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Enhancing English Writing Competence and Self-Correction Awareness through the RADAR Process in Argumentative Writing

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Abstract

Among Thai EFL learners, developing academic writing proficiency presents ongoing challenges—particularly in constructing grammatically accurate sentences, maintaining paragraph coherence, and engaging in self-directed revision. This study investigates the efficacy of the RADAR process—an instructional framework grounded in metacognitive strategies and recursive revision—in enhancing English writing competence and self-correction awareness. A one-group pretest–posttest design was conducted over a 16-week term with 30 junior students majoring in English under the Bachelor of Arts program, enrolled in a course on argumentative reading and writing. The instructional intervention followed the five-stage RADAR sequence: Recognition, Analysis, Diagnosis, Adjustment, and Reconstruction. Data were collected from pretest and posttest writing tasks, which were assessed using an analytic writing rubric, along with self-report questionnaires and semi-structured interviews. Quantitative findings revealed statistically significant gains in writing scores ($t(29) = 3.56$, $p = .0017$), particularly in sentence variety, grammatical precision, and cohesion. Qualitative data supported these results, showing increased metacognitive awareness, improved proofreading habits, and greater learner autonomy in revising writing errors. Despite these positive outcomes, the study's scope was limited by the absence of a control group and its focus on paragraph-level writing tasks, which may not fully represent broader academic writing abilities. Overall, the study offers empirical support for the RADAR process as an effective instructional model that integrates linguistic instruction with cognitive engagement. It contributes to EFL pedagogy by fostering both writing accuracy and learner autonomy and provides implications for curriculum design, teacher training, and self-regulated learning.

Keywords: academic writing development, argumentative writing, metacognitive strategies, RADAR process, self-correction

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Introduction

In an increasingly globalized academic and professional landscape, English argumentative writing has become a vital skill, enabling learners to articulate opinions, defend positions, and participate in reasoned discourse. However, for learners of English as a Foreign Language (EFL), particularly in Thailand, mastering this genre remains a persistent challenge (Ka-kan-dee, 2014). This issue is especially apparent in my experience teaching the course *Argumentative English Writing* for junior students majoring in English. Despite having completed academic writing courses in their sophomore year, many continue to struggle with foundational skills. Their written texts often display repetitive grammatical errors, limited sentence variety, and disorganized paragraph structures. These recurring issues not only undermine their ability to develop persuasive arguments but also suggest a deeper lack of metacognitive control over their writing processes. Based on my observations over several semesters, students tend to rely heavily on assistance tools such as Google Translate, AI applications, and Grammarly, along with teacher feedback, which limits the development of independent writing competence and self-correction awareness.

This phenomenon aligns with recent findings that highlight how EFL undergraduates often lack logical reasoning and fail to support claims effectively in argumentative writing, frequently omitting essential components such as evidence or transitional devices (Tahir & Qasim, 2025). Studies also indicate that while AI-based tools can enhance surface-level accuracy, they may reduce critical engagement and autonomous revision, especially when students use them as content generators rather than as revision aids (Tang, 2025). Furthermore, teachers across different contexts have observed that learners often lack metacognitive strategies like self-monitoring, which hinders their ability to revise or refine their arguments independently (Al-Mashani, 2025). Cross-linguistic interference, particularly from students' native languages, has also been shown to influence rhetorical structures and lexical choices in English writing, contributing to sentence-level and discourse-level errors (Mat Said & Almassry, 2025). These patterns collectively reveal a pressing need for pedagogical models that foster metacognitive awareness, critical reasoning, and autonomous learning in EFL argumentative writing classrooms.

The challenges faced by Thai EFL learners are also well documented in existing literature. Research conducted in Thailand corroborates the assertion that EFL students frequently encounter significant difficulties in academic writing, particularly in sentence construction, paragraph coherence, and grammatical accuracy (Andania, 2017; Prapobratanakul, 2024; Watcharapunyawong & Usaha, 2013). These issues are often linked to first-language interference and a lack of targeted instructional approaches that cultivate revision skills and metacognitive engagement. Such findings reinforce the need for pedagogical models that address both linguistic development and the cognitive processes involved in writing. Recent studies in second language writing have increasingly emphasized the role of metacognition in overcoming such challenges. Metacognitive strategies—such as self-monitoring, error diagnosis, and reflective revision—have been shown to improve writing quality and foster learner autonomy (Rimun & Yumarnamto, 2024). Although process-based writing instruction promotes drafting and revision, many EFL classrooms still lack a clearly defined, research-based framework to guide students through the metacognitive dimensions of revision. As a

result, learners often remain unsure of how to detect and correct their writing weaknesses independently.

Based on years of teaching experience in argumentative writing, I consistently observed a wide range of recurring problems among EFL students, including grammatical and syntactic errors, misuse of academic conventions, illogical reasoning, and the transfer of Thai sentence structures into English writing. Despite direct instruction and explicit feedback, these issues persisted, indicating deeper gaps in students' metacognitive awareness and revision practices. To address these challenges, I developed the RADAR process—an instructional framework consisting of five recursive stages: Recognition, Analysis, Diagnosis, Adjustment, and Reconstruction. In the Recognition phase, which occurs early in the instructional sequence, students engage with model texts to identify key elements of effective writing such as structure, cohesion, and grammar. This phase is designed to raise students' awareness of quality writing features before they begin analyzing their own work. From the Analysis phase onward, students are introduced to a sentence analysis form that prompts them to deconstruct their drafts by identifying subjects, predicates, and verb tenses, and then revising each sentence accordingly. This form serves as a structured tool for guiding students through the recursive ARAR cycle, enabling deeper error diagnosis and targeted revision. The RADAR framework, grounded in actual classroom practice, was reviewed by expert raters through an Index of Item-Objective Congruence (IOC) and deemed appropriate for its instructional goals. Further details on the validation process are provided in the methodology section.

While prior research has investigated the effects of feedback strategies, peer review, and process-oriented writing approaches in EFL contexts, limited empirical work has focused on how a structured, metacognitive framework like RADAR can impact students' writing development—particularly in Thai university settings. This study seeks to fill that gap by evaluating the effectiveness of RADAR-based instruction on three key aspects of academic writing: sentence construction, paragraph coherence, and grammatical accuracy. Existing literature has shown that metacognitive writing strategies—such as self-monitoring, structured revision protocols, and recursive drafting—can significantly enhance writing performance and foster learner autonomy. For instance, Riwayatiningsih et al. (2024) demonstrated that specific metacognitive strategies, including planning, monitoring, and evaluation, contribute to improvements in coherence, grammatical accuracy, and clarity. Similarly, Chen (2024) found a strong positive correlation between students' proficiency in metacognitive strategy use and their writing outcomes, particularly in attentional control, planning, and evaluative reflection. These findings provide a strong theoretical foundation for the implementation of structured instructional models like RADAR that integrate metacognitive engagement to support both linguistic development and independent revision practices in EFL writing classrooms.

Literature Review

1. Argumentative Writing and Its Cognitive Demands

Argumentative writing is widely recognized as one of the most cognitively demanding genres in academic communication. It requires the integration of linguistic proficiency, logical

reasoning, rhetorical awareness, and genre-specific conventions. Writers must not only structure a coherent argument but also critically evaluate evidence and address opposing viewpoints. However, EFL learners often struggle to meet these demands due to limited exposure to persuasive rhetoric and restricted command of the target language. Recent studies confirm that EFL students face challenges in presenting logical arguments, supporting claims with evidence, and employing rhetorical strategies effectively (Tahir & Qasim, 2025). Furthermore, students' limited academic vocabulary and difficulties in engaging with genre-specific structures further hinder their ability to write persuasively (Alhammad, 2025). In the Thai context, research shows that EFL students frequently fail to construct clear thesis statements or cohesive arguments. This is often attributed to unfamiliarity with argumentative genre structures and difficulties in expressing logical relationships and supporting evidence (Ka-kan-dee & Kaur, 2015; Sutinwong, 2023). These challenges are further exacerbated by limited classroom exposure to argumentative writing tasks during earlier stages of education.

2. Writing Deficiencies Among Thai EFL Learners

Despite increased emphasis on English proficiency within Thai higher education, writing remains one of the weakest skill areas for Thai EFL learners. Recent studies have shown that student writing frequently relies on simplistic sentence structures and exhibits persistent grammatical errors—particularly with subject-verb agreement, article usage, tense consistency, and prepositions (Matwangsaeng et al., 2025). These issues hinder syntactic variety and clarity, often resulting in vague or fragmented expression.

At the paragraph level, structural deficiencies such as underdeveloped topics, incoherent sequencing, and a lack of cohesive devices remain prevalent. These are frequently influenced by L1 rhetorical norms, such as indirectness and circular reasoning, which contrast with the linear, explicit structure expected in English academic discourse (Suraprajit, 2024). Compounding these issues is a reliance on teacher-centered correction. Students seldom take initiative in self-editing or peer review, resulting in limited development of autonomous writing strategies. Additionally, many learners rely heavily on digital assistance tools—such as Google Translate, AI applications, and Grammarly—together with teacher feedback. This dependence restricts their capacity to engage in independent writing and hinders the development of self-correction awareness.

3. The Role of Metacognitive Strategies in Writing Development

A growing body of research highlights the critical role of metacognitive strategies in improving writing proficiency among EFL learners. These strategies—encompassing planning, monitoring, evaluating, and revising—equip learners with the cognitive tools necessary to navigate the complexities of academic writing. In EFL contexts, metacognitive awareness enables students to self-regulate their writing processes, identify recurring errors, and implement strategic revisions. Recent studies show that Thai students benefit significantly from metacognitive instruction, demonstrating improvements in both grammatical accuracy and rhetorical effectiveness when guided through reflective practices (Rorintulus et al., 2024). However, such strategies are rarely integrated systematically into Thai writing instruction.

Students are often not trained to critically assess their own work and tend to rely primarily on teacher correction. This reactive learning approach delays the acquisition of deeper writing competence and impedes the development of independent writing habits.

4. The RADAR Process: Bridging Metacognition and Structured Writing

To address the aforementioned challenges, the RADAR process—comprising Recognition, Analysis, Diagnosis, Adjustment, and Reconstruction—was developed as a classroom-based framework informed by both practical teaching experience and recent research in metacognitive strategy use and writing self-regulation. The decision to implement RADAR stemmed from persistent learner difficulties observed during writing instruction, particularly in sentence construction and revision, which were not adequately resolved through traditional feedback, peer review, or product-focused writing cycles. Drawing from contemporary models of self-regulated learning and structured revision (Riwayatiningsih et al., 2024; Sabaliauskas et al., 2025), RADAR was designed to guide students through recursive writing engagement. Each stage plays a specific role in fostering metacognitive control: recognition involves examining model texts for effective writing elements; analysis requires deconstructing learners' own sentences by identifying grammatical components; diagnosis focuses on detecting specific errors; adjustment prompts learners to revise targeted components; and reconstruction entails rewriting drafts to improve clarity and cohesion. This cyclical process not only aligns with research advocating scaffolded revision frameworks (Pei, 2025), but also supports learner autonomy and the transfer of writing skills by reframing writing as an iterative and reflective process.

Although RADAR has yet to be widely adopted in Thai EFL contexts, its metacognitive foundation and clear instructional stages make it well-suited to address common problems in sentence construction, coherence, and grammatical accuracy (Kawinkoonlasate, 2023). However, despite advances in understanding EFL writing difficulties in Thailand, there remains a lack of intervention-based, classroom-oriented studies that systematically apply metacognitive strategies (Noipa & Phusawisot, 2024; Phothongsunan, 2023). While some Thai researchers have explored genre-based instruction and process writing approaches, these efforts often lack theoretical integration or fail to emphasize cognitive regulation during revision (Thaksanan & Chaturongakul, 2023). Moreover, although learners' error patterns are well documented, few empirical studies have examined how reflective tools—such as revision checklists or the RADAR framework—impact long-term writing development. Despite widespread use of summative assessments in EFL writing research, few studies have systematically embedded structured metacognitive instruction—such as the RADAR process—into classroom writing tasks. This study addresses this gap by applying RADAR across multiple writing tasks and evaluating its effects through pretest–posttest comparisons.

Research Objectives

This study aimed to examine the effectiveness of the RADAR process as a metacognitive instructional framework for enhancing English writing competence and self-correction awareness among Thai EFL university students. The specific objectives were as follows:
1. To investigate the extent to which the RADAR process improves students' English writing competence in terms of sentence construction, paragraph coherence, and grammatical accuracy
2. To explore how the RADAR process enhances students' self-correction awareness and metacognitive engagement in argumentative writing tasks

Methodology

1. Research Design

This study employed a quasi-experimental one-group pretest-posttest design to examine the effects of the RADAR process on students' English writing competence and self-correction awareness. This approach was appropriate for investigating within-group changes over time, particularly in the absence of a control group due to classroom constraints. A mixed-methods framework was adopted, integrating quantitative analysis of writing scores with qualitative data from student interviews and questionnaires to provide a multidimensional understanding of learner progress.

2. Participants

The participants consisted of a purposive sample of 30 undergraduate EFL students enrolled in a course on argumentative reading and writing as part of their third-year English major studies in a Bachelor of Arts program at a public university in Thailand. All participants were native Thai speakers. Participation was voluntary, and all students provided informed consent. Inclusion criteria required at least 80% attendance and completion of both pretest and posttest writing tasks.

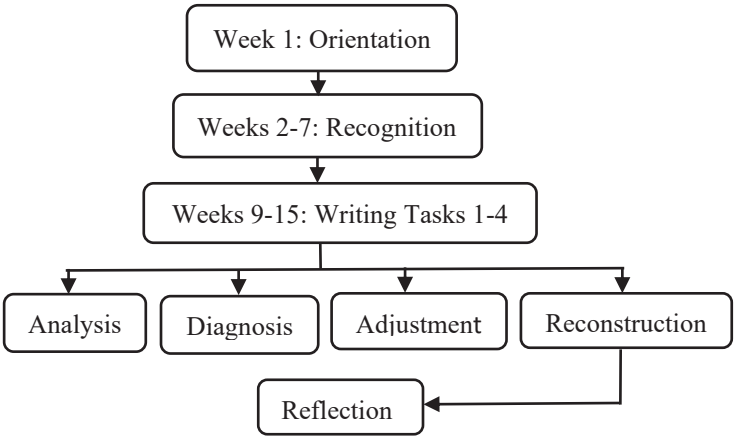
3. Instructional Procedures and Timeline

3.1 The RADAR Process

The 16-week RADAR intervention comprised five metacognitive stages designed to support students' writing development through recursive learning. These included activities targeting grammar, sentence construction, paragraph coherence, and self-correction. The instructional structure and timeline are summarized in Figure 1.

Figure 1

Overview of the 16-Week Instructional Intervention Based on the RADAR Framework



In Week 1, students completed a pretest to assess their baseline writing skills. Weeks 2 to 7 were devoted to the Recognition stage, during which students examined model texts to identify effective writing features, focusing on sentence structure, cohesion, and grammatical accuracy. Week 8 involved a midpoint review and guided self-reflection on students' writing development. In Weeks 9 to 15, students participated in a series of writing tasks structured around the RADAR stages of Analysis, Diagnosis, Adjustment, and Reconstruction. During this phase, they also used the Subject–Predicate Analysis Table to identify grammatical elements, diagnose sentence-level errors, and revise their writing for clarity and accuracy. Each writing cycle was followed by reflective practice to reinforce metacognitive awareness. In Week 16, students completed a posttest and participated in qualitative data collection activities.

To ensure alignment between the research objectives and the research instruments, each tool was purposefully designed to target specific components of writing development and metacognitive awareness. Objective 1 focuses on improving students' English writing competence, particularly in sentence construction, paragraph coherence, and grammatical accuracy through using the writing assessment tasks, the Sentence Analysis and Revision Table, and the analytic scoring rubric. Objective 2 aims to explore students' self-correction awareness and metacognitive engagement. It was addressed using the Sentence Analysis and Revision Table, the post-intervention questionnaire on metacognitive awareness, and the semi-structured interviews. Collectively, these instruments provided both quantitative and qualitative data that aligned with the RADAR framework.

3.2 *Instruments and Data Collection*

3.2.1 Writing Assessment Tasks

Participants completed two timed writing tasks—one at the beginning (pretest) and one at the end (posttest) of the intervention. Each task required students to compose a structured argumentative paragraph in response to a standardized prompt. The writing samples were used to evaluate students' improvements in sentence construction, paragraph coherence, and grammatical accuracy over the course of the RADAR-based instruction.

3.2.2 Sentence Analysis and Revision Table

As a key component of the instructional intervention, students regularly used the *Sentence and Predicate Identification and Correction Table*. This tool prompted learners to analyze their writing at the sentence level by identifying grammatical elements (subject, predicate, tense), diagnosing errors, and rewriting each sentence for clarity and correctness. Students then reconstructed their revised sentences into cohesive paragraphs. This structured table was applied across four writing tasks during the Diagnosis, Adjustment, and Reconstruction stages of the RADAR process. Paragraphs composed and revised using this tool were later evaluated as part of the component-level analysis of students' writing development, particularly in the areas of sentence construction, grammar accuracy, and self-correction. This table functioned as both an instructional scaffold and a research instrument, aligning with the four RADAR stages—Analysis, Diagnosis, Adjustment, and Reconstruction—and enabling systematic observation of learners' sentence-level revisions.

3.2.3 Scoring Rubric

An analytic rubric was used to evaluate both pretest and posttest writing samples. The rubric assessed three core dimensions:

- Sentence Construction: Sentence variety, syntactic accuracy, and clarity
- Paragraph Coherence: Topic unity, logical progression, and cohesive devices
- Grammatical Accuracy: Subject-verb agreement, tense consistency, article usage, and overall error reduction

Each dimension was rated on a 5-point scale (1 = Weak; 5 = Excellent), resulting in a total possible score ranging from 3 to 15. Inter-rater reliability was confirmed through a pilot sample rated by two trained assessors, yielding a coefficient of agreement of 0.87. This value indicates a high level of inter-rater reliability, suggesting that the scoring process was consistent and dependable.

To provide a more detailed understanding of writing development, each core dimension was further broken down into specific sub-criteria. Sentence construction included sentence variety and subject-verb agreement. Paragraph Coherence was assessed through logical transitions and vocabulary precision. Grammatical accuracy was evaluated based on grammar rule mastery, tense consistency, and the ability to proofread and self-correct. These sub-criteria were aligned with the learning goals of the RADAR framework and were used to guide instruction as well as posttest analysis.

3.2.4 Questionnaire on Metacognitive Awareness

Following the intervention, a post-questionnaire was administered to 26 students to evaluate changes in their metacognitive awareness related to writing. Of the 30 students who participated in the study, four were absent on the day of data collection and were therefore excluded from this phase. As a result, the questionnaire was completed by the remaining 26 students. The questionnaire consisted of eight Likert-scale items, each reflecting a specific writing behavior or strategy aligned with the RADAR framework: (1) writing complete and

grammatically correct sentences, (2) using punctuation accurately, (3) applying transitions to enhance paragraph coherence, (4) avoiding structural sentence errors, (5) proofreading before submission, (6) using consistent tense, (7) applying academic vocabulary, and (8) logically sequencing ideas within a paragraph. Each item used a 5-point Likert scale ranging from 1 (Not Aware) to 5 (Highly Aware).

3.2.5 Semi-Structured Interviews

Out of the original group of 30 participants, 24 students were purposefully selected to take part in semi-structured interviews. These students were categorized into high, mid, and low performers to ensure a range of perspectives. Six students were unavailable during the interview schedule and were thus excluded. The interview protocol consisted of open-ended questions designed to elicit reflections on writing habits, perceived progress, and engagement with the RADAR process. To ensure content validity, two experts in English writing instruction evaluated the interview questions using the Index of Item-Objective Congruence (IOC). All items received scores above 0.67, confirming that they were well aligned with the intended constructs and met the accepted standard for validity.

4. Data Analysis

4.1 Quantitative Data

Quantitative data were analyzed using both descriptive and inferential statistics. Descriptive statistics were used to summarize students' mean scores and standard deviations from the pretest and posttest writing assessments. To determine whether the changes in writing performance were statistically significant, paired-sample t-tests were conducted, with significance set at $p < .05$. In addition, responses from the post-intervention questionnaire were examined to identify trends in self-reported metacognitive awareness across key writing areas.

4.2 Qualitative Data

Interview transcripts were analyzed thematically using an inductive coding approach. These were categorized into four emergent themes: sentence construction, paragraph coherence, grammar awareness, and proofreading behavior. Recurring ideas were grouped under metacognitive categories such as self-monitoring, strategy use, and error detection. These themes were triangulated with questionnaire results to ensure interpretive validity.

Results

1. Improvement in Writing Proficiency

1.1 Overall Writing Performance

The results from the writing assessment tasks, evaluated using an analytic scoring rubric, indicate a statistically significant improvement in students' writing performance following the RADAR intervention. As shown in Table 1, the mean score increased from 6.98 (SD = 4.01) in the pretest to 7.90 (SD = 3.43) in the posttest. These scores were based on a total of 15 points, derived from three main analytic components—sentence construction, paragraph coherence,

and grammatical accuracy—each rated on a 5-point scale. A paired-sample t-test confirmed the significance of this improvement ($t(28) = 3.46$, $p = .0017$). The reduction in standard deviation suggests a narrowing performance gap, with many lower-performing students in the pretest demonstrating notable gains. This is further supported by a clustering of posttest scores in the upper quartile, indicating a more consistent level of writing competence across the cohort.

Table 1

Descriptive Statistics of Overall Writing Scores (n = 30)

Assessment	M	SD	MD	t	df	p
Pretest	6.98	4.01				
Posttest	7.90	3.43	0.92	3.56	29	.0017

Note. M = Mean; SD = Standard Deviation; MD = Mean Difference; t = t-value; df = degrees of freedom; p = p-value

In addition to the overall score, each writing sample was analyzed across three components—sentence construction, paragraph coherence, and grammatical accuracy—each comprising several sub-criteria. Table 2 presents the posttest mean scores for these sub-criteria, based on a 5-point rubric. These criteria reflect the specific learning targets of the RADAR framework and illustrate students' performance across key aspects of academic writing.

Table 2

Post-test Mean Scores by Writing Component (Max = 5.0)

Writing Component	Sub-Criterion	M
Sentence Construction	Sentence Variety	3.9
	Subject-Verb Agreement	3.8
Paragraph Coherence	Logical Transitions	4.0
	Vocabulary Precision	3.8
Grammatical Accuracy	Grammar Rule Mastery	4.0
	Tense Consistency	3.9
	Proofreading and Self-Correction	4.0

Although the mean scores reported in Table 2 range from 3.8 to 4.0, these are based on a 5-point rubric. According to the score range interpretation presented in Table 3, these averages fall within the "Satisfactory" to "Strong" performance levels. Within this scoring framework, such results indicate consistently high levels of competence, especially in logical transitions, grammar rule mastery, and self-correction. These sub-skills were among the most emphasized components in the RADAR-driven intervention and reflect meaningful gains in students' writing development.

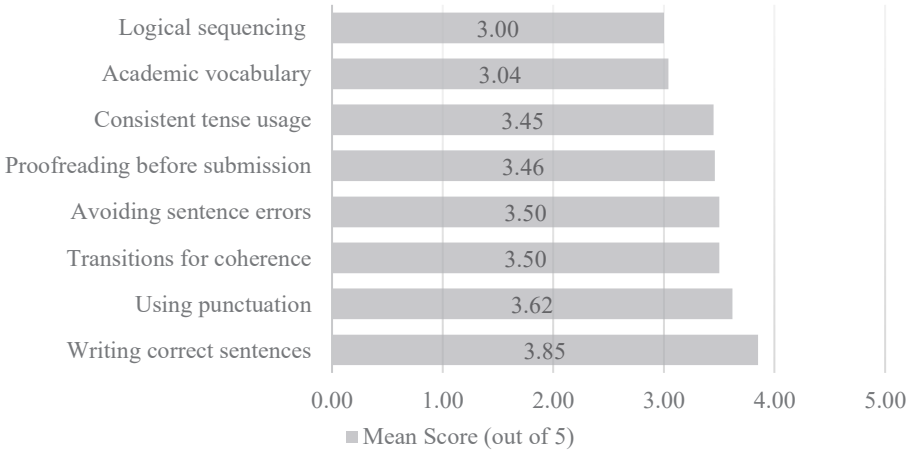
Table 3
Score Range Interpretation

Score Range	Performance Level	Interpretation
4.5 – 5.0	Excellent	Exceptional control of structure, accuracy, and clarity
4.0 – 4.4	Strong	Clear and consistent use of target features
3.5 – 3.9	Satisfactory	Adequate performance with minor issues
3.0 – 3.4	Limited	Noticeable weaknesses in writing features
Below 3.0	Weak	Frequent errors or lack of control

1.2 Student Experiences and Self-Correction Awareness
1.2.1 Questionnaire-Based Metacognitive Awareness

Post-intervention questionnaire responses from 26 students further indicated increased metacognitive awareness. Figure 2 summarizes mean scores across eight targeted domains.

Figure 2
Students' Self-Reported Metacognitive Awareness (n = 26)



This graph illustrates the mean scores of students' self-perceived metacognitive awareness across eight writing domains. The highest levels of awareness were reported in grammatical sentence construction (M = 3.85) and punctuation accuracy (M = 3.62), while the lowest scores appeared in academic vocabulary use (M = 3.04) and logical sequencing (M = 3.00). These results suggest that students developed foundational sentence-level awareness more readily than higher-order discourse skills, indicating areas for further instructional focus. The score patterns displayed in Figure 2 support qualitative reflections and confirm the RADAR process's emphasis on sentence accuracy and proofreading routines. These results suggest that students demonstrated stronger awareness of sentence-level elements than of higher-order discourse or lexical organization. This pattern highlights the need for extended instructional scaffolding in areas related to academic vocabulary and paragraph-level coherence. The quantitative trends, derived from the metacognitive awareness questionnaire, also reinforce findings from interview data. Several students noted their ability to detect tense shifts and

article errors independently and described how they applied revision strategies introduced during the Diagnosis and Adjustment stages. These patterns confirm the RADAR process's effectiveness in promoting sentence accuracy and revision awareness.

1.2.2 Thematic Insights from Interviews

Semi-structured interviews with 24 students from high, mid, and low proficiency levels revealed four major themes indicating cognitive and behavioral changes through the RADAR process. While the level of confidence and depth of understanding varied, patterns across groups consistently reflected growth in writing awareness and autonomy.

Sentence Construction:
Across proficiency levels, students reported greater clarity and correctness in building sentences. The Subject–Predicate Analysis Table used during the Diagnosis and Adjustment stages helped them distinguish between subjects, predicates, and tenses.

> "The form helped me clearly identify subjects and verbs. I now understand better how a complete sentence should be built." (Mid-level student)
> "I know a sentence must have a subject, verb, and object. I feel more confident now when I write." (High-level student)
> "I still get confused sometimes, but the form makes it easier to notice structure." (Low-level student)

Paragraph Coherence:
Many students, especially from the mid and high groups, described an increased ability to connect ideas logically and structure content in a more organized way.

> "Before, my writing was random. Now I plan and link ideas better." (High-level student)
> "The practice taught me how to arrange ideas step by step so they flow." (Mid-level student)

Grammar Awareness:
Students expressed increased attention to grammar, though lower-proficiency students often noted ongoing struggles. All groups mentioned that the form helped them become more conscious of grammatical elements.

> "I'm not always sure, but I now know when something feels wrong in my grammar." (Low-level student)
> "The form helped me think about tense and subject-verb agreement more carefully." (Mid-level student)
> "I'm now aware of the typical mistakes I make, and I try to fix them before submitting." (High-level student)

Proofreading Behavior:
Students from all groups described a shift in their revision habits—from little or no checking to deliberate and repeated proofreading.

> "I used to just write and send. Now I read through two or three times to fix things." (Low-level student)
> "I recheck grammar and sentence structure more carefully now." (Mid-level student)
> "I always review my writing multiple times—punctuation, grammar, flow—everything." (High-level student)

These findings reflect a meaningful progression toward metacognitive awareness and self-regulated learning across proficiency levels. While the confidence level varied, all participants demonstrated behavioral changes that aligned with the objectives of the RADAR framework, particularly in error detection, sentence construction, and revision routines.

A cross-group comparison revealed nuanced differences in how students from varying proficiency levels experienced the RADAR process. High-performing students demonstrated a more confident and strategic engagement with revision. They often referred to specific techniques, such as applying cohesive devices and adjusting sentence variety based on feedback. For example, several students in this group mentioned revising their drafts multiple times to ensure logical flow and grammatical precision.

Mid-level students exhibited growing awareness and developing control over their writing. They often relied on the structured tools (e.g., sentence correction tables) to detect errors and guide revision but occasionally needed prompts to reflect deeper. These learners showed improvement in organizing ideas and recognizing typical mistakes, though they still expressed uncertainty about certain grammar rules.

Low-level students, while less confident, expressed meaningful shifts in writing behavior. They reported greater clarity in identifying sentence components (subject, verb, object) and an increased willingness to proofread. Although these students required more guidance and modeling, their responses suggested emerging metacognitive awareness and a gradual transition toward more independent revision habits.

This comparative insight reinforces the RADAR framework's adaptability across proficiency levels, highlighting its capacity to support differentiated growth. It also underscores the importance of scaffolding and targeted feedback in fostering self-regulated learning among lower-proficiency students. These findings suggest that differentiated instruction not only accommodates learner diversity but also empowers students to take greater control over their revision strategies. By observing these behavioral shifts, we gain clearer insight into how instructional scaffolds foster metacognitive habits essential for long-term writing development.

Discussion

The purpose of this study was to investigate the impact of the RADAR process on Thai EFL university students' argumentative writing competence and self-correction awareness, with specific attention to sentence construction, paragraph coherence, and grammatical accuracy. The findings provide compelling evidence that the RADAR process—through its structured, metacognitive phases—can significantly improve both writing performance and learner autonomy in revision behaviors.

In addressing the first research objective regarding improvements in students' sentence construction, paragraph coherence, and grammatical accuracy, the data revealed statistically significant gains across all three dimensions. The strongest gains occurred in logical transitions, grammatical precision, and self-correction—subskills directly tied to the Diagnosis, Adjustment, and Reconstruction stages of the RADAR model. These outcomes align with previous findings that metacognitive strategy instruction leads to improved syntactic complexity, grammatical accuracy, and textual coherence (Riwayatiningsih et al., 2024). The reduced variability in posttest scores, which reflects a narrower range of performance outcomes, further supports the idea that RADAR is effective across a range of proficiency levels. This consistency suggests that students at different proficiency levels were able to benefit from the structured metacognitive stages of the RADAR process.

To address the second research objective concerning students' self-correction awareness and metacognitive engagement, students reported a shift from passive reception of teacher feedback to active engagement with their own texts. Many described newfound confidence in identifying and fixing errors, organizing arguments, and applying grammatical knowledge—all hallmarks of metacognitive engagement. These changes are supported by recent findings in EFL writing research, which demonstrate that metacognitive strategy training enhances learners' ability to monitor their own writing processes and apply targeted revisions. For instance, Anggraeni et al. (2025) showed that self-regulated learning-based instruction significantly improved students' planning, drafting, and revising behaviors, particularly among those with initially low writing self-efficacy. Likewise, Prompan and Piamsai (2024) observed that incorporating peer feedback within a metacognitive writing framework cultivated learner independence and critical thinking, especially in Thai university contexts. These findings underscore that structured metacognitive interventions not only improve technical writing skills but also reshape learners' identities as autonomous writers.

Crucially, the RADAR process does not function as a mere writing technique but as a cognitive and behavioral scaffold. It transforms revision from a mechanical task into a reflective process, giving learners structured opportunities to monitor, evaluate, and improve their work iteratively. This shift supports prior assertions that metacognitive frameworks enhance critical thinking and learner engagement during writing (Heard et al., 2025; Khairuddin et al., 2025). The emergence of proofreading habits, which were largely absent in students' initial drafts, illustrates the behavioral transformation made possible through structured metacognitive guidance.

The integration of RADAR into classroom practice also addresses a common shortcoming in Thai EFL contexts: overreliance on teacher correction and underdevelopment of learner agency. By empowering students to self-diagnose and reconstruct, RADAR helps dismantle the "teacher-as-corrector" model and repositions students as critical readers of their own texts. This pedagogical shift is crucial in promoting self-regulated learning and aligns with recent findings emphasizing the role of structured peer and self-feedback in fostering autonomy and learner control (Öztürk, Yüce & Mıhçı Türker, 2025).

Conclusion

This study demonstrates that the RADAR process is an effective instructional framework for enhancing argumentative writing competence and fostering metacognitive self-regulation among Thai EFL learners. By guiding students through a recursive, reflective writing cycle, the RADAR model cultivates grammatical precision, paragraph coherence, and strategic awareness—essential components of academic literacy and independent writing ability. As English writing becomes increasingly important in global academic and professional contexts, pedagogical models such as RADAR offer a compelling alternative to correction-centered approaches. Rather than relying solely on teacher feedback, students become active agents in their own learning, equipped with structured tools for revision and reflection. This transformation bridges the gap between language performance and cognitive development, contributing to more sustainable writing improvement.

Despite these promising outcomes, the study has several limitations. Most notably, the absence of a control group restricts the ability to draw strong causal inferences regarding the RADAR process's unique impact. Future research using randomized controlled designs is recommended to strengthen empirical validation. Additionally, the use of paragraph-level writing tasks—although pedagogically manageable—may not fully represent the complexities of longer academic texts. Elements such as rhetorical depth, lexical cohesion, and extended argumentation may behave differently in full-length essays, warranting further investigation. Moreover, although the questionnaire targeted key sentence-level and error-awareness areas, it did not fully capture broader metacognitive dimensions such as planning and strategy monitoring. Future studies should consider incorporating more comprehensive instruments to address these higher-order metacognitive skills.

In conclusion, while the study confirms the pedagogical value of the RADAR process in a Thai EFL context, its broader applicability should be explored through diverse research settings, longer writing formats, and comparative instructional models. Such efforts will help establish RADAR not only as an effective classroom strategy but also as a scalable framework for writing development in varied educational environments.

Recommendations

1. Pedagogical and Practical Implications

The findings of this study hold meaningful implications for curriculum designers, writing instructors, and EFL program administrators aiming to improve student writing outcomes through metacognitive engagement. First, the RADAR process is highly adaptable for curricular integration in argumentative or expository writing units. Its five-phase structure supports scaffolded instruction, allowing students to build writing competence through recursive and reflective practice—an approach shown to enhance long-term writing development and strategy transferability. Second, teacher preparation should go beyond technical familiarity with RADAR. Instructors need to be trained in facilitating peer diagnosis, reflective discussions, and metacognitive modeling—techniques proven to foster writing autonomy and critical engagement (Nguyen, 2025). These instructional behaviors support the internalization of revision habits and self-regulated learning patterns, essential in developing writing fluency and coherence. Third, assessment systems should be restructured to evaluate not only final writing products but also the process by which students revise and improve their work. Studies highlight the role of peer feedback and process-oriented assessment in building self-regulated learning, especially when students take active roles in identifying and addressing their writing issues (Ha & Ho, 2025). Finally, RADAR offers a robust strategy for self-directed learning beyond formal instruction. This is especially relevant in English-medium instruction (EMI) contexts and high-stakes testing environments, where students must demonstrate independent writing capabilities. Recent research has shown that explicit metacognitive strategy training improves learners' ability to regulate their writing process and adapt it across varied academic tasks (Gunning et al., 2024).

2. Further Studies

The findings of this study indicate that the RADAR framework has strong potential for supporting EFL learners' writing development, particularly in terms of grammatical accuracy, paragraph coherence, and self-correction awareness. It is recommended that this framework be incorporated into writing instruction at the tertiary level, especially in contexts where learners face persistent difficulties in revision and sentence construction. Additionally, the structure of RADAR makes it suitable for long-term integration across academic semesters. Its recursive stages provide a foundation for continuous writing improvement. Educators and curriculum designers may also consider adapting the framework for blended or digital environments, particularly with the growing availability of AI-supported feedback tools. Future studies should examine how students engage with each phase of the RADAR framework and evaluate how different delivery modes—such as digital platforms or peer-supported settings—affect cognitive engagement during revision.

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