance on evaluating and critically integrating digitally generated content. Despite its contributions, this study remains context-bound. The sample was drawn from a single cohort within one institution, limiting transferability. Additionally, reliance on self-reported data may obscure unacknowledged practices. Future research could employ interviews, classroom or writing-session observation, screen recordings of drafting sessions, analysis of successive thesis drafts, or supervisors' perspectives to capture digitally mediated writing practices with greater methodological depth than self-report alone allows.

CONCLUSION

This study examined how Indonesian undergraduate ELT students enact digitally mediated academic writing practices during thesis completion. The findings show that students draw on a broad ecosystem of tools, including generative platforms (e.g., ChatGPT), translation and grammar tools (e.g., Google Translate, DeepL, Grammarly), and paraphrasing and originality-checking tools (e.g., QuillBot and Turnitin). These tools were deployed most heavily during editing, literature review, and discussion writing. Their motivations include efficiency, linguistic support, quality enhancement, and idea generation. They closely align with their reported practices, indicating intentional and task-oriented tool use rather than indiscriminate reliance on any single platform.

Importantly, students described iterative integration strategies, including drafting independently, consulting digital platforms for feedback or expansion, and revising outputs in their own words. These patterns suggest that digital mediation does not simply replace authorship but becomes embedded within students' writing processes. Rather than confirming assumptions of uncritical dependence, the findings highlight emerging forms of digital academic literacy characterized by strategic coordination, customization, and ethical awareness. Although this strategic use should not be read as evidence that students no longer require structured pedagogical guidance, the sophistication of their workflows makes explicit instruction in critical and ethical tool use more necessary.

INFORMED CONSENT STATEMENT

Participation in this study is entirely voluntary. By agreeing to take part, the participants acknowledge that they have been informed about the purpose, procedures, potential risks, and benefits of the study. Participants understand that their identities are kept confidential and that all information they provide is used solely for research purposes. They have the right to withdraw from the study at any time without any penalty or loss of benefits to which they are

otherwise entitled. By continuing, they give their informed consent to participate in this research under the conditions described.

DATA AVAILABILITY STATEMENT

The data utilized in this study cannot be made publicly available due to strict adherence to privacy concerns and ethical obligations that safeguard participant confidentiality. This ensures compliance with ethical research standards and data protection regulations. However, researchers or interested parties who require access to the dataset for validation or further analysis may request it. Such requests will be considered on a case-by-case basis and must be deemed reasonable.

DECLARATION OF AI TOOL USE

Python-based natural language processing tools were used during the early coding stage of data analysis to support preprocessing (tokenization, lemmatization, and stop-word removal) and to help organize textual data for thematic analysis. These computational procedures were used solely to support pattern identification and did not replace human interpretation. All coding, theme development, and interpretation were conducted by the researchers.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the institutional and administrative support provided by Universitas Muhammadiyah Sidoarjo throughout the conduct of this research. The university's support played an important role in facilitating the successful completion of this study.

REFERENCES

- Ariza Pinzón, V., Méndez García, E., & Aguilar González, G. (2019). RWR: The reading-writing-research tasks for thesis writing development. *Estudios Aambda. Teoría y Práctica de la Didáctica en Lengua y Literatura*, 4(2), 48–70. <https://doi.org/10.36799/el.v4i2.100>
- Atan, M. A., Abdul Hamid, A. A., Jamil Azhar, S. B. H., & Norwahi, N. A. (2024). Digital communication tools in language education: A conceptual analysis of their impact on classroom language practices. *International Journal of Academic Research in Business and Social Sciences*, 14(12). <https://doi.org/10.6007/IJARBSS/v14-i12/23756>
- Azizah, N. N., Sadifah, S. N., Wati, D. P., Misdhi, M., & Dwiniasih, D. (2025). ChatGPT in academic writing: EFL pre-service teachers' points of view. *Wiralodra English Journal*, 9(2), 105–118. <https://doi.org/10.31943/wej.v9i2.456>
- Barton, D., & McCulloch, S. (2018). Negotiating tensions around new forms of academic writing. *Discourse, Context & Media*, 24, 8–15. <https://doi.org/10.1016/j.dcm.2018.01.006>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Cladis, A. E. (2020). A shifting paradigm: An evaluation of the pervasive effects of digital technologies on language expression, creativity, critical thinking, political discourse, and interactive processes of human communications. *E-Learning and Digital Media*, 17(5), 341–364. <https://doi.org/10.1177/2042753017752583>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE.
- Deep, P. D., & Chen, Y. (2025). The role of AI in academic writing: Impacts on writing skills, critical thinking, and integrity in higher education. *Societies*, 15(9), 247. <https://doi.org/10.3390/soc15090247>
- Eragamreddy, N., & Joseph, R. (2025). Digital tools and writing education: A thematic analysis of technology's role in writing skills development. *Arab World English Journal*, 16(3), 3–25. <https://doi.org/10.24093/awej/vol16no3.1>

- Ginting, P., Batubara, H. M., & Hasnah, Y. (2023). Artificial intelligence-powered writing tools as adaptable aids for academic writing: Insight from EFL college learners in writing final project. *International Journal of Multidisciplinary Research and Analysis*, 6(10). <https://doi.org/10.47191/ijmra/v6-i10-15>
- Graham, O., & Milan, Y. (2025). The influence of AI tools on the student writing process and compositional fluency. *Preprints*. <https://doi.org/10.20944/preprints202506.0832.v1>
- Gulamovna, Y. L. (2025). The impact of technology on language use and evolution. *International Journal of Pedagogics*, 5(3), 125–127. <https://doi.org/10.37547/ijp/Volume05Issue03-35>
- Hanura, H., & Widiarti, T. R. (2025). Investigating students' perceptions of AI-powered language learning tools in academic writing. *Global Synthesis in Education Journal*, 3(2), 59–68. <https://doi.org/10.61667/dmx3j235>
- Kervin, L., Comber, B., & Woods, A. (2017). Toward a sociomaterial understanding of writing experiences incorporating digital technology in an early childhood classroom. *Literacy Research: Theory, Method, and Practice*, 66(1), 183–197. <https://doi.org/10.1177/2381336917718522>
- Loo, D. B. (2022). Unfocused written corrective feedback for academic discourse: The sociomaterial potential for writing development and socialization in higher education. *Journal of Language and Education*, 8(4), 194–199. <https://doi.org/10.17323/jle.2022.12996>
- Malik, Z., & Setiawan, S. (2025). Textual and linguistic characteristics in ELT research article abstracts: Insights from Indonesian novice writers. *Englisia: Journal of Language, Education, and Humanities*, 12(2), 184. <https://doi.org/10.22373/ej.v12i2.28747>
- Prihandoko, L. A. (2024). Exploring the impact of academic reading and research competence on academic writing: A multi-regression analysis among EFL undergraduates. *Journal of Languages and Language Teaching*, 12(1), 451. <https://doi.org/10.33394/jollt.v12i1.9738>
- Rafida, T., Suwandi, S., & Ananda, R. (2024). EFL students' perception in Indonesia and Taiwan on using artificial intelligence to enhance writing skills. *Jurnal Ilmiah Peuradeun*, 12(3), 987–1016. <https://doi.org/10.26811/peuradeun.v12i3.1520>
- Ramadhan, R. A., Abdul Rahim, Darmanto, & Paris, A. S. (2024). Enhancing academic writing through digital tools: A systematic review. *Journal of Language and Literature Studies*, 4(4), 707–770. <https://doi.org/10.36312/jolls.v4i4.2342>
- Saugmann, P. M. (2024). The precariousness of academic publishing in a digital world. *European Review*, 32(S1), S75–S91. <https://doi.org/10.1017/S1062798723000613>
- Tusino, T., Dewi, P., Lestari, E., Onate, R. V., Chen, Y., & Mezentsev, I. (2024). Computer-based technology on writing performance: A systematic literature review. *Journal of Languages and Language Teaching*, 12(2), 820. <https://doi.org/10.33394/jollt.v12i2.10812>
- Utami, A. A., & Kuswandono, P. (2023). Undergraduate students' learner autonomy during thesis writing: The case of a group of EFL students in Indonesia. *Eralingua: Jurnal Pendidikan Bahasa Asing dan Sastra*, 7(2), 316. <https://doi.org/10.26858/eralingua.v7i2.46043>
- Valerio, M. T. B. (2025). Enhancing argumentative essay skills: Evaluating the efficacy of AI-powered tools versus the traditional approach among learners. *Arab World English Journal*, (AI Special Issue 15), 270–289. <https://doi.org/10.24093/awej/AI.15>
- Velez, G. E., Spencer, A. E., Adams, L. B., & Velez Florez, M. C. (2023). Understanding diversity through qualitative research. *Journal of the American Academy of Child & Adolescent Psychiatry*, 62(10), S425–S426. <https://doi.org/10.1016/j.jaac.2023.07.983>

- Xena, E. D. A. A., Setyawan, M. A., Anwar, S., & Pambayun, R. N. (2025). Exploiting the Grammarly application in English language program writing skills: Perceptions. *English Language Teaching Methodology*, 5(2), 176–186.
<https://doi.org/10.56983/eltm.v5i2.1875>