PRE-SERVICE TEACHERS' PERCEPTIONS OF GENERATIVE AI USE IN ACADEMIC WRITING: A CASE STUDY

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Abstract

This study investigates pre-service teachers' perceptions of generative artificial intelligence (GenAI) in academic writing within the English Language Education program at University of Brawijaya. Key challenges in academic writing for pre-service teachers include grammatical accuracy, vocabulary development, and argumentation. GenAI tools have been proposed as potential solutions to these challenges, but their adoption raises concerns about effectiveness, ethical considerations, and the risk of over-reliance. Employing a qualitative case study design, data were collected through a structured questionnaire comprising Likert-scale ratings and open-ended written explanations from pre-service teachers who had completed teaching internships. The results indicate that all participants regarded GenAI as a beneficial supporting tool capable of enhancing grammatical precision, broadening academic vocabulary, structuring arguments, facilitating idea development, and providing constructive feedback during the revision process. Nevertheless, several challenges were also reported, such as the difficulty of assessing the reliability of AI-generated output, the struggle to preserve originality given the presence of AI detection tools, and the potential for excessive dependence on AI to weaken autonomous writing abilities. All participants further expressed shared concern that the lack of well-defined institutional policies contributes to ambiguity surrounding the ethical use of GenAI in academic settings. In light of these findings, it is recommended that higher education institutions establish clear regulations governing the appropriate use of GenAI in academic writing and incorporate digital literacy programs that enable pre-service teachers to engage with AI tools responsibly, ensuring that such tools serve as supportive aids rather than substitutes for independent critical thinking and writing competence.

Keywords: *Academic Writing, Generative AI, Perception, Pre-Service Teacher.*

A. INTRODUCTION

Academic writing constitutes a fundamental skill in higher education, particularly for pre-service teachers enrolled in English Language Education programs. These students are expected to produce essays, research reports, and thesis manuscripts throughout their academic careers. Such assignments not only fulfill course requirements but also foster critical thinking, logical argumentation, and effective communication. Proficiency in academic writing equips pre-service teachers to serve as effective writing models for their future students. Consequently, teacher preparation programs should emphasize the development of academic writing skills. Amo Sánchez-Fortún et al. (2024) found that future teachers recognize the significance of written communication competencies for professional development, yet report dissatisfaction with the emphasis placed on these skills within university curricula.

Academic writing assignments require students to demonstrate advanced competencies, including identifying relevant information, critically evaluating arguments, organizing ideas systematically, and synthesizing them into coherent academic texts (Bui et al., 2023). These skills surpass those required for everyday communication. Similarly, Malik et al. (2023) found that higher education students view AI tools as potentially advantageous for academic essay writing, although the degree of engagement depends on prior experience and digital literacy.

Despite its importance, academic writing is a significant challenge for many students in higher education. Taye and Mengesha (2024) identified common English writing challenges among undergraduate students, reporting that grammatical inaccuracy, limited vocabulary, and difficulties in organizing arguments coherently are among the most persistent obstacles. These challenges reduce the clarity and persuasiveness of students' written output and can generate anxiety, particularly when students are uncertain about how to begin or develop their ideas. Darwin et al. (2024) further noted that the emergence of Artificial Intelligence (AI) tools adds a new layer of complexity, as students must now navigate not only the demands of academic writing itself but also how to engage with AI responsibly while maintaining their own critical thinking capacities.

Recent technological advancements have expanded opportunities to enhance students' academic writing. AI now widely integrated into educational environments. Miao and Holmes (2023) report that an increasing number of students utilize AI tools, such as chatbots, to facilitate learning and complete assignments. These tools deliver immediate feedback, clarify complex concepts and provide illustrative examples, thereby making the learning process more accessible. Golan et al. (2023) describe the incorporation of generative artificial intelligence (GenAI) into academic writing as a transformative technological development, observing that GenAI tools have significantly reshaped how written content is produced and assessed in scholarly environments. Given the ongoing difficulties students experience, GenAI holds considerable relevance for academic writing support.

GenAI has garnered substantial academic interest for its capacity to enhance the writing process. Bae et al. (2024) examined pre-service teachers' views on the application of GenAI in educational settings and reported that these tools can support multiple phases of academic writing, from idea generation and framework construction to drafting and revision. Kostka and Toncelli (2023) analyzed the integration of ChatGPT into English language teaching, identifying benefits for vocabulary development, grammar correction, and content generation, while also highlighting concerns regarding accuracy and the necessity for critical evaluation of AI-generated content. Common platforms that support academic writing include ChatGPT, Grammarly, QuillBot, and Claude.

Although GenAI offers significant advantages, its application in academic writing necessitates rigorous oversight. Maphoto et al. (2024) examined the integration of generative AI to enhance academic writing skills and warned that GenAI may undermine the authenticity of scholarly work by facilitating idea organization with minimal cognitive engagement, thereby diminishing originality and raising ethical concerns. Cotton et al. (2024) also noted that the swift adoption of tools such as ChatGPT has posed urgent challenges to academic integrity, as institutions struggle to distinguish between legitimate AI-assisted work and academically dishonest practices. Clearly defining GenAI's role as an assistive tool, distinct from the student's primary authorship role, is crucial to avoid misattribution of credit and potential violations of academic integrity.

Although scholarly interest in GenAI has grown rapidly, the existing body of research has predominantly examined GenAI from the perspective of general student populations in higher education or has concentrated on policy-level debates surrounding academic integrity. Considerably less attention has been devoted to pre-service teachers, who occupy a distinctive position as both current learners contending with the demands of academic writing and future educators who will bear the responsibility of guiding their own students in the ethical and effective use of technology. Furthermore, investigations into how pre-service teachers perceive the utility of GenAI in relation to specific academic writing challenges such as grammatical accuracy, vocabulary development, and argument construction remain scarce. This gap is particularly pronounced within the Indonesian higher education context, where institutional policies governing the use of GenAI in academic work have yet to be substantively developed.

The present study therefore seeks to address this gap by investigating pre-service teachers' perceptions of the effectiveness of GenAI in academic writing, with attention to both its advantages and limitations. The findings aim to determine whether GenAI serves as a valuable supplementary tool for enhancing academic writing skills and to inform the development of pedagogical strategies that integrate technology while fostering independent writing abilities.

This study aims to explore how pre-service teachers perceive the effectiveness of generative artificial intelligence in addressing challenges in academic writing. In addition, it seeks to identify the various challenges that pre-service teachers encounter when using generative AI tools for academic writing purposes.

B. LITERATURE REVIEW

1. Perception Theory

Perception as a cognitive phenomenon encompasses the mental processes through which individuals selectively attend to, organize, and ultimately interpret sensory stimuli in order to construct meaningful understandings of their surrounding environment (Qiong, 2017). This process is not passive; rather, it demands active cognitive engagement, as individuals continuously filter incoming information through the lens of their prior knowledge, accumulated experiences, and pre-existing expectations. The process itself unfolds across three interrelated stages: selection, whereby individuals direct their attention toward particular stimuli while disregarding others; organization, whereby the selected information is arranged into coherent cognitive patterns; and interpretation, whereby meaning is attributed to the organized information on the basis of internal and external factors. Internal factors include personal beliefs, attitudes, and cognitive frameworks, while external factors encompass the characteristics of the stimuli themselves, such as their intensity, novelty, and contextual salience.

In the field of educational technology, perception theory provides an analytical framework for examining how learners assess and interact with new tools in educational settings. Students' perceptions of emerging technologies are influenced by the technical features of these tools, prior experience with similar technologies, self-efficacy in using digital resources, and underlying beliefs about the role of technology in learning. Chan and Hu (2023) highlighted the importance of student perceptions in their investigation of university students' perspectives on GenAI, demonstrating that perceptions of benefits, challenges, and risks substantially affect students' engagement with AI tools in academic contexts. These perceptual processes ultimately shape whether students view a tool as advantageous, threatening, or irrelevant to their academic progress.

In this study, perception theory serves as the analytical framework to explore how pre-service teachers in the English Language Education program understand and evaluate the role of generative artificial intelligence (GenAI) in their academic writing practices. While existing literature predominantly addresses GenAI from technical or policy-oriented perspectives, limited research explores the perceptual dimensions of GenAI use among pre-service teachers, who serve as both current learners and future educators responsible for guiding students' engagement with technology (Qiong, 2017). By foregrounding perception theory, the study seeks to elucidate the subjective experiences, evaluative judgments, and practical reasoning that shape pre-service teachers' interactions with GenAI tools.

2. Academic Writing in Higher Education

Academic writing is widely regarded as an essential component of higher education, as it requires students to demonstrate critical analysis, evidence-based reasoning, and coherent argumentation. In English Language Education programs, it is considered a key professional competency that influences future teaching practice. Amo Sánchez-Fortún et al. (2024) found

that while education students recognize the value of written communication, they see a significant gap between their needs and current university curricula. The ability to produce well-structured essays, research reports, and theses serves as both a measure of academic competence and a foundation for effective teaching.

Academic writing remains challenging for many pre-service teachers. Bui et al. (2023) found that EFL pre-service teachers struggle with the complexity of scholarly composition. Taye and Mengesha (2024) identified three main issues: grammatical inaccuracy, especially in formal and complex sentences; limited academic vocabulary, which restricts expression; and difficulty developing coherent arguments, which affects clarity and persuasiveness. The demand to meet high academic standards often increases anxiety and reduces confidence.

This study examines the specific challenges pre-service teachers encounter in academic writing, particularly difficulties with grammar, vocabulary, and argument construction. By identifying these challenges from the participants' own perspectives, the research aims to establish whether their perceptions of writing difficulties reflect their actual academic writing needs, rather than general attitudes toward technology. This focus provides a grounded basis for evaluating the role of GenAI as a potential support tool in the areas where pre-service teachers report the greatest difficulty.

3. Generative AI in Academic Writing

Generative Artificial Intelligence (GenAI) represents a significant advancement in educational technology, especially for academic writing support. Unlike traditional digital writing tools that use predefined corrections or templates, GenAI systems generate original text, paraphrases, and structural suggestions in response to user prompts. Miao and Holmes (2023) note that an increasing number of higher education students are adopting AI-powered tools to enhance learning and complete assignments. Almassaad et al. (2024) found that 78.7% of students in their study frequently use GenAI tools, with ChatGPT as the most widely adopted platform. This indicates that GenAI is already widely integrated into academic contexts.

GenAI stands out from earlier writing assistance technologies by supporting multiple stages of the writing process. Bae et al. (2024) found that pre-service teachers view GenAI as helpful for idea generation, framework development, drafting, and revision. Kostka and Toncelli (2023) highlighted ChatGPT's potential in English language teaching, such as vocabulary development, grammar correction, and content generation, but noted concerns about factual accuracy and the need for pedagogical support. Baek et al. (2024) reported that while college students find GenAI highly capable, their trust in its output depends on their ability to critically assess the generated content.

Integrating GenAI into academic writing presents significant ethical and pedagogical challenges. Maphoto et al. (2024) warned that GenAI may undermine the authenticity of scholarly work by enabling ideas to be organized with minimal cognitive effort, thereby reducing originality. Cotton et al. (2024) noted that the rapid adoption of ChatGPT complicates academic integrity, making it harder to distinguish between legitimate support and academic dishonesty. Chan and Hu (2023) found that while university students see value in GenAI for personalized learning and writing assistance, they are concerned about accuracy, privacy, and its effects on personal development. These concerns highlight the need for transparency and ethical standards in academic writing.

Chung and Jeong (2024) examined Chinese pre-service teachers' views on integrating GenAI into English language teaching, identifying benefits such as improved instructional efficiency and challenges such as over-reliance and reduced pedagogical autonomy. These findings highlight both the practical advantages and ethical risks of GenAI, establishing the technological and pedagogical context for this study. For pre-service teachers, who must produce academic texts and guide students in responsible technology use, perceptions of GenAI

are especially important. By considering both benefits and challenges, the literature reviewed here forms the conceptual basis for interpreting participants' responses.

C. METHOD

This study employed a qualitative case study design to explore how pre-service teachers in the English Language Education program at Universitas Brawijaya perceived the use of generative AI in academic writing. A case study approach was selected because it enables an in-depth examination of a phenomenon within its natural context and is particularly suitable for research that prioritizes depth of understanding rather than statistical generalization (Yin, 2018). The qualitative orientation of this study foregrounded participants' subjective experiences, evaluative judgments, and practical reasoning as the primary units of analysis.

The participants consisted of four pre-service teachers enrolled in the English Language Education program at the Faculty of Cultural Studies, University of Brawijaya. Two criteria guided participant selection: completion of a teaching internship at the junior or senior high school level, and documented experience using GenAI tools in academic writing, particularly during the completion of their thesis or research-related coursework. This sample size is consistent with qualitative case study methodology, which emphasizes the depth and richness of individual experience rather than the breadth of representation (Creswell & Creswell, 2018).

Data were collected through a structured questionnaire comprising ten statements divided into two sections. Section A contained six statements addressing participants' perceptions of GenAI effectiveness in overcoming academic writing difficulties, corresponding to the first research question. Section B contained four statements addressing the challenges participants encountered when using GenAI for academic writing, corresponding to the second research question. For each statement, participants indicated their level of agreement on a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). These Likert-scale responses served a descriptive function, providing an initial overview of participants' general orientation toward each issue prior to the primary qualitative analysis. Following each rating, participants provided written explanations of one to two sentences articulating the reasoning behind their responses. These open-ended written explanations constituted the primary qualitative data of the study and formed the basis for thematic analysis.

The questionnaire was distributed online via Google Forms. Each participant received the questionnaire link individually and was given sufficient time to complete the questionnaire at their own pace. The use of an online questionnaire allowed participants to reflect on their experiences before providing responses, which helped ensure that their answers represented their genuine perceptions of GenAI use in academic writing. To uphold ethical standards, participants' identities were anonymized throughout the reporting process, and no real names or identifiable information were disclosed in the findings. This procedure ensured the confidentiality of participants and minimized potential concerns related to privacy or academic evaluation.

Data analysis proceeded through two complementary stages. In the first stage, Likert-scale responses were summarized descriptively to provide an initial indication of participants' overall level of agreement with each statement. Given the small sample size of four participants, these descriptive summaries were reported as individual response distributions, that is, the number of participants selecting each scale point, rather than as arithmetic means, in order to preserve the qualitative character of the study and avoid implying statistical generalizability. In the second and primary stage, participants' written explanations were analyzed through thematic coding. The coding process was informed by the principles of reflexive thematic analysis as described by Byrne (2022), involving data familiarization, initial coding, theme development, theme review, and theme refinement. Given that the written responses were brief in nature, the analytical procedure is more precisely characterized as

thematic coding of open-ended questionnaire data rather than full-scale reflexive thematic analysis of extended interview transcripts. This methodological distinction is acknowledged as a limitation of the study.

D. RESULT AND DISCUSSION

This section presents the findings obtained from the questionnaire administered to four pre-service teachers in the English Language Education program at University of Brawijaya. The results are organized into two parts corresponding to the two research questions: participants' perceptions of GenAI effectiveness in overcoming academic writing difficulties (Section A) and the challenges they encountered when using GenAI for academic writing (Section B). For each section, descriptive summaries of Likert-scale response distributions are presented first to indicate general patterns of agreement, followed by thematic analysis of participants' written explanations as the primary qualitative findings.

Four participants were selected through purposive sampling based on two criteria: completion of a teaching internship and experience using GenAI tools in academic writing. Table 1 summarizes the participant profiles. To maintain ethical standards, participants are identified using codes (P1–P4) throughout this section.

Table 1. Participant Profiles

Code	Internship Level	GenAI Tools Used	Primary Writing Use
P1	Junior High School	ChatGPT, Grammarly, Gemini	Grammar checking, drafting
P2	Senior High School	ChatGPT, Grammarly, Gemini, QuillBot	Full writing process
P3	Senior High School	ChatGPT, Grammarly, Gemini	Grammar, vocabulary, structure
P4	Senior High School	ChatGPT, Gemini	Grammar correction, ideas

Table 1 shows that the four participants carried out their teaching internships at either junior or senior high school levels and each reported employing more than one GenAI tool for academic writing purposes. ChatGPT, Grammarly, and Gemini were common tools used by all respondents, whereas P2 demonstrated the widest range of tool adoption by also utilizing QuillBot. The ways in which participants primarily used these tools differed considerably: P1 focused on grammar checking and drafting, P2 relied on GenAI across the entire writing process, P3 used the tools mainly for vocabulary improvement and structural organization, and P4 applied them for grammar correction and idea exploration. Such variation in tool preference and usage behavior indicates that each participant had developed a distinct strategy for incorporating GenAI into their academic writing, offering a meaningful basis for exploring their perceptions in the subsequent sections of the questionnaire.

Section A: Perceptions of GenAI Effectiveness

Table 2. Distribution of Likert-scale Responses for Section A (GenAI Effectiveness)

Statement	SD (1)	D (2)	N (3)	A (4)	SA (5)
S1. Grammatical accuracy	–	–	–	2	2
S2. Vocabulary expansion	–	–	–	3	1
S3. Argument structure	–	–	–	2	2
S4. Idea generation	–	–	–	3	1
S5. Drafting and revision	–	–	–	3	1
S6. Overall supplementary tool	–	–	–	3	1

Note. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree. Numbers indicate the count of participants (n = 4) selecting each scale point.

The distribution of responses across Section A indicates a consistent pattern of agreement among all four participants. No participant selected Neutral, Disagree, or Strongly

Disagree for any statement, suggesting a broadly favorable perception of GenAI's effectiveness in supporting academic writing. Grammatical accuracy (S1) and argument structure (S3) each received two Strongly Agree and two Agree responses, making them the most positively rated dimensions. The remaining items, namely vocabulary expansion, idea generation, drafting and revision, and the overall perception of GenAI as a supplementary tool, each received three Agree and one Strongly Agree responses, indicating consistently positive but slightly less emphatic endorsement.

The Likert-scale distributions provide a general indication of participants' agreement with each statement and offer an overview of their overall perceptions of GenAI in academic writing. However, these numerical responses alone do not fully capture the reasoning behind participants' evaluations. The written explanations provided by participants therefore offer deeper qualitative insights into how they interpret the usefulness and limitations of GenAI. Through thematic examination of these responses, several recurring patterns emerged that illuminate the underlying perspectives shaping participants' perceptions.

Grammar Correction and Language Polishing. All four participants identified grammar correction as the most immediately recognized function of GenAI. P1 described using Grammarly specifically to proofread writing for grammatical accuracy, while P4 stated that AI corrects grammatical errors effectively. P2 provided a more specific account, highlighting QuillBot's capacity to address frequently misplaced sentence structures and verb tense errors. These responses indicate that participants perceive GenAI as particularly valuable for surface-level linguistic revision, a finding consistent with their recognition of grammatical inaccuracy as a persistent challenge in academic writing.

Vocabulary Enhancement and Academic Register. All participants reported that GenAI contributes to vocabulary development, particularly in adopting the formal register expected in scholarly writing. P2 described how AI tools can transform everyday expressions into more sophisticated academic terminology, while P1 valued the opportunity to encounter unfamiliar but academically appropriate vocabulary through AI-generated suggestions. P4 observed that AI frequently employs advanced vocabulary, which in turn expands the participant's own lexical repertoire. These accounts indicate that participants view GenAI not merely as a correction tool but as a resource for ongoing linguistic growth.

Structural Organization and Coherence. Participants consistently valued GenAI's capacity to impose structural coherence on complex academic arguments. P2 offered a particularly vivid description, explaining how GenAI can reorganize a disordered logical flow into a systematic writing framework. P1 noted that AI assists in making thesis chapters more concise and coherent, while P3 stated that GenAI suggests improved structural organization, rendering academic writing more logical. These responses reveal that participants perceive GenAI as especially useful when managing the organizational demands of extended academic texts, a dimension of support that extends beyond sentence-level correction to encompass broader discourse-level coherence.

GenAI as Supplementary Rather Than Replacement Tool. A particularly notable finding emerged in responses to Statement 6, where all four participants explicitly distinguished between using GenAI as a support mechanism and depending entirely upon it. P1 emphasized that generative AI assists in completing ideas but does not generate the ideas themselves, asserting that the intellectual core of the writing remains the student's responsibility. P2 characterized AI as an intelligent partner that enhances the technical dimensions of writing while the writer retains full control over the logical architecture that only humans can construct. P4 further observed that AI-generated writing tends to sound mechanical and lacks human qualities, limiting its viability as a standalone authoring tool. This shared perception indicates that participants have constructed a clear conceptual boundary between technical assistance and intellectual authorship.

Section B: Challenges in Using GenAI

Section B of the questionnaire comprised four statements aimed at investigating the difficulties participants faced in using GenAI tools during academic writing. Each statement focused on a specific area of challenge: assessing the reliability and relevance of AI-generated output (S7), the possibility that dependence on GenAI may weaken one's capacity to write independently (S8), the difficulty of maintaining academic originality and preventing plagiarism (S9), and the ethical ambiguity caused by a lack of formal institutional regulations regarding GenAI use (S10). In contrast to the largely uniform agreement found in Section A, participants' responses in this section varied more noticeably, suggesting that the challenges related to GenAI use are perceived differently based on each individual's approach to using these tools and their ability to self-regulate. The Likert-scale response distribution for the four statements in Section B is presented in Table 3.

Table 3. Distribution of Likert-scale Responses for Section B (Challenges in Using GenAI)

Statement	SD (1)	D (2)	N (3)	A (4)	SA (5)
S7. Accuracy evaluation	–	–	1	3	–
S8. Skill diminishment	–	2	–	2	–
S9. Originality & plagiarism	–	–	2	2	–
S10. Institutional guidelines	–	–	–	3	1

Note. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree. Numbers indicate the count of participants (n = 4) selecting each scale point.

In contrast to the uniformly positive responses in Section A, the distribution of responses in Section B reveals greater variability, reflecting the more contested nature of the challenges associated with GenAI use. The most notable divergence appeared in Statement 8 on skill diminishment, where responses were evenly split between Disagree (two participants) and Agree (two participants), making it the most polarized item across the entire questionnaire. By comparison, institutional guidelines (S10) generated the strongest consensus, with three participants selecting Agree and one selecting Strongly Agree. Responses to accuracy evaluation (S7) and originality concerns (S9) occupied an intermediate position, with some participants expressing agreement and others selecting Neutral.

Thematic coding of the written explanations in Section B yielded three themes that illuminate the qualitative dimensions underlying these response patterns.

Content Accuracy and Verification Difficulty. Three of the four participants recognized the challenge of evaluating the accuracy of AI-generated content. P2 characterized GenAI as fundamentally a word prediction mechanism that can sometimes produce erroneous output, drawing attention to the deceptive confidence with which AI presents its responses. P4 provided a concrete instance, reporting that AI-generated references contained fabricated bibliographic information that did not correspond to actual published sources. P1 described a compensatory strategy, explaining that the participant uses multiple AI tools simultaneously to cross-verify results, thereby reducing the risk of accepting inaccurate output uncritically. P3 expressed uncertainty regarding this issue, selecting Neutral on the Likert scale without extensive elaboration. Taken together, these responses indicate that participants are aware of GenAI's tendency to produce plausible but potentially inaccurate content, although their strategies for managing this limitation vary in sophistication.

Divergent Views on Skill Dependency. The question of whether GenAI use diminishes independent writing ability produced the most polarized responses in this study. P2 and P3, who both selected Agree, articulated concerns about the long-term effects of habitual GenAI use. P2 warned that continual reliance on AI tools would cause writing skills to stagnate over time, while P3 observed that excessive dependence reduces opportunities for creative thinking. In contrast, P1 and P4, who both selected Disagree, framed their responses around their own

usage patterns. P4 explained that AI is used strictly as a support tool rather than a replacement for independent effort, while P1 noted that AI-generated results frequently fail to address specific writing goals, which necessitates the participant's own critical engagement. This divergence suggests that perceptions of dependency risk are mediated by individual usage patterns: participants who employ GenAI selectively and maintain critical distance are less concerned about skill erosion than those who recognize the temptation of over-reliance.

The Need for Institutional Regulation. The absence of clear institutional guidelines governing GenAI use in academic writing generated the strongest consensus in Section B, with all four participants expressing agreement. P4 articulated the central concern, observing that without explicit rules, students lack the criteria to distinguish between acceptable AI-assisted work and academic dishonesty. P2 concurred that every educational institution bears the responsibility of establishing clear boundaries for GenAI use. P3 extended this argument beyond institutional policy, emphasizing that educational institutions must proactively develop transparent AI use policies while simultaneously improving students' digital literacy. P1 similarly agreed with the necessity of institutional regulation. This consensus underscores the practical urgency of developing formal policy frameworks that address the ethical complexities of GenAI integration in academic writing contexts.

The findings of this study indicate that pre-service teachers in the English Language Education program at Universitas Brawijaya perceive generative AI as a beneficial supplementary tool for academic writing, while simultaneously acknowledging several challenges related to its use. This section interprets the findings through the lens of perception theory (Qiong, 2017), which serves as the analytical framework of this study, and situates them within the broader scholarly discourse on GenAI in educational contexts.

The first stage of perception, selection, concerns the process through which individuals attend to specific stimuli while filtering out others (Qiong, 2017). The findings suggest that participants selectively attended to the functional aspects of GenAI that directly addressed their most pressing academic writing difficulties. Grammatical accuracy (S1) and argument structure (S3) received the strongest agreement among participants, which aligns with Taye and Mengesha's (2024) identification of grammatical inaccuracy and incoherent argumentation as persistent challenges among undergraduate students. This pattern suggests that participants' perceptual selection was shaped by their lived experiences of difficulty in academic writing.

Participants appeared to prioritize the features of GenAI that directly responded to these challenges. By contrast, dimensions such as idea generation and drafting support, while still positively evaluated, received slightly less emphatic responses. This indicates that these functions were perceived as useful but not as immediately critical as grammar and structural support. This pattern is consistent with Bui et al.'s (2023) finding that EFL pre-service teachers actively seek strategies to manage the linguistic demands of academic writing, suggesting that participants approached GenAI with pre-existing priorities that shaped how they perceived its usefulness.

The second stage, *organization*, involves structuring selected information into coherent cognitive patterns (Qiong, 2017). The most prominent organizational pattern that emerged from the data was participants' clear conceptual distinction between GenAI as a *technical assistant* and the student as the *intellectual author*. All four participants articulated this boundary unprompted, framing GenAI's role as limited to surface-level improvements grammar, vocabulary, structure while reserving the generation of original ideas, critical arguments, and intellectual substance as their own domain. This binary organizational schema is significant because it reveals how participants have cognitively categorized GenAI within their existing understanding of the writing process. Rather than perceiving GenAI as a monolithic entity that either helps or threatens, they have organized their understanding along a tool–agent continuum, positioning GenAI firmly on the tool end. This finding resonates with Bae et al.'s

(2024) observation that pre-service teachers expressed interest in GenAI for learning purposes but remained cautious about broader implications. It also aligns with Chan and Hu's (2023) finding that university students recognize both the potential benefits and inherent limitations of GenAI tools. The convergence of these findings suggests that the tool–agent distinction may represent a common cognitive organizing principle among student users of GenAI.

The third stage, *interpretation*, involves assigning meaning to organized information based on prior knowledge, beliefs, and contextual factors (Qiong, 2017). Participants' interpretations of GenAI's role were shaped by at least two mediating factors. The first was their *prior experience with academic writing difficulties*. Because participants had encountered persistent challenges with grammar, vocabulary, and argumentation throughout their academic careers, they interpreted GenAI's capabilities through the lens of these accumulated frustrations. Vocabulary enhancement, for instance, was not merely viewed as a convenient feature but was interpreted as a means of accessing the academic register that participants recognized as essential yet difficult to acquire independently. This experiential mediation explains why participants endorsed GenAI so consistently across Section A: their interpretation of its value was anchored in real, felt needs rather than abstract technological appreciation.

The second mediating factor was *individual usage patterns*, which produced the most notable divergence in the findings. The polarized responses to Statement 8 on skill diminishment reveal that interpretation is not uniform even within a small, relatively homogeneous group. P2 and P3, who expressed concern about dependency, appeared to interpret GenAI through a framework of long-term risk recognizing that the convenience of AI assistance could gradually erode independent competence. P1 and P4, who dismissed this concern, interpreted the same tool through a framework of selective utility, emphasizing their own agency in determining when and how GenAI is employed. This divergence aligns with Maphoto et al.'s (2024) warning that GenAI may undermine the authenticity of scholarly work when used with minimal cognitive engagement, while simultaneously confirming Baek et al.'s (2024) finding that students' trust in GenAI output depends on their capacity to critically evaluate the generated content. The implication is that the risk of skill dependency is not inherent in GenAI itself but is contingent upon the critical stance adopted by the user.

Beyond individual perceptual processes, the findings reveal a structural concern that transcends individual cognition. The strong consensus on the need for institutional regulation (S10) indicates that participants' perceptions are shaped not only by their personal experiences with GenAI but also by the *absence of external guidance* from their academic institution. This concern corroborates Cotton et al.'s (2024) argument that academic integrity frameworks must be updated to address the challenges posed by GenAI, and echoes Chan and Hu's (2023) finding that university students express anxiety about the ethical boundaries of AI use. Chung and Jeong (2024) identified similar apprehensions among Chinese pre-service teachers, suggesting that the call for institutional regulation is not context-specific but reflects a broader pattern across diverse educational settings. The practical significance of this finding is considerable: without clear institutional policies, individual perceptual processes no matter how sophisticated lack the external scaffolding necessary to translate personal understanding into consistent, ethically informed practice.

The concern about content accuracy (S7) further illustrates how participants' interpretive frameworks shape their engagement with GenAI. P4's report of fabricated AI-generated references reflects a widely documented limitation of large language models, while P1's cross-referencing strategy suggests that some participants have independently developed informal verification practices. These individual responses indicate an emerging but uneven critical literacy: some participants actively interrogate GenAI output, while others remain uncertain about how to evaluate it. Kostka and Toncelli (2023) documented similar accuracy concerns in their analysis of ChatGPT's application in English language teaching, and Miao

and Holmes (2023) emphasize the necessity of developing critical evaluation skills alongside technical proficiency. The uneven distribution of critical strategies among participants reinforces the argument that structured instructional support rather than informal, individually developed practices is essential for responsible GenAI integration.

Based on these findings, several practical implications warrant consideration. First, English Language Education programs should integrate explicit instruction on the responsible and critical use of GenAI tools into their academic writing curricula. Second, higher education institutions should establish clear and transparent policies on GenAI use, specifying the boundaries between legitimate AI-assisted work and academic misconduct. Third, educators should adopt a balanced pedagogical approach that leverages GenAI's demonstrated strengths in grammar correction, vocabulary enhancement, and structural organization while simultaneously cultivating students' capacity for independent critical thinking, argumentation, and original idea development. Malik et al. (2023) support this recommendation, noting that effective integration of AI in academic writing requires structured pedagogical frameworks rather than ad hoc student adoption. Mahapatra (2024) further corroborated this position, finding that ChatGPT has a significant positive effect on ESL students' academic writing skills when employed as a formative feedback tool within a structured instructional context, thereby reinforcing the argument that GenAI is most effective when embedded within intentional pedagogical design.

E. CONCLUSION

This study explored how pre-service teachers in the English Language Education program at University of Brawijaya perceive the role of generative AI in their academic writing practices. The results show that participants viewed GenAI as a valuable supporting tool for addressing common writing challenges such as grammar improvement, vocabulary expansion, argument organization, idea development, and draft refinement, while consistently recognizing that intellectual ownership of their work remains their own responsibility. At the same time, several challenges were identified, notably the difficulty of assessing the reliability of AI-generated output, varying opinions on whether GenAI use may lead to reduced writing independence, and a shared concern about the lack of formal institutional regulations for GenAI use in academic contexts. It should be noted that this study is limited by its small number of participants and its focus on a single institution, and the use of short written responses may not have captured the full complexity of participants' experiences.

Subsequent studies are recommended to involve larger and more diverse participant groups and to utilize in-depth interviews across different institutional settings in order to produce more comprehensive and generalizable insights. Research with a longitudinal design that traces the long-term effects of GenAI use on the growth of autonomous writing competence would further contribute to resolving the open question of skill dependency. Additionally, it is recommended that higher education institutions formulate clear and transparent regulations concerning GenAI use in academic writing and embed critical AI literacy within teacher education programs, so that pre-service teachers are prepared to use these technologies in an informed and ethical manner throughout their academic and professional careers.

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