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INTEGRATING AI TOOLS IN EFL WRITING: ENHANCING CRITICAL THINKING AND ADDRESSING CULTURAL BIAS

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Abstract: AI-assisted language learning tools such as Grammarly and ChatGPT are increasingly used in English as a Foreign Language (EFL) writing classrooms to support linguistic accuracy and drafting efficiency. However, their role in fostering critical thinking and cultural awareness remains insufficiently explored. This qualitative study investigates how undergraduate English majors at Syiah Kuala University, Indonesia, integrate Grammarly and ChatGPT into their academic writing and how cultural bias in AI-generated suggestions is recognized and addressed. Data were collected from AI-mediated students' writing samples and semi-structured interviews and analyzed using perspectives from second language acquisition and cross-cultural communication. The findings reveal that while AI tools contribute to improved grammatical precision and lexical accuracy, they frequently generalize or flatten culturally embedded meanings, resulting in texts that are linguistically polished but culturally superficial when adopted uncritically. The study further shows that explicit pedagogical interventions, including guided reflection and critical prompts, enable students to evaluate AI feedback more critically and reinsert local cultural perspectives into their writing. These findings highlight the essential role of educators in mediating AI use and suggest that effective integration of AI in EFL writing requires balancing linguistic accuracy with the development of critical thinking and cultural literacy.

Keywords: *AI tools, critical thinking, cultural bias, EFL students*

INTRODUCTION

Generative artificial intelligence (GenAI) has increasingly reshaped writing pedagogy in English as a Foreign Language (EFL) classrooms. Tools such as ChatGPT and Grammarly are now commonly integrated across drafting, revising, and editing stages, offering automated feedback on grammar, lexis, cohesion, and organization, as well as support for idea generation and genre modeling (Dizon & Gayed, 2024; Marzuki

et al., 2023). When used purposefully, GenAI has been shown to support writing fluency, self-regulation, learners' cognitive, behavioral, and affective engagement with writing (Meniado et al., 2024; Teng, 2024). Consequently, recent research has shifted from a primary focus on detecting AI-generated texts toward examining the pedagogical affordances and limitations of GenAI for second language (L2) writers (Mizumoto et al., 2024; Warschauer et al., 2023).

Despite these developments, concerns regarding academic integrity, over-reliance, and uncritical use of AI tools persist (Dang & Wang, 2024; Kasneci et al., 2023). Beyond these ethical and technical issues, a less explored but equally significant concern involves the cultural dimension of AI-assisted writing. Large language models such as ChatGPT are predominantly trained on English-centric and Western-oriented corpora, which may encode and reproduce cultural biases, dominant discourse norms, and Anglophone rhetorical expectations (Navigli et al., 2023). Prior studies have documented tendencies toward social identity bias, dialect prejudice, and Western-normative discourse in AI-generated outputs (Hofmann et al., 2024; Qu & Wang, 2024). For EFL learners, this raises the risk that culturally situated meanings, local epistemologies, and authentic voices may be flattened or generalized during AI-assisted revision.

This issue is particularly salient in the Indonesian EFL context, especially within teacher education programs. In faculties of teacher training and education (FKIP), undergraduate students progress through multiple stages of academic writing, from paragraph and essay writing to research-based academic texts. Observations and informal consultations indicate that tools such as Grammarly and ChatGPT are frequently used to address linguistic accuracy, idea development, paraphrasing, and structural organization. While students report benefits in surface-level correctness and drafting efficiency, they also encounter challenges when culturally specific content, such as Indonesian educational practices or local sociocultural references, is rephrased by AI into more generic or Anglophone-dominant forms. This tension reflects international findings that GenAI can simultaneously empower learners while creating uncertainty around authorship, authenticity, and cultural representation (Meniado et al., 2024; Teng, 2024).

Although AI-assisted L2 writing research has expanded rapidly, several gaps remain. First, existing studies largely emphasize linguistic accuracy and revision behaviors, often overlooking how learners critically engage with cultural bias embedded

in AI-generated suggestions. Second, limited attention has been paid to the role of pedagogical mediation, such as teacher-designed prompts, reflective tasks, or culturally informed rubrics, in helping students interrogate and adapt AI feedback meaningfully. Third, situated evidence from Indonesian FKIP programs remains scarce, despite the fact that student-teachers will later model AI use and ethical writing practices in their own classrooms. Addressing these gaps is essential to avoid positioning AI merely as a neutral corrective tool rather than a sociotechnical mediator of language, meaning, and culture.

In response to these gaps, the present study investigates AI-assisted writing among undergraduate EFL student-teachers at FKIP Bahasa Inggris, Universitas Syiah Kuala, through a critical cultural lens. Drawing on perspectives from L2 writing, automated writing evaluation, and critical cultural literacy, the study examines how students use Grammarly and ChatGPT in their academic writing, how cultural bias or misalignment manifests in AI-generated suggestions, and how pedagogical interventions can foster more critical and culturally responsive engagement with AI outputs. Accordingly, this study addresses the questions of (1) How do undergraduate EFL students at FKIP Bahasa Inggris USK integrate Grammarly and ChatGPT across stages of academic writing? (2) What forms of cultural bias or cultural misalignment emerge in AI-generated suggestions within student writing? (3) How do pedagogical interventions support students' critical thinking and cultural literacy when engaging with AI-assisted feedback?

By foregrounding culture and pedagogy in AI-assisted L2 writing, this study contributes empirical evidence from the Indonesian teacher education context and offers pedagogical insights for integrating GenAI in ways that enhance accuracy without compromising voice, identity, and cultural authenticity.

REVIEW OF LITERATURE

AI-Supported Writing in EFL Settings

Research on artificial intelligence (AI)-supported writing in English as a Foreign Language (EFL) settings has increased at an extremely fast pace, keeping pace with a heightened need to understand how technology restructures second language (L2) writing practices. Investigations have consistently established that writing software such as Grammarly and ChatGPT yield the substantial results in linguistic accuracy, fluency, and composition (Dizon & Gayed, 2024; Marzuki et al., 2023; Mizumoto et al., 2024). Dizon

and Gayed (2024) also conducted a systematic review of L2 writing and the application of Grammarly and concluded that computer feedback had a significant impact of diminishing surface-level grammatical errors as well as enhancing textual coherence. However, they also highlighted that the same feedback was superficial in supporting higher-order writing skills such as argumentation, rhetorical development, and critical thinking, skills that were still at the center of pedagogy of academic writing.

Similarly, Marzuki et al. (2023) researched the experiences of Indonesian teachers and students with AI writing tools and concluded that while students liked ChatGPT's capability to facilitate brainstorming and idea organization, they used it without applying critical thinking. Such overreliance could potentially destroy student autonomy and reflective participation in the writing process. These results resonate with broader trends in computer-assisted language learning (CALL), where digital affordances are either supporting or seizing learners' cognitive activity based on pedagogic incorporation.

Besides language accuracy, current research has also looked at the role of AI in motivation and engagement. Meniado et al. (2024) found that generative AI positively affected learners' self-regulation and writing motivation in Saudi EFL settings and helped them deal with complex writing assignments more confidently. Teng (2024) also indicated that Chinese university students perceived ChatGPT as a "writing companion," which gave them specific tips for structure and vocabulary. Teng (2024) also stated that the majority of students accepted AI-provided feedback with inadequate critical thinking, leading to surface-level mastery of writing improvement. Together, these studies demonstrate that while AI can enhance efficiency and confidence, it also creates challenges regarding dependency, critical thinking, and learner agency.

Assessment scholarship has now further placed these results in perspective. According to Mizumoto et al. (2024), AI tools could be considered forms of Automated Writing Evaluation (AWE) that yield reliable and immediate feedback to minimize revision cycles. Warschauer et al. (2023), on the other hand, cautioned that AI implementation in assessment practice blurs lines between human and machine authorship, raising ethical issues of originality and transparency. Thus, the literature builds a twofold narrative: AI tools have incontrovertible advantages of linguistic precision and productivity, but their use without reflection can compromise significant pedagogical goals of creativity, thought, and authenticity in L2 writing.

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Critical Thinking and Cultural Dimensions in AI-Mediated Writing

Even though early AI writing studies were largely focused on mechanical accuracy, newer scholarship has shifted towards cognitive and cultural directions. Particularly, it focuses on the development of critical thought and cultural sensitivity. With generative AI tools such as ChatGPT now being more integrated into academic writing, there is now concern that they could be used to reinforce Western thought domination. Navigli et al. (2023) assumed that LLMs inherit the biases present in their majority-English-language training data and thereby perpetuate disproportionate cultural representations. Hofmann et al. (2024) empirically discovered that AI-generated texts are likely to reflect latent linguistic bias against Anglophone norms and suppress non-Western approaches to discourse.

For EFL writers, especially those with linguistically and culturally diverse backgrounds, these tendencies are of great importance. When AI programs paraphrase or rephrase location-based concepts in the language of Western rules of discourse, students may unknowingly take them up, diluting cultural authenticity in their writing. Qu and Wang (2024) had called this impact "distributional dominance," wherein model output is heard as the statistical domination of certain worldviews, literally silencing local epistemologies. Consequently, EFL students will tend to produce texts that are grammatically accurate but culturally superficial.

This clash between linguistic truth and representation of culture is particularly crucial in environments such as Indonesia, where English is used not just as a global medium of communication but also as a local expression. Unless students are made explicitly aware of the ways in which AI systems reproduce and represent cultural assumptions, they will tend to reinforce cultural homogenization. The literature then points out the need to go beyond evaluating AI on its productivity or accuracy alone. Ethical use of generative AI, as Dang and Wang (2024) contended, requires critical literacy, understanding how algorithms make meaning and when to critique or reinterpret AI-generated language.

Theoretically, these discussions intersect with sociocultural and cross-cultural communication paradigms. Language acquisition is not only cognitive but also social and cultural (Lantolf & Thorne, 2007; Vygotsky, 1978). For this view, AI-mediated writing can be understood as mediated action in which the students negotiate meaning by way of

human-machine interaction. By critically reading AI-generated texts, students generate higher-order thought beyond surface correction to metacognitive understanding and intercultural awareness. Therefore, AI-augmented writing environments can be useful sites for the cultivation of critical thinking, if students are instructed to ask questions, situate things, and reclaim their own voices.

Pedagogical Mediation and Indonesian Gaps

With these prospects and possibilities, scholars have increasingly emphasized the teacher's role in mediating students' work with AI. Kasneci et al. (2023) proposed the introduction of "cultural checkpoints" and questioning within composition classes to prompt students to scrutinize AI proposals instead of blindly accepting them. Similarly, Dang and Wang (2024) argued that AI must be introduced by teachers as neither a sole authority nor an autonomous agency but as a dialogic interlocutor the student learns to work out with. This pedagogical reimagining places AI as an instrument for fostering critical and cultural literacy rather than simply autopilot correcting.

Although recommendations like these are available, empirical evidence for successful interventions in classrooms is scarce, particularly in Southeast Asian and Indonesian contexts. Though contributions from Japanese, Chinese, and Middle Eastern studies are commendable (Dizon & Gayed, 2024; Meniado et al., 2024; Teng, 2024), none have examined the cultural handling of AI-sourced feedback by Indonesian EFL learners, especially those who will be the future teachers. Marzuki et al. (2023) reported that Indonesian students will use ChatGPT to refine coherence and vocabulary but never once probe its cultural background. This finding implies that the outputs of these tools could cause cultural bias left unexamined.

In academic writing courses, such as those offered at FKIP Universitas Syiah Kuala (USK), students learn to balance linguistic proficiency with intercultural proficiency and reflective teaching. Yet, little is known about how these prospective teachers integrate AI tools in ways that preserve cultural authenticity. Warschauer et al. (2023) noted that AI's educational value depends less on its inherent capabilities than on how teachers contextualize it. Accordingly, fostering metacognitive and intercultural reflection must become a central element of AI-integrated writing instruction.

The scarcity of localized empirical data presents both a challenge and an opportunity. By examining how Indonesian EFL student-teachers recognize, negotiate,

and adapt to AI-generated feedback, researchers can contribute to a more situated understanding of AI's pedagogical and cultural implications. Such inquiry aligns with the broader aim of critical pedagogy in language education: empowering learners to use technology not merely for correctness or productivity but for agency, identity, and intercultural dialogue.

Across literature, three interconnected themes occur. One, AI tools such as Grammarly and ChatGPT enhance linguistic accuracy and productivity but offer little support for higher-order thinking and cultural sensitivity. Two, unhindered uses of AI can reinforce Western-biased notions and lead to cultural flattening in EFL writing. Three, teacher mediation, through intentional instruction, reflective exercises, and culturally responsive feedback, is required to convert AI into a corrective tool.

Despite extensive global research, the Indonesian context remains to be explored. Most studies pertain to English language competence in general rather than specifically how students critically evaluate or culturally adapt AI-generated text. Therefore, this current study intends to fill the gap by investigating how Indonesian EFL student-teachers employ Grammarly and ChatGPT in writing at university, identify cultural bias, and respond to teacher intervention that promotes critical and culturally conscious engagement with AI production. Situating AI-assisted writing within a critical cultural literacy paradigm, this study expands on existing scholarship and develops a more pedagogically and ethically grounded deployment of AI within EFL pedagogy.

METHOD

In this study, a qualitative descriptive design was used to examine how the EFL students integrate the AI tools such as Grammarly and ChatGPT, and how these tools specifically influence critical thinking in the writing context which related to the cultural bias. Through this design, this study particularly aimed to provide understanding on how the students recontextualize the AI-generated feedback (Creswell & Poth, 2018). Therefore, this approach could suggest an in-depth examination of students' perceptions, experiences, and reflections, showing contexts of learning through AI-mediated situations that would be difficult to explain using quantitative methods (Merriam & Tisdell, 2016).

The study was conducted at the English Department under the English Teacher Training and Education Faculty at Universitas Syiah Kuala, Indonesia. This major

encompasses coursework ranging from English language skills, such as academic writing and formal spoken English, linguistics, pedagogy, to cross cultural communication. These courses prepare the undergraduate students to become prospective English teachers. A total of 24 students in the fourth semester enrolled in *Academic Writing* course participated in the study. In this course, GenAI such as ChatGPT and Grammarly were being integrated as a part of the preparation in the writing practices. The proficiency of the students ranging from intermediate to upper-intermediate levels.

From 24 students, around eight students were purposively selected for in-depth interviews. The selection was based on (a) diversity in writing quality (high, medium, low performance), (b) gender representation, and (c) English proficiency levels. This purposive sampling strategy allowed the study to capture a range of perspectives and ensure representativeness in terms of learning backgrounds (Palinkas et al., 2015).

Data Collection Procedures

All 24 students were required to submit two writing tasks as part of their coursework. The first writing task was about an argumentative essay using Grammarly and ChatGPT as support tools, and the second one was about a reflective essay evaluating the usefulness and limitations of these tools in addressing linguistic and cultural aspects of writing. These writing samples were collected over one semester. The texts provided evidence of how AI tools contributed to linguistic accuracy, how students identified and engaged with cultural bias, and how they integrated critical thinking into their written products. Writing samples were also useful for triangulating the themes that emerged from the interviews.

In-depth semi-structured interviews were conducted with the purposive subset of eight participants. Each student participated in two interviews. The initial interviews (at the beginning of the semester), aimed to capture their prior experiences with AI tools, expectations, and preliminary perceptions of how these tools might support or hinder their writing. Follow-up interviews (at the end of the semester), explored the students' reflections on the actual use of Grammarly and ChatGPT, particularly focusing on issues of cultural bias, critical thinking development, and teacher guidance.

Interviews were conducted in English and Bahasa Indonesia, depending on participants' comfort. Each session lasted 30–40 minutes and was audio-recorded with

informed consent. Using both initial and follow-up interviews enabled the researcher to trace the evolution of students' awareness and attitudes over time (Teng, 2024).

Data Analysis

Data analysis followed an iterative thematic analysis approach (Braun & Clarke, 2021). The process involved several stages. First is familiarization, in which reading and rereading writing samples and interview transcripts were conducted to gain initial insights. Secondly, initial codes were generated inductively, focusing on linguistic accuracy, detection of cultural bias, and critical reflection. Third, theme was developed by grouping codes into themes such as *accuracy vs. cultural literacy*, *teacher mediation in AI use*, and *critical stance toward AI feedback*. Then, writing samples were cross-analyzed with interview data to ensure coherence and validate emerging interpretations. Finally, themes were refined to align with the study's research questions and theoretical framework of SLA and cross-cultural communication.

NVivo 12 software was employed to facilitate the coding and organization of qualitative data. The combination of textual (writing samples) and narrative (interviews) data enhanced the validity of findings by providing multiple perspectives on the same phenomenon (Fetters & Freshwater, 2015).

FINDINGS AND DISCUSSION

Findings

The findings are presented in relation to the three research questions: (1) how students integrated Grammarly and ChatGPT during academic writing; (2) what types of cultural bias were evident in AI-generated suggestions; and (3) how pedagogical interventions enhanced critical engagement with AI outputs. Data are drawn from writing samples of 24 students and semi-structured interviews with eight participants.

Patterns of AI Integration in Writing Stages

Analysis of writing samples and student reports indicated that Grammarly and ChatGPT were integrated at different stages of the writing process. Table 1 summarizes the dominant patterns of use.

As shown in Table 1, Grammarly was most frequently used in later stages (83-95%) for surface-level editing, while ChatGPT was preferred in the drafting stage (75%) to generate outlines, expand arguments, or provide model sentences.

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Table 1. Integration of Grammarly and ChatGPT across Writing Stages

Writing Stage	Grammarly Use (%)	ChatGPT Use (%)	Typical Functions Reported
Drafting	21%	75%	Brainstorming, idea expansion, outlining
Revising	83%	58%	Grammar correction, rephrasing, sentence flow
Editing/Final	95%	36%	Mechanical accuracy, punctuation, cohesion

Source: Data of 24 writing samples and 8 interviews

Interview data confirmed these trends. For example, one participant (P4) stated:

> "I used Grammarly to make sure my essay was error-free, but ChatGPT helped me when I didn't know how to start the introduction."

Types of Cultural Bias in AI Suggestions

Thematic coding of writing samples identified three main forms of cultural bias or flattening. Importantly, these categories are not mutually exclusive, a single writing sample could exhibit more than one type of bias. Therefore, the frequencies reported in Table 2 reflect overlapping occurrences, which explains why percentages exceed 100%.

Table 2. Instances of Cultural Bias Identified in Student Writing

Category	Frequency (%)	Local Concept (Acehnese/Indonesian)	AI Suggestion (Anglophone/Western)	Comment
Anglophone replacement of terms	16 (67%)	*Pesantren*	Boarding school	Misses Islamic/communal orientation of pesantren.
		Meugang (Acehnese tradition before Ramadan)	Family gathering with food	Erases religious meaning and social solidarity aspects.
Overgeneralization of context	11 (46%)	*Kurikulum Merdeka*	Freedom curriculum	Loses reform philosophy, reduced to literal translation.
		Dayah (Acehnese traditional Islamic school)	Religious institution	Flattens cultural specificity into generic term.
Implicit value assumptions	9 (38%)	*Gotong royong* in rebuilding Aceh post-tsunami	Volunteerism / individual initiative	Frames collective obligation as personal choice.
		Syariat Islam in Aceh	Local community rules	Neutralizes religious-legal system into secularized phrasing.

Source: Data of 24 writing samples

Anglophone cultural dominance

AI often replaced culturally specific Acehnese or Indonesian concepts with generic Anglophone equivalents. For instance, *pesantren* was rendered as *boarding school*, which ignores its Islamic educational orientation. Similarly, *meugang* (an

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Acehnese tradition of communal cooking and meat sharing before Ramadan) was paraphrased as *family gathering with food*, erasing its religious and communal depth.

Overgeneralization of sociocultural context

Policies and practices embedded in the Indonesian context were often simplified into vague, globalized terms. For example, *Kurikulum Merdeka* was translated as *freedom curriculum*, reducing its pedagogical philosophy to a literal phrase stripped of its Indonesian educational reform context. Likewise, *dayah* (traditional Islamic school in Aceh) was generalized into *religious institution*, overlooking its distinctive role in Acehnese society.

Implicit value assumptions

ChatGPT suggestions tended to normalize Western-centric notions such as individualism and secularism. For example, when students wrote about *gotong royong* in rebuilding post-tsunami Aceh, AI rephrased it as *volunteerism* or *individual initiative*, emphasizing personal choice rather than collective obligation. Similarly, narratives about Acehnese *syariat Islam*-based regulations were softened into *local community rules*, reflecting a tendency to neutralize religious specificity in favor of secular, globally palatable phrasing.

Effects of Pedagogical Interventions

To examine changes in students' critical engagement with AI outputs, Figure 1 illustrates shifts in student responses before and after teacher-led pedagogical interventions. Before intervention, five out of eight students accepted AI outputs without modification, two made partial changes, and one critically adapted outputs. After intervention, six out of eight students critically adapted AI outputs, two partially changed, and none accepted outputs uncritically. This change indicates that teacher mediation significantly increased students' critical stance toward AI feedback. Additionally, 19 of 24 writing samples in the reflective essays showed explicit attempts to reinsert cultural elements that had been flattened by AI, compared with only seven in the initial argumentative essays.

One participant (P2) summarized this process:

> "At first, I just copied ChatGPT's suggestions. But after the class discussion about cultural context, I realized I needed to edit the sentences to show Indonesian perspective."

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These findings indicate that pedagogical intervention influenced not only revision behavior but also students' critical evaluation processes.

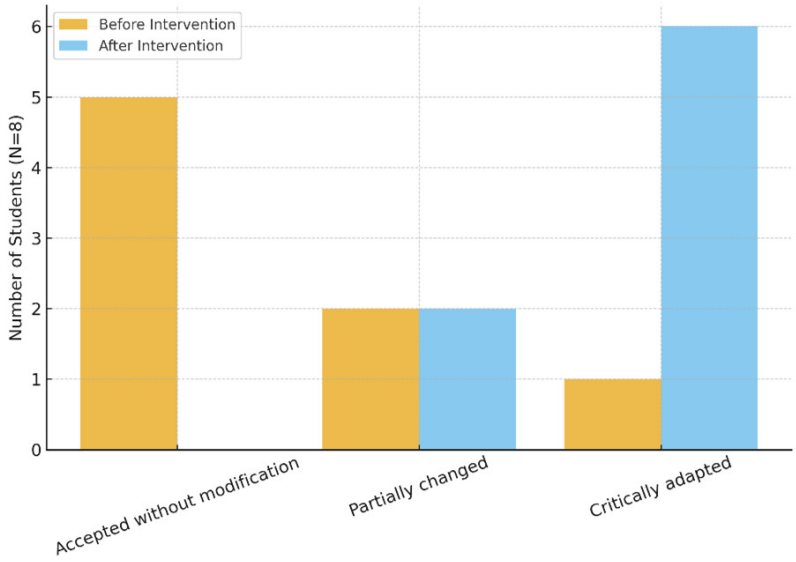

Figure 1. Change in Student Responses to AI Suggestions
Source: Data from eight interviewees

Discussion

This study examined how Indonesian undergraduate EFL students integrated Grammarly and ChatGPT in their writing, how cultural biases appeared in AI suggestions, and how pedagogical interventions shaped their responses. The findings contribute to ongoing debates in AI-assisted language learning by situating the discussion within the intersection of linguistic accuracy, cultural literacy, and critical pedagogy.

First, the complementary use of Grammarly and ChatGPT confirmed prior findings that AI tools support different dimensions of writing (Dizon & Gayed, 2024; Meniado et al., 2024). Grammarly functioned as an automated writing evaluation (AWE) system primarily for micro-level corrections (grammar, punctuation, cohesion), aligning with previous work showing that AWE enhances surface accuracy but rarely influences higher-order thinking (Mizumoto et al., 2024). In contrast, ChatGPT served more meaning-making functions, such as brainstorming, paraphrasing, and structuring. This reflects earlier research that generative AI facilitates idea expansion and genre modeling (Teng, 2024; Warschauer et al., 2023). However, the reliance on ChatGPT during drafting also risks over-dependence, echoing Kasneci et al. (2023), who warned that uncritical adoption of AI suggestions may compromise learner autonomy.

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Second, the analysis of cultural bias in AI outputs reinforces recent scholarship on how large language models (LLMs) reproduce Anglophone and Western-centric perspectives (Navigli et al., 2023; Hofmann et al., 2024). In this study, vocabulary socio-religious depth was often flattened into generalize equivalents that caused unrelated or broaden contexts from the intended meaning. Concepts, such as *gotong royong* (a communal practice of mutual assistance), *pesantren* (Islamic boarding schools that combine religious education with daily communal life), *meugang* (Acehnese concept to show feasting in celebrating the coming of Ramadhan Month) were generalized into 'volunteerism', 'boarding school', and 'family gathering'. This generalization or cultural flattening demonstrate what Qu and Wang (2024) refer as "distributional dominance," in which Western cultural concepts majorly shape the outputs of GenAI. This can generate drawbacks to Indonesian EFL learners because this situation do not only become the linguistic issues but also epistemological aspects. It could risk undermining the authenticity and specific voices of local culture in global academic environment. Thus, Dang and Wang (2024) suggests that cultural literacy should be embedded in EFL pedagogy when integrating GenAI.

Most significantly, this study also emphasises the essential role of academic and pedagogical interventions in EFL classrooms when mediating the use of AI. Scaffolding from teachers, including clear and explicit prompts to critique and filter all AI outputs, enabled students to have conscious actions when transitioning from passive acceptance to active adaptation. The interventions and scaffolding from teachers essentially help learners internalize higher-order skills as echoed in sociocultural perpsectives in SLA (Lantolf & Thorne, 2007; Vygotsky, 1978). After intervention, students are expected to rethink the AI outputs and reinserted appropriate cultural nuance into their writings. It demonstrate that AI can be integrated not only for efficiency aspect but also for critical literacy development. As a result, it shows that the use of GenAI depends less on the tool itself and more on how teachers contextualize and frame its use.

In terms of theoritical aspect, the findings encompass the cross-cultural communication framework by demonstrating how AI could act as a sociotechnical mediator or meaning rather than a neutral linguistic assistant. The fact that students noticed, negotiated, and resisted cultural misalignments suggests that AI-mediated writing can foster intercultural awareness if supported by reflective pedagogy. Practically,

this means EFL teachers should not only train students in technical mastery of AI tools but also design "cultural checkpoints" (Dang & Wang, 2024) where learners must evaluate the alignment between AI outputs and local epistemologies.

Taken together, the study suggests that AI-assisted writing, when critically mediated, can enhance both linguistic competence and cultural literacy. However, without explicit pedagogical scaffolding, AI outputs risk promoting superficial correctness at the expense of deeper cultural authenticity.

CONCLUSION AND SUGGESTIONS

This study examined Indonesian undergraduate EFL students' engagement with Grammarly and ChatGPT, with particular attention to how AI-assisted writing mediates critical thinking and cultural representation. The findings demonstrate that Grammarly and ChatGPT function complementarily in the writing process: Grammarly primarily supports linguistic accuracy, while ChatGPT facilitates idea development and text organization. However, AI-generated suggestions frequently exhibited cultural flattening by replacing culturally embedded Acehnese and Indonesian concepts with generic Anglophone expressions. These patterns reaffirm that AI-assisted writing is not a neutral process but one shaped by dominant linguistic and cultural epistemologies embedded in large language models.

More importantly, the study highlights critical thinking as a pedagogical outcome of AI-mediated writing when supported by instructional intervention. Teacher-led scaffolding, such as prompts encouraging evaluation, comparison, and contextual revision of AI suggestions, enabled students to move from uncritical acceptance toward deliberate adaptation. This shift reflects sociocultural perspectives in second language acquisition, which emphasize mediation and guided participation in the development of higher-order cognitive skills (Lantolf & Thorne, 2007; Vygotsky, 1978). In this sense, AI tools functioned as mediational artifacts that, when pedagogically framed, fostered learners' critical reflection on meaning, audience, and cultural positioning in academic writing.

With regard to cultural diversity, the findings suggest that diversity in AI-assisted writing is not automatically generated by the tools themselves but emerges through students' critical negotiation of AI outputs. By questioning culturally biased suggestions

and reinserting local perspectives, students actively preserved diverse cultural voices within global academic discourse. Thus, cultural diversity in this study is conceptualized not as representational variety but as the ability to sustain culturally situated meanings and epistemologies through critical writing practices.

Despite these contributions, the study has several limitations. The participant pool was relatively small and context-specific, which limits generalizability. Additionally, the analysis focused on Grammarly and ChatGPT, while students may engage with a wider range of AI tools. Future research should involve larger and more diverse cohorts across institutional contexts and incorporate mixed-method approaches, such as pre- and post-assessments of critical thinking or cultural literacy. Comparative studies across different generative AI platforms would also deepen understanding of how design features influence cultural representation in AI-mediated writing.

In conclusion, this study underscores that the pedagogical value of AI-assisted writing lies not merely in efficiency or accuracy but in its potential to cultivate critical thinking and cultural diversity through guided mediation. To realize this potential, educators must actively frame AI use as a reflective and evaluative practice, ensuring that AI serves not only as a linguistic aid but also as a catalyst for developing critically engaged, culturally responsive EFL writers in an increasingly AI-mediated academic landscape.

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