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INTERPLAY OF AI WRITING TOOL USAGE, METACOGNITIVE STRATEGIES, AND SELF-EFFICACY AMONG STRUGGLING STUDENTS IN WRITING

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ABSTRACT

Writing proficiency requires the integration of cognitive regulation, sustained practice, and efficacy beliefs. However, a gap exists in the literature regarding the transition of senior high school students to advanced academic writing. This descriptive-correlational study, anchored in Flavell's Theory of Metacognition and Bandura's Social Cognitive Theory, examined the relationships among artificial intelligence (AI) writing tool usage, metacognitive strategies, self-efficacy, and writing performance among 147 Grade 11 students during the 2025–2026 academic year. Data were collected using adapted Likert-type instruments measuring AI tool usage, metacognitive strategy use, and self-efficacy in writing, alongside an essay-writing task evaluated through an analytic rubric. Descriptive statistics were computed to determine variable levels, and canonical correlation analysis was employed to examine multivariate associations. Results indicated moderate use of AI writing tools, primarily as organizational and research scaffolds rather than as substitutes for independent composition. Metacognitive strategies were rated high, with monitoring emerging as the strongest dimension, followed by planning and evaluation. In contrast, self-efficacy was moderate while actual writing performance was approaching proficiency, suggesting that while students could produce structurally basic texts, coherence and mechanical accuracy remained areas of difficulty. Canonical correlation findings revealed a statistically significant association between AI writing tool usage and writing performance. However, the associations between metacognitive strategies and self-efficacy and writing performance were not statistically significant. These findings indicate that engagement in self-regulatory practices coupled with self-efficacy in writing does not automatically translate into higher-level writing

proficiency. A major research recommendation is to implement experimental or longitudinal studies to determine whether structured AI-integrated writing interventions can causally enhance writing proficiency, metacognitive transfer, and self-efficacy development over time.

Keywords: *AI writing tool usage, metacognitive strategies, self-efficacy, writing skills*

INTRODUCTION

Writing is one of the most important literacy skills learners should acquire to express their ideas clearly, warranting appropriate academic and professional involvement. For senior high school, writing is more than understanding grammar, sentence structure, and mechanics. Students' writing performance is improved in organization, coherence, grammar, and vocabulary through targeted instruction by AI-assisted feedback (Song & Song, 2023). In addition, effective writing also involves higher-order thinking skills and self-regulatory learning through deliberate practice and reflection (Rosdiana et al., 2023).

With the internet age, the advent of artificial intelligence (AI)-based writing programs, including Grammarly, Quillbot, and ChatGPT, has reshaped how students approach writing. These tools give instantaneous feedback on grammar, coherence, and vocabulary usage, which improves learners' mindfulness about language accuracy and text quality (Liu et al., 2021; Yan, 2023). The challenge is whether students will be able to maintain writing capability and confidence without the use of AI integrated deeply with learning environments. In addition to integrating technology, successful writing requires metacognitive strategies, learners' ability to plan, monitor, and evaluate their writing, as well as self-efficacy, which refers to belief in one's own capacity to accomplish a writing task (Hakikiy et al., 2025). The employed metacognitive strategy makes students able to organize their ideas and revise them to produce writing in a more coherent and meaningful manner (Teng, 2022). Thus, high writing self-efficacy can foster motivation, persistence in the face of failure, and self-regulated learning behaviors that may lead to a performance gain (Amin et al., 2022).

Language learning environments supported by Artificial Intelligence (AI) can also be beneficial for writing outcomes when accompanied with metacognitive and motivational support (Nazari et al., 2021). However, literature is limited in this area among emerging adult learners due to the majority of previous studies being carried out at EFL or ESL settings involving only college or tertiary level students, which clearly possessed a population gap (Miles, 2017). There have been few studies that explored how senior high school students, who are at a transitional phase between basic and higher education, use AI writing tools, implement metacognitive strategies during the writing process, and evaluate their self-efficacy in the process of writing. At the senior high school level, these dynamics of writing engagement are vital as learners are expected to have developed certain fluency in basic writing before further education and the workforce.

In this study, the researcher is committed since in his teaching area, students face challenges in writing (a condition experienced over his four years of teaching). Despite the expectation that senior high school students have strong foundational writing skills, many still face challenges with writing and are unclear about why they struggle.

Hence, this study aimed to examine the relationships among AI writing tool use, metacognitive strategies, and self-efficacy in writing skills among senior high school students. By addressing the population gap, this research contributed to a more nuanced understanding of how technological and psychological factors interact to influence writing proficiency at this critical educational stage. This study aligns with the target of Sustainable Development Goal 4 (SDG 4: Quality Education) to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UNICEF, 2023). Fostering 21st-century skills of critical thinking, digital literacy, and independent learning, it enables students to improve the quality of education through better writing because they use AI responsibly, applying the metacognitive strategies, and possessing self-efficacy in writing.

Research Questions

This descriptive correlational study aimed to examine the relationships among AI writing tool usage, metacognitive strategies, self-efficacy, and the writing skills of Senior High School Students in one of the private institutions in Cagayan de Oro City. Specifically, it aimed to answer the following questions:

1. What is the extent of participants' use of AI writing tools?
2. What is the participants' extent of use of metacognitive strategy in terms of:
   2.1 Planning;
   2.2 Monitoring; and
   2.3 Evaluating
3. What is the participants' level of self-efficacy in English writing?
4. What is the participants' level of English writing skills?
5. Are participants' use of AI writing tools, metacognitive strategies, and self-efficacy significantly associated with their writing skills?

METHODOLOGY

This study employed a descriptive-correlational research design to examine the association among AI writing tool usage, metacognitive strategies, self-efficacy, and writing skills among senior high school students. This design is particularly suitable for educational research in which natural settings are maintained, and variables are observed as they occur.

The participants of this study were Grade 11 HUMSS (Humanities and Social Sciences) students of one private senior high school in Cagayan de Oro City. These students were currently taking the *Reading and Writing Skills* subject in the second semester. Before

conducting the study, the researcher secured approval from Lourdes College's Research and Ethics Committee (REC) to ensure adherence to institutional and national ethical research standards. This research also ensured that the collection, processing, and/or storage of personal information are lawful, fair, and transparent in compliance with Republic Act No. 10173, otherwise known as the Data Privacy Act of 2012. Under the Act, personal data can only be collected for legitimate, proclaimed, and specific purposes with the knowledge and consent of data subjects. For purposes of confidentiality, participants were not identified by name; coded identifiers were used instead. Data was used only for academic and research purposes.

This study used a purposive sampling technique to represent fairly. A total of 180 students from the HUMSS strand comprising sections were selected proportionately based on a population of 452. Specifically, participants were chosen from the bottom 20 in each class based on their academic performance. During the factor analysis of the study, it was found that 180 participants were initially included, but only 147 were retained due to outliers. This sample size was considered sufficient in representing the population and in providing reliable statistical results for correlation analysis.

The AI Writing Tool Usage Questionnaire was adapted from the study of Nemt-Allah et al. (2024), which developed and validated the ChatGPT Usage Scale to measure students' extent and patterns of generative AI use in academic tasks. The original instrument was designed for postgraduate students and focused on frequency, purpose, and perceived usefulness of AI tools in writing-related activities. For the present study, selected items were modified to suit the senior high school context and were contextualized to common AI writing tools such as ChatGPT, Grammarly, and QuillBot. The adapted items measured how frequently students used AI tools for idea generation, grammar correction, organization, revision, and overall writing assistance.

The Metacognitive Strategies Questionnaire was adapted from a scale by Huang and Zhang (2022), who developed their L2 argumentative writing using a process-genre-based instruction instrument to assess learners' use of metacognitive strategies. The original questionnaire items were divided into three subscales, including planning, monitoring, and evaluating. The items themselves tended to include slight linguistic modifications, ensuring clarity and appropriateness for Grade 11 students, while keeping the original idea intact: Writing already included goal setting before writing, checking progress during writing, and reviewing output after completion of a task.

The Self-Efficacy in Writing Questionnaire was adapted from Bruning et al. (2013), who developed a multidimensional writing self-efficacy scale measuring students' confidence in performing writing-related tasks. Items were selected and modified for this study to represent students' confidence in generating ideas, organizing written work, using correct grammar/mechanics, and completing writing tasks independently. Contextualization was carried out on the adapted instrument for English writing tasks that senior high school students typically face.

Moreover, for the assessment of writing skills, an adapted model of Petajen-Brillantes (2013) was used as a framework through means for analysis for use in gauging academic writing performance. Writing ability was assessed based on content, organization, coherence, grammar, and mechanics. These components were mapped to the Grade 11 Reading and Writing Skills curriculum competencies. A descriptive scoring rubric was employed for assessing the written outputs of the students, which allowed for an objective evaluation of each sub-aspect in writing.

The researcher utilized an adapted questionnaire that was initially validated for content clarity and relevance through expert judgment. To establish reliability, a pilot test was conducted, yielding acceptable to excellent Cronbach's alpha scores ranging from 0.696 to 0.907 across all constructs (AI writing tool usage = 0.882; Metacognitive Strategies = 0.710–0.907; Self-efficacy = 0.819; Writing Skills = 0.696), meeting the established thresholds for internal consistency (George & Mallery, 2024; Schrepp, 2020). This preliminary testing specifically involved a separate group of 30 students to prevent any data overlap with the actual research participants. Following the main data collection, the instrument's structural validity was analyzed by the panel members and further rigorously assessed using Exploratory Factor Analysis (EFA) to identify underlying constructs and Confirmatory Factor Analysis (CFA) to verify the pre-specified theoretical model, ensuring the tool accurately captured the relationships between the study's variables. Ultimately, these comprehensive evaluation procedures confirmed that the composite instrument was highly robust and perfectly suited for the main data collection phase.

The researcher used the following statistical tools to organize the data: For research questions 1, 2, 3, and 4, the researcher used descriptive statistics, including mean, frequency distributions, and standard deviation, to establish the profile of the study. For research question 5, canonical correlation analysis was performed to investigate the relationships between the predictor set (AI writing tool usage, metacognitive strategies, and writing self-efficacy) and the criterion set (students' writing skills). The assumptions of canonical correlation, including normality, linearity, independence among constructs, and homoscedasticity, were evaluated before the analysis and were reasonably met.

RESULTS

Research Question 1. What is the participants' extent of AI writing tool usage?

Table 1 presents the distribution of participants' levels of AI writing tool use, including frequency, percentage, and mean. The overall mean score of 3.23, with a standard deviation of 0.52, indicates a Moderate extent of usage and relatively consistent responses among participants. This suggests that students are in a transitional phase of digital literacy, using AI as a "technological scaffold" for specific tasks rather than as a replacement for independent thought. This finding corresponds with Barrot's (2023) observations, which indicated that although AI possesses considerable potential for feedback, students frequently face challenges that require human intervention. The results show that the respondents are moderately engaged with these tools, as 94 participants

(63.95%) indicated a moderate rating. These others were 36 participants (24.49%) with a High level of usage, 16 participants (10.88%) with a Low level of usage, and only 1 participant (0.68%) with a Very High level of usage.

Table 1

Frequency, Percentage, and Mean Distribution of the Participants' Extent of AI Writing Tool Usage

Range	Description	Interpretation	Frequency	Percentage
4.51-5.00	Always	Very High	1	0.68
3.51-4.50	Often	High	36	24.49
2.51-3.50	Sometimes	Moderate	94	63.95
1.51-2.50	Rarely	Low	16	10.88
1.00-1.50	Never	Very Low	0	0.00
		Total	**147**	**100.0**
		Overall Mean	**3.23**	
		Interpretation	**Moderate**	
		SD	**0.52**	

Specific Indicators	M	Description	SD
1. I trust the quality and accuracy of AI outputs.	2.83	Sometimes	0.80
2. I use AI to generate ideas for my academic writing.	3.17	Sometimes	0.75
3. AI assists me in finding relevant sources or references for my research.	3.54	Often	0.87
4. I use AI as a brainstorming partner rather than a source of final answers.	3.07	Sometimes	0.96
5. I use AI to generate drafts that I edit and finalize myself.	3.29	Sometimes	0.82
6. AI helps me get started when I experience writer's block in writing essays.	3.22	Sometimes	0.90
7. AI assists me in organizing my thoughts and creating outlines.	3.46	Sometimes	0.87
8. AI saves me time and effort in academic writing.	3.25	Sometimes	0.89

The analysis shows which AI-supported behaviors students perform most, with the highest average scores. The item with the highest mean (M = 3.54, SD = 0.87) is "AI assists me in finding relevant sources or references for my research", which means that students consider AI primarily as a tool to retrieve information. A close second is their utilization of AI as a structural and writing-first draft assistant: "AI assists me in organizing my thoughts and creating outlines" (M = 3.46, SD = 0.87), suggesting dependence on technology for logical premises. For example, "AI helps me get started when I experience writer's block" (M = 3.22, SD = 0.90) indicates students' propensity to use these technologies as a way

of building momentum in their writing. In addition, participants appreciate using AI as their preliminary draft: “I use AI to generate drafts that I edit and finalize myself” (M = 3.29, SD = 0.82), which highlights the emphasis on self-finalization. Finally, students use AI for time: “AI saves me time and effort in academic writing” (M = 3.25, SD = 0.89), stressing the efficiency role of AI. These results also align with prior study, which has shown that AI-assisted feedback can enhance students’ organizational structure and coherence (Tran 2025). They claimed that reliance on technology for a rational strategy suggested considerable improvement in content arrangement and flow among students while using AI-prompted writing.

The lowest mean score, “I trust the quality and accuracy of AI outputs” (M= 2.83, SD = 0.80), suggests that participants maintain some skepticism about AI-generated content. Following closely is the sentiment, “I use AI as a brainstorming partner rather than a source of final answers” (M = 3.07, SD = 0.96), which indicates that students still value independent final decision-making. The practice of “I use AI to generate ideas for my academic writing” (M = 3.17, SD = 0.75) is also less dominant, reflecting a moderate level of caution. This emphasizes that over-reliance on AI tools could have the unintended effect of student engagement in their own cognitive and metacognitive writing processes. These patterns suggest that, although the affordances of AI tools are considerable, students adopt a “cautious adoption” to avoid the dangers of misinformation and cognitive passivity (Farrokhnia et al., 2023). Haleem et al. (2022) corroborate this collective skepticism and assert that the functionality of AI in education lies completely in those who use it, who must critically appraise and verify machine appearances.

Research Question 2. What is the participants’ extent of use of metacognitive strategy in terms of:

2.1 Planning;
2.2 Monitoring; and
2.3 Evaluating?

Table 2 presents a summary of the participants’ usage of metacognitive strategies. The overall mean score of 3.74 with a qualitative description of "High" suggests that senior high school students regularly and constantly exercise control over their cognitive processes during writing activity. This degree of metacognitive awareness suggests that the students do not write without thinking; they manage, lead, and regulate their thinking to meet particular academic writing objectives.

Table 2
Summary Table of Metacognitive Strategy

Dimensions	Mean	Interpretation	SD
Planning	3.63	High	0.56
Monitoring	3.87	High	0.78
Evaluation	3.71	High	0.67
Metacognitive Strategy	**3.74**	**High**	**0.56**

For the specific metacognitive strategies, its result showed that Monitoring obtained the highest mean score (3.87). That reveals that students are more than capable of monitoring their writing, being mindful of how they use language, and making adjustments as they write. The Evaluation criterion also earned a high mean of 3.71, showing that students review and determine the quality of outputs against their intended objectives. In contrast, Planning had the lowest mean of 3.63, which was still interpreted as "High" verbally. This suggests that in the write-to-learn process, students prepare and organize their ideas well before proceeding to writing, and they spend a little more cognitive effort on monitoring their writing during than they do when preparing to write. Peni Handayani et al. (2023) underline the significance of metacognitive strategies, namely planning, monitoring, and evaluating, in academic writing: students with high levels of metacognitive awareness better develop ideas and assess overall organization and quality of their texts.

Similarly, Qin et al. (2022), Monitoring and Evaluating more often than not deliver higher levels of engagement. This is an approach that takes seriously how these specific parts are strong predictors of successful performance in writing, so students are empowered as independent agents with the ability to self-repair while composing. Similarly, when learners use these metacognitive writing strategies intentionally (especially throughout the thought monitoring process), they significantly improve not only their writing proficiency but also their motivation, which is why self-regulated learning is so fundamental to producing organized and coherent outputs (Han 2024).

Research Question 3. What is the participants' level of self-efficacy in English writing?

Table 3 shows the frequency, percentage, and mean distribution of participants' level of self-efficacy in English writing. The overall mean of 2.67 further indicates a Moderate level of self-efficacy in English writing, suggesting that students generally have an average or developing belief in their writing capabilities. This means that students can meet some minimum writing requirements, but without an underlying internal drive and confidence to guide themselves through writing struggles well past the superficial. This finding is consistent with the findings made by Guevarra et al. (2025); Kim et al. (2021) highlight that senior high school students still struggle with writing regardless of their self-efficacy levels.

Table 3

Frequency, Percentage, and Mean Distribution of the Participants' Level of Self-efficacy in English Writing

Range	Description	Interpretation	Frequency	Percentage
4.51-5.00	Very Confident	Very High	1	0.68
3.51-4.50	Moderately Confident	High	18	12.24
2.51-3.50	Somewhat Confident	Moderate	64	43.54
1.51-2.50	Slightly Confident	Low	55	37.41
1.00-1.50	Not at all Confident	Very Low	9	6.12
		Total	**147**	**100.0**

Overall Mean	**2.67**	
Interpretation	**Moderate**	
SD	**0.75**	

Specific Indicators	M	Description	SD
1. I can think of many ideas for my writing.	2.86	Somewhat Confident	1.04
2. I can finish writing tasks within the time I set.	2.58	Somewhat Confident	1.23
3. I can develop my ideas with enough detail.	2.88	Somewhat Confident	1.03
4. I can keep working on my writing even when it is difficult.	2.82	Somewhat Confident	1.07
5. I can avoid errors in grammar and usage.	2.27	Slightly Confident	1.08
6. I can correctly use punctuation in my writing.	2.61	Somewhat Confident	1.03

The analysis of specific indicators shows a wide variation in confidence levels, from content creation to technical implementation. The mean for the highest level of confidence, "I can develop my ideas with enough detail" (M = 2.88, SD = 1.03) is closely followed by "I can think of many ideas for my writing," (M = 2.86, SD = 1.04), indicating students are somewhat confident, but wary, belief in their capacity to engage ideation and content generation processes. Even as students move into the actual drafting phase, their confidence remains in the moderate level, which helps explain statements like "I can keep working on my writing even when it is difficult" (M = 2.82, SD = 1.07) and "I can correctly use punctuation in my writing". (M = 2.61, SD = 1.03).

Also, their self-efficacy on "I can finish writing tasks within the time I set" as well (M= 2.58, SD = 1.23), showing that confidence dropped a little as the exercises went more technical. This declines to a maximum extent reflected in the lowest mean, "I can avoid errors in grammar and usage" (M = 2.27, SD = 1.08), which corresponds with the "Slightly Confident" level - showing an extreme lack of confidence in their linguistic accuracy. That means that the thing communicative writing is hardest for students to get technically correct, and which most regularly undermines their overall sense of efficacy with language, is the grammar of effective composition. This vulnerability validates the conclusions by Dahan et al. (2025) that between writing performance and self-efficacy is on the pathway of grammatical competence, which implies that confidence requires actual skills of technicality to be translated into superior practice.

Research Question 4. What is the participants' level of English writing skills?

Table 4 presents the frequency, percentage, and mean distribution of participants' English writing skills. The overall mean score of 13.66 confirms that students are still at an *Approaching Proficiency level* of English writing skills among the senior high school participants. This means that the students are still in a transitional phase of their literacy development, where they can construct paragraphs but have yet to achieve mastery over

grammar, vocabulary, and sense organization. This result validates the observation that fundamental writing components, specifically idea relevance, depth, and development, remain core areas needing significant improvement among senior high school learners (Monredondo & Oco, 2023).

Table 4

Frequency, Percentage, and Mean Distribution of the Participants' Level of English Writing Skills

Range	Description	Frequency	Percentage
21–25	Advanced	0	0.00
16–20	Proficient	27	18.37
11–15	Approaching proficiency	106	72.11
6–10	Developing	14	9.52
1–5	Beginning	0	0.00
	Total	**147**	**100.0**
	Overall Mean	**13.66**	
	Interpretation	**Approaching Proficiency**	
	SD	**2.39**	

The distribution of scores provides further context for this trend. Most of the participants produced average writing performance, with 72.11% obtained an Approaching proficiency level of English writing competencies. On the other hand, 18.37% were at the "Proficient level", indicating a higher proficiency. Conversely, a small group (9.52%) showed poor writing abilities. Importantly, no one scored in either the very high or below average groups, so everyone seems to have at least some degree of writing ability, and none are severely limited.

This average proficiency demonstrates the specific problems students encounter in technical execution; as Egonia and San Jose (2024) have pointed out, senior high school learners in the Philippines still make simple errors with basic written outputs and continue to need support in writing mechanics. So, to raise these students from the "Approaching Proficiency level" to the "Proficient level", they require ongoing access to targeted practice. Student engagement in writing tasks is another situation that encourages higher-order thinking (Kuznetsova, 2023). It requires focus, planning, and reflection, which encourages them to cement their ideas and ultimately enhances their ability to express themselves effectively in an academic context.

Overall, the distribution suggests that while the learners can create basic written outputs, they are mostly within and around an average or developing level of competency, in which their essays probably show passable ideas but significant overall weakness in depth, structure, and technical execution. This observation aligns with recent findings on ESL/EFL learners' writing proficiency, which demonstrate that students frequently produce texts that are average in substance and vocabulary but fall below average regarding

technical execution, such as grammar, mechanics, and sentence structure (Gabanit, 2026).

Research Question 5. Are the participants' AI writing tool usage, use of metacognitive strategies, and self-efficacy significantly associated with their writing skills?

Ho_1: The participants' AI writing tool usage is not significantly associated with their writing skills.
Ho_2: The participants' use of metacognitive strategies are not significantly associated with their writing skills.
Ho_3: The participants' self-efficacy is not significantly associated with their writing skills.

Table 5 presents the results of the Canonical Correlation Analysis examining the association between AI-writing tool usage and writing skills. The findings revealed a significant association with a canonical correlation of (R = 0.278) with a coefficient of determination (R^2 = 0.077), indicating that approximately 7.7% of the variance in writing skills is explained by AI-writing tool usage. The obtained F-value of 43.546 and p-value of .042 confirm statistical significance at the 0.05 level. Therefore, the null hypothesis (Ho_1) stating that participants' AI writing tool usage is not significantly associated with their writing skills is rejected.

Table 5
Canonical Correlation Analysis of AI-writing Tool Usage and Writing Skills

Variable	Cross loading	R	R2	F	p
AI-writing tool usage	0.278				
Writing Skills					
Content	0.131	0.278	0.077	43.546*	.042
Organization	0.044				
Coherence	0.039				
Grammar	0.256				
Mechanics	0.134				

Significant at 0.05 two-tailed alpha level

The cross-loading values revealed that the AI-writing tools accounted for a substantial part of the canonical function, in this case with a cross-loading of 0.278, which suggests a mild yet statistically significant association with writing skills. This means that even though AI-writing tools have a relationship with students' writing performance, their overall impact is marginal. This low (R^2= 0.077) value further suggests that using AI tools to improve writing explains only a small part of the variance found in writing skills, thus supporting the argument against replacing structured writing instruction with technology entirely. Indeed, this evaluation is supported by the work of Alharbi (2023), who suggests that automated writing assistance tools offer pedagogical support in real-time yet cannot

replace the comprehensive cognitive skills introduced and refined as part of traditional writing instruction, instead serving only as frameworks. But that means a whopping 92.3% of the variance is accounted for by something else.

The weakness of the relationship, however, raises the possibility that while AI-writing tools may provide some help, particularly in areas like grammar and mechanics, they are not very good at predicting overall writing ability. This implies that students' own cognitive processing and practice, as well as interactions with instructional support, will be necessary for successful development as effective writers, independent of simply using these tools. This same trend was also validated in recent studies by Decano and Galicia (2025), indicating that while students of Senior High School find tools of AI extremely effective as an aid to education, their use does not lean to superiority for linguistic or writing language abilities, with the notion that limits at basic levels in language cannot be filled using artificial intelligence tools.

For writing skills, the highest cross-loading was found for Grammar (0.256), followed by Mechanics (0.134) and Content (0.131), whereas Organization (0.044) and Coherence (0.039) had little association with single-skills transition probabilities, hence low driving relationships. The relatively high loading for Grammar suggests that AI-writing tools can help to an above-average degree with those surface-level features of writing (e.g., grammar, sentence correction). This trend seems to corroborate Yan's (2023) findings, which examined the effect of AI tools, including ChatGPT, on L2 writing. It is concluded that the learners use AI tools mainly for localized and shallow-level revisions like grammatical reforms and vocabulary changes, while they seldom come up with such tools to make big revisions or even benefit from the outcomes, illuminating why the associations with constructs of deep levels are limited regarding organization and coherence. This pattern might indicate students' inclination to use AI tools mainly for proofreading and editing rather than revising structural argumentation.

Aside from metacognitive strategies and self-efficacy, writing ability is influenced by a complex interplay of interacting factors, both internal and external. Internally, foundational linguistic restraints (like small lexicon, inadequate reading comprehension, and sentence construction) hugely limit students in constructing and paraphrasing texts appropriately (Clarin et al., 2023).

Moreover, these cognitive and linguistic challenges are intimately connected to the mental state of a learner. As Talle et al. (2023) found, a writing student's own intrinsic motivation contributes to determining how resiliently they navigate these formative writing barriers. Besides internal issues, the external educational context plays a vital role in writing proficiency.

From the outside, instructional environments (e.g., the quality of written corrective feedback) come into play. A significant block to learning during written assessments is imposed due to a lack of clear, constructive feedback from teachers that aids in identifying and rectifying grammatical and structural errors (Carambas et al., 2024). If the student has the basics down and is a good teacher, then that makes for good writing, they added.

Samad et al. (2024) found that processes of continuous formative assessment, consistent feedback from their teachers, and peer collaboration are what help students learn best. This is one of the largest drivers of skill formation, alongside socioeconomic factors related to parental education levels. So, for all the potential of AI tools to provide minimal supplementary assistance, internal motivation, fundamental language skills, and responsive teacher feedback remain far better predictors of success in writing.

Table 6 presents the results of the Canonical Correlation Analysis examining the relationship between metacognitive strategies and writing skills. The findings revealed a non-significant canonical correlation (R = 0.1999) with a coefficient of determination (R^2 = 0.0396), indicating that only approximately 3.96% of the variance in writing skills is explained by the participants' use of metacognitive strategies. The obtained F-value of 0.754 and p-value of .739 confirm that this relationship is not statistically significant at the 0.05 level. Therefore, the null hypothesis stating that participants' use of metacognitive strategies is not significantly associated with their writing skills is not rejected.

Table 6

Canonical Correlation Analysis of Metacognitive Strategies and Writing Skills

Variable	Cross loading	R	R2	F	p
Metacognitive Strategies					
Planning	-0.194				
Monitoring	-0.135				
Evaluation	-0.092	0.199	0.0396	0.754	.739
Writing Skills					
Content	-0.099				
Organization	-0.093				
Coherence	-0.121				
Grammar	-0.191				
Mechanics	-0.149				

Significant at 0.05 two-tailed alpha level

The cross-loading values show that metacognitive strategy usage contributed to the canonical function, with a cross-loading of 0.199, indicating a very weak association with writing skills. This indicates that metacognitive strategies are somewhat correlated with students' writing performance, their overall contribution is very small. The low (R^2 = 0.0396) also suggests that metacognitive strategies only explain a small part of the variation in writing skills, and thus again highlights their importance without meaning they are sufficient to make noteworthy improvements in writing performance.

Overall, the results in Table 6 suggest that metacognitive strategy usage is weakly related to writing skills. Therefore, the null hypothesis stating that there is no significant relationship between metacognitive strategies and writing skills is not rejected. Given the weak association, the researchers infer that metacognitive strategies function best within a guided writing process.

Table 7 presents the results of the Canonical Correlation Analysis examining the relationship between self-efficacy and writing skills. The findings revealed a non-significant canonical correlation (R = 0.150) and a coefficient of determination (R^2 = 0.0225), indicating that only approximately 2.25% of the variance in writing skills is explained by participants' self-efficacy. The obtained F-value of 0.646 and p-value of 0.665 confirm that this relationship is not statistically significant at the 0.05 level. Therefore, the null hypothesis stating that participants' self-efficacy is not significantly associated with their writing skills cannot be rejected.

This finding indicates that, in this study, a student's reported level of self-efficacy in writing does not significantly influence their actual writing performance. A plausible explanation is that while students may have confidence in their ability to write, they likely lack the technical skills, grammar, or writing practice needed to effectively apply this self-belief in their actual writing tasks, which affects their writing performances.

Table 7
Canonical Correlation Analysis of Self-efficacy and Writing Skills

Variable	Cross loading	R	R2	F	p
Self-efficacy	0.150				
Writing SKills					
Content	0.053	0.150	0.0225	0.646	.665
Organization	0.074				
Coherence	0.054				
Grammar	0.145				
Mechanics	0.086				

Significant at 0.05 two-tailed alpha level

The results indicate that no significant association was found among the variables examined. The cross-loading value for self-efficacy was found to be 0.150, as it has an ignored relationship with writing skills in the canonical function. In fact, the coefficient of determination (R^2 = 0.0225) reveals that only 2.25% of writing skills variance was explained by self-efficacy alone. These findings underscore the fact that self-efficacy failed to provide an impactful position with significant statistical properties in students' writing outcomes for this study.

The higher relative loading for Grammar is likely due to self-efficacy demonstrating a slightly stronger relationship with shallow writing components such as grammar and mechanics, but this effect is still weak. This pattern might capture students' tendency to feel confident about managing more basic writing tasks, but less frequently revising higher-order features of writing, such as depth of content or overall coherence. This pattern might reflect students' inclination to feel assured in their ability to manage basic writing tasks, but less often in revising more complex features of writing, including informativeness or general cohesion. This contrasts with the results of Sehlström et al. (2023), who observed that college students routinely produce higher-quality texts when

they are more writing self-efficacious, suggesting that true confidence should guide mastery of deeper, higher-order dimensions, rather than basic grammar only.

Conclusions

The study found that the characteristics of grade 11 learners' English writing skills were attributed more to their interaction with artificial intelligence than internal learning regulators and affective factors. The relationships seen below show that students' use of AI writing tools has relatively more weight, albeit modest, for their writing performance than their metacognitive strategy or level of self-efficacy. This communique, therefore, brings to light the fact that other than relying on digital scaffolds for their improvements in writing competence, struggling writers are still catching up with internal planning, monitoring, and evaluation of the process, which as yet remains untracked through improvements in written outputs.

Practically, the study suggests that instruction must focus on techniques with less reliance on technology and a clearer bridge between students' metacognitive awareness and what they write. Classroom practices that stress core writing mechanics, structured drafting, and the responsible use of AI tools — such as teaching students to evaluate rather than blindly accept automated feedback — might help close the gaps in basic writing skills like content organization and coherence. At the school levels, writing clinics that hit specific areas in identifying errors (and self-regulation) might also be able to help (though those cost less to run). Such implications are meaningful especially in the context of Philippine senior high schools, where students are expected to develop minimum writing proficiency and academic independence before they proceed to higher education.

However, these results should be interpreted with regard to some limitations. With the context limited to the underachieving behavior of Grade 11 students in a single private institution here in Cagayan de Oro City, not only is this study less translatable outside an academic environment, but also the least generalizable to higher-level students. These findings lay the groundwork for models of more diverse samples, additional learner and classroom parameters, and alternative study designs that hold the potential to extend insights derived from this work.

Taken together, all in all, the study makes a tentative but significant contribution to highlighting the complex reality of struggling writers operating within a digital era. This reads that gaining AI learning tools facilitates instant feedback loops closer to the point of use; however, knowledge alone bestows cognitive awareness but does not instantly become a skill. It has ramifications for pedagogical fine-tuning: there is a need for targeted instruction that clarifies the relationship between self-regulation, confident writing, and technology use, rather than sweeping generalizations.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are offered: For students, they may actively practice applying their high metacognitive

awareness into actual writing execution by critically analyzing AI-generated feedback rather than passively accepting it, helping to bridge the gap between their planning and actual writing performance. Also, they may engage in collaborative peer-review activities that focus on identifying and correcting grammatical and technical errors, thereby building their self-efficacy and reducing vulnerability in foundational writing mechanics. For English teachers, they may emphasize direct instruction on ethical and critical uses of AI writing tools, instructing students in how to assess and revise what AI outputs so that it mitigates their challenges with content depth, structural coherence, and organization. Also, they may incorporate focused writing exercises and organized drafting tasks that help students make the transition from internal monitoring and evaluating strategies to overt improvements in their writing outputs. For Administrators of the Language Department, they may formulate school-wide policies and self-directed learning programs that strike a balance between responsible use of AI tools and development of original critical thinking, authentic writing skills. They may also provide teacher training and workshops to align the integration of digital technology with cognitive and affective writing supports, to help struggling senior high school students with their writing. For future researchers, they may extend this work by testing specific instructional interventions that combine AI writing assistance with self-efficacy-building activities across broader samples, diverse grade levels, or higher student proficiencies. Explore the longitudinal effects of AI writing tool dependency on the development of higher-order writing skills, reading comprehension, and critical thinking in varied educational and socio-economic contexts. Moreover, modify the Metacognitive Strategies questionnaire by adding more indicators to the Monitoring sub-scale. Expanding this specific section beyond the two items used in this study will provide a more nuanced measurement of students' monitoring behaviors and improve the overall statistical reliability of the instrument.

Compliance with Ethical Standards

This study strictly adhered to established ethical guidelines throughout the data-gathering process. In compliance with Republic Act No. 10173, or the Data Privacy Act of 2012, all personal information was collected solely for valid research purposes. To protect participants' identities, direct identifiers such as names, cellphone numbers, and email addresses were not collected during the administration of the instruments. Instead, the researcher assigned a unique code number to each participant, which was written on the survey questionnaires and writing assessments. Any master list linking participants' identities to these codes, if needed for coordination, was kept entirely separate from the research data, accessible only to the researcher, and excluded from all analyses and reports. All collected data were treated with strict confidentiality. Upon the completion of the study and data encoding, all soft copies will be permanently deleted, and hard copies will be properly disposed of. Prior to data collection, the researcher secured assent forms from the student participants, as well as informed consent from their respective parents or guardians.

Furthermore, the study rigorously observed the Belmont Report principles of beneficence, justice, and respect for persons. To maintain beneficence, the researcher assessed and minimized any potential risks, clearly outlined risks and benefits in the consent documents,

and optimized the expected benefits of participation. While the study posed no significant risks, participants may have experienced minor fatigue or boredom while completing the survey and writing tasks. To mitigate this, the researcher ensured a comfortable, safe environment and refrained from compelling responses. Any adverse feelings experienced during the scheduled sessions could be communicated to the teacher or researcher for immediate assistance and resolution. To ensure justice, the researcher selected participants through fair inclusion and exclusion criteria, ensuring that risks and benefits were distributed equally and without bias or exploitation of vulnerable individuals. To maintain respect for persons, a comprehensive informed consent process was conducted, ensuring that participants were fully aware of the study's nature, voluntarily agreed to participate, and had their dignity and autonomy safeguarded at all times. Finally, the researcher affirms that there are no conflicts of interest associated with this study, and no personal, financial, or professional interests have influenced the conduct or outcomes of this research.

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