

Argumentation and Critical Thinking in EFL Writing: A Theoretical and Empirical Exploration

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This article examines the interrelationship between argumentation, critical thinking (CT), and English as a Foreign Language (EFL) writing through an integrative synthesis of both conceptual and empirical scholarship. It argues that argumentative writing extends beyond the production of a linguistic text, functioning instead as an observable manifestation of cognitive behaviour involving reasoning, evaluative judgement, evidence assessment, and metacognitive control. Drawing upon Toulmin's argument framework, CT theory, sociocultural perspectives on learning, genre-based pedagogy, and contemporary findings from EFL writing research, the review consolidates current understanding of how learners formulate claims, justify positions with evidence, anticipate opposing viewpoints, and construct rebuttals while operating within the limitations of a second language. The reviewed literature indicates a generally positive association between CT and writing quality; however, this relationship is neither direct nor guaranteed. Evidence suggests that

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instructional approaches incorporating explicit argumentation training, genre-oriented exemplification, metacognitive prompts, collaborative discussion, and scaffolded feedback contribute to stronger claims, more developed counterarguments, improved evidential support, and greater textual coherence. Nevertheless, the effectiveness of such interventions is influenced by several contextual and learner-related factors, including language proficiency, assessment practices, instructional competence, task familiarity, and existing rhetorical knowledge. Adopting a cognitive-behavioural perspective, the article conceptualises EFL argumentative writing as a dynamic interaction among linguistic resources, argumentative competence, social support mechanisms, and reflective self-regulation. The review concludes by proposing directions for future mixed-methods investigations and outlining implications for curriculum design, writing instruction, and assessment practices.

Keywords: Argumentation; Critical Thinking; EFL Writing; Argumentative Writing; Toulmin Model; Genre Pedagogy; Metacognition.

Introduction

Background of the Study

The growing emphasis on CT within language education has substantially reshaped contemporary perspectives on EFL writing. Earlier approaches to writing instruction predominantly concentrated on grammatical accuracy, paragraph construction, textual cohesion, and examination-oriented formats. Although these components remain necessary, they are insufficient for academic writing, which requires learners to investigate issues, assess information critically, and construct reasoned arguments. CT encompasses a range of higher-order cognitive processes, including interpretation, analysis, evaluation, inference, explanation, and self-monitoring, whereas argumentative writing represents the communicative expression of these intellectual operations (Ennis, 2011; Facione, 1990). Consequently, argumentative essays provide valuable evidence regarding how effective learners evaluate information, justify conclusions, challenge assumptions, formulate inferences, and recognise limitations associated with their own viewpoints.

Within contemporary EFL writing scholarship, argumentation is increasingly viewed as a teachable and assessable competence. One of the most influential frameworks employed for examining argumentative discourse is Toulmin's model, which identifies six principal components: claim, data, warrant, backing, qualifier, and rebuttal (Toulmin, 2003). The framework has gained considerable acceptance in EFL contexts because it transforms abstract reasoning processes into identifiable textual features. When learners articulate a clear claim, support it with relevant evidence, and address opposing viewpoints through rebuttal, they are not merely adhering to a prescribed writing structure. Rather, they demonstrate the

capacity to integrate evidence, audience awareness, competing perspectives, and logical reasoning within a coherent argument. In this respect, argumentation serves as an observable indicator of the cognitive and behavioural processes underpinning written communication.

Empirical evidence from Asian EFL environments suggests that satisfactory linguistic competence does not necessarily translate into strong argumentative performance. Despite demonstrating acceptable levels of grammatical and lexical proficiency, many learners encounter difficulties in constructing persuasive and logically developed arguments. Frequently reported weaknesses include insufficient evidential support, overreliance on personal experiences, limited engagement with counterarguments, weak rebuttals, and formula-driven organisational patterns. Qin and Karabacak (2010) observed that Chinese university students employed Toulmin's argumentative elements unevenly, while (Pei et al., 2017) reported that CT abilities were not automatically associated with overall writing scores. Nevertheless, their findings revealed a positive relationship between CT and the production of arguments characterised by greater relevance, clarity, and logical consistency. Such findings suggest that the connection between thinking and writing is multifaceted, with the influence of CT becoming more visible through specific argumentative behaviours rather than through aggregate writing scores alone.

The pedagogical implications of this relationship have been highlighted by a growing body of intervention research. For example, Yang (2022) demonstrated that scaffolding strategies grounded in Toulmin's framework contributed to notable improvements in several dimensions of argumentative writing among Chinese university students. Similarly, Yang and Pan (2023) found that a whole-to-part approach to argumentation instruction enhanced both the frequency and quality of argumentative elements during a ten-week action research project. Consistent findings were also reported by Samad et al. (2024), whose scaffolded genre-based pedagogy supported undergraduate EFL students in developing more effective argumentative texts. Collectively, these studies indicate that argumentation skills can be developed through explicit instructional support, modelling practices, collaborative engagement, and reflective learning activities.

Despite these encouraging findings, the literature does not consistently support the assumption that CT instruction inevitably results in improved writing performance. Several investigations have documented mixed relationships between CT dispositions and writing outcomes, while others have shown that instructional benefits are confined to particular aspects of writing, such as evidential support or counterargument development (Li & Zhang, 2022; Wang, 2022). Such inconsistencies suggest that the

relationship between CT and argumentative writing cannot be explained through a simple cause-and-effect framework. Instead, it appears to be shaped by a combination of contextual influences. Accordingly, the present article synthesises theoretical perspectives and empirical findings to examine the complex interrelationship among CT, argumentation, and EFL writing, while explaining how linguistic proficiency, pedagogical practices, cognitive factors, and assessment conditions collectively influence this relationship.

Problem Statement

Despite the substantial growth of scholarships on EFL argumentative writing, several unresolved issues continue to characterise the field. One major concern relates to how CT is conceptualised and assessed within writing research. A considerable proportion of studies rely on overall writing scores as indicators of performance, yet manifestations of CT are often embedded in specific argumentative actions occurring within the text. These actions include qualifying assertions, connecting evidence to underlying warrants, anticipating opposing viewpoints, challenging assumptions, and revising weak lines of reasoning. Such cognitive operations may not be adequately reflected in holistic scoring systems, particularly in studies that prioritise aggregate measures of writing quality. Consequently, findings across the literature are often inconsistent. While some quantitative investigations report weak or statistically insignificant relationships between CT and writing achievement, qualitative examinations frequently reveal substantial differences in sophistication, coherence, and logical quality of learners' arguments. This discrepancy suggests that broad performance indicators may overlook important dimensions of reasoning behaviour expressed through written discourse.

A second issue concerns the tendency to treat linguistic competence and reasoning ability as separate constructs. In many EFL contexts, learners possess well-developed ideas and analytical insights but encounter difficulties in expressing them effectively because of limitations in linguistic resources. Challenges may arise when conveying causal relationships, signalling stance, expressing concession, or constructing rebuttals. Conversely, some learners demonstrate fluency and control over language forms while relying on superficial evidence, formulaic structures, or memorised argumentative patterns. These contrasting profiles indicate that argument quality cannot be understood solely as a reflection of either language proficiency or CT. Rather, effective argumentation represents a cognitive-linguistic accomplishment in which reasoning processes and language resources operate simultaneously. Accordingly, a more comprehensive theoretical perspective is needed to explain how linguistic

resources, rhetorical knowledge, and CT collectively shape argumentative behaviour and writing performance.

A third limitation lies in the considerable variation that characterises empirical research on argumentation instruction. Existing studies differ substantially in their theoretical foundations, instructional approaches, and assessment procedures. Some investigations employ Toulmin-based frameworks to evaluate argument quality, whereas others emphasise genre awareness, metacognitive training, collaborative dialogue, peer interaction, or technology-supported feedback mechanisms. Although each approach contributes valuable insights, the resulting evidence remains dispersed across multiple disciplinary domains, including education, applied linguistics, psychology, and writing studies. The fragmentation of this knowledge base makes it difficult to determine which instructional mechanisms consistently facilitate the development of argumentative competence and CT among EFL learners. In the absence of a comprehensive synthesis, understanding of the processes underpinning successful argumentative writing remains incomplete.

To address these limitations, the present article integrates major theoretical perspectives and empirical findings into a unified explanatory framework. By bringing together diverse strands of research, it seeks to provide a more coherent account of how CT, language proficiency, rhetorical knowledge, and pedagogical intervention interact to influence the development of argumentative writing in EFL contexts.

Aim and Research Objectives

The present article seeks to develop an integrated understanding of the connections among CT, argumentation, and EFL writing by synthesising relevant theoretical perspectives and empirical evidence. In doing so, it aims to explain how these constructs interact within argumentative writing contexts and to explore their implications for research, assessment, and pedagogical practice.

R01: To investigate the conceptual and theoretical links connecting CT, argumentation, and EFL argumentative writing.

R02: To synthesise existing empirical findings regarding the ways in which CT and argumentative competence are manifested in the written performance of EFL learners.

R03: To propose pedagogical, assessment-related, and methodological directions that can inform future research and practice in EFL writing instruction.

Significance of the Study

This study contributes to EFL writing scholarship by reframing argumentative writing as a cognitive-behavioural construct rather than

treating it as a purely linguistic output or positioning CT as an exclusively internal cognitive attribute. Instead, it conceptualises writing as a space in which reasoning is enacted, structured, evaluated, and communicated through observable behaviour. This perspective is consistent with contemporary writing theories that emphasise its situated, socially mediated, and cognitively multifaceted nature (Graham, 2018). From a methodological standpoint, the article highlights the limitations of relying on holistic writing scores in EFL research and underscores the need to examine discrete components of argumentation. These include the precision of claims, relevance and adequacy of evidence, explicitness of warrants, strength of counterarguments, and effectiveness of rebuttals. Such analytical dimensions provide a more fine-grained and valid indication of CT as they are operationalised within L2 written discourse. In pedagogical terms, the study proposes several implications for classroom practice and curriculum development. These include the integration of Toulmin-informed instructional design, genre-focused analysis, structured questioning techniques, peer interaction activities, metacognitive reflection tasks, and continuous formative feedback. For researchers, the article offers an organising framework for future empirical work that more effectively connects theoretical models, instructional practices, and observable outcomes in student writing.

Literature Review

The article begins by outlining its conceptual and empirical foundations. It starts with the premise that argumentation constitutes a form of reasoning in practice and proceeds to examine how CT is defined and operationalised within EFL writing contexts. In this context, it also considers the relevance of Toulmin's argumentative model as a key analytical framework, alongside the role of pedagogical mediation in supporting learners' development of argumentative competence. The discussion then synthesises the central theoretical perspectives and identifies the existing research gap, thereby providing a consolidated overview of the conceptual orientation that underpins the study.

Argumentation as Cognitive and Communicative Behavior

Argumentation is both a cognitive process and a communicative act. On the cognitive side, it requires writers to construct a position, generate supporting reasons, evaluate and test evidence, and anticipate potential objections. From a rhetorical perspective, these mental operations must be externalised in a form that is intelligible to an audience through coherent organisation, linguistic choices, and strategic positioning within discourse.

Toulmin's model remains particularly relevant in this regard, as it clarifies the functional relationships between claims and the supporting

grounds that justify them (Toulmin, 2003). When integrated into writing pedagogy, it enables learners to recognise that persuasive discourse is not merely a linear sequence of paragraphs, but a structured network of interrelated argumentative moves. At the level of textual behaviour, argumentation becomes visible through identifiable components: claims indicate what the writer expects the reader to accept; data provide factual, experiential, or textual support; warrants establish the logical link between evidence and claims; qualifiers indicate the strength or scope of assertions; counterarguments introduce alternative perspectives; and rebuttals explain why opposing positions are insufficient or invalid. These elements should not be understood as purely formal categories, but rather as teachable and assessable reasoning operations embedded in written discourse. In this sense, argumentation provides a conceptual bridge between EFL writing research and educational psychology.

In addition, dialogue plays a central role in the development of argumentative competence. Sociocultural theory posits that higher-order cognitive functions are first formed through socially mediated interaction before being internalised by the individual (Vygotsky, 1978). Within this framework, collaborative pre-writing discussions, peer feedback activities, and teacher-led questioning can externalise reasoning processes and make them open to negotiation in the classroom. Empirical studies on small-group discussion further support this view, showing that pre-writing interaction can enhance specific aspects of argumentative writing, including the formulation of counterclaims and the provision of counterevidence (Li & Zhang, 2022). Accordingly, argumentation should be understood not only as a feature of the final written product, but also as a socially situated process that actively shapes the development of individual written performance.

Critical Thinking in EFL Writing

CT is commonly defined as purposeful, self-regulated cognition directed towards interpreting information, forming judgements, making decisions, or solving problems (Facione, 1990). In EFL writing contexts, these cognitive processes become observable when learners evaluate the relevance of evidence, distinguish between reasons and illustrative examples, recognise underlying assumptions, and revise their arguments in response to alternative viewpoints. However, CT cannot be equated with surface-level writing features such as grammar, vocabulary range, or organisational control, and it remains difficult to measure directly. The relationship between CT and writing performance is therefore inherently complex and multidimensional. A well-structured essay may still contain weak or logically flawed reasoning, whereas a linguistically limited text may nevertheless demonstrate sophisticated evaluative thinking.

Empirical evidence reflects this complexity. For instance, Pei et al. (2017) found no statistically significant correlation between CT skills and overall argumentative writing scores among Chinese undergraduates.

However, subsequent textual analysis revealed that students with stronger CT abilities tended to produce arguments that were more relevant, coherent, logically developed, conceptually deeper, and more flexible in perspective-taking. This indicates that global writing scores may fail to capture underlying reasoning processes embedded in written discourse, thereby limiting their sensitivity to CT-related behaviours. It also highlights the importance of complementing quantitative assessment with fine-grained qualitative analysis of textual features. In addition, CT development is shaped by epistemic beliefs and classroom culture. Learners who perceive writing primarily as the reproduction of correct information are less likely to engage in source evaluation, claim qualification, or the integration of counterarguments. By contrast, those who view writing as a form of inquiry are more inclined to interrogate evidence and construct critically engaged arguments. This distinction is particularly relevant in EFL contexts where examination-oriented pedagogies may encourage formulaic writing practices. As a result, effective CT instruction should extend beyond the rhetorical inclusion of the term “critical thinking” in learning outcomes and instead provide structured opportunities for questioning, comparison, evidence evaluation, and reflective revision.

Toulmin-Based Argumentation and EFL Writing Quality

Findings from the reviewed literature indicate that Toulmin-based approaches have gained considerable influence in both instruction and assessment of argumentative writing in EFL contexts, largely due to the concreteness and operational clarity of their metalanguage. Qin and Karabacak (2010), in their analysis of Chinese EFL university students' writing, demonstrated that specific argumentative components and the interactions among them were associated with overall argument quality. Their work marked a methodological shift in writing assessment, moving it away from holistic impressions towards more fine-grained evaluation of discrete elements such as claims, grounds, warrants, and rebuttals. This analytical orientation is particularly advantageous in EFL settings, as it renders the often-implicit logic of academic argumentation more explicit, and therefore more teachable.

Subsequent research has extended this line of inquiry. For instance, Yang (2022) examined the effects of Toulmin-based scaffolding on the argumentative writing performance of Chinese university students and reported significant improvements across multiple dimensions of argumentative composition. Similarly, Yang and Pan (2023), through a ten-

week action research intervention grounded in a whole-to-part instructional sequence, found measurable gains in both overall writing performance and the quality of specific argumentative components. Collectively, these studies support the view that argument structure can be explicitly taught, systematically sequenced, and reinforced through iterative practice, thereby enhancing learners' development in EFL writing.

Nevertheless, the literature also highlights important limitations of Toulmin-based instruction. Although students may become familiar with the terminology of argument components, this does not necessarily translate into flexible or context-sensitive use. In some cases, learners may insert counterarguments mechanically without providing meaningful rebuttals, or present evidence without clearly articulating the warrant that connects it to the claim. Such issues suggest that Toulmin's model should not be treated as a rigid template for essay construction, but rather as an analytical and pedagogical tool. Its effectiveness is maximised when integrated with complementary approaches such as genre awareness, audience consideration, critical source evaluation, and metacognitive reflection. In this way, learners are encouraged not only to identify structural components of argumentation, but also to understand their rhetorical purpose and functional significance within academic discourse.

Pedagogical Mediation: Genre, Metacognition, Talk, and Feedback

Empirical evidence suggests that several pedagogical mechanisms play a central role in fostering both argumentation and CT in EFL writing. One widely recognised approach is genre-based instruction, which enables learners to understand the social purposes, structural organisation, and linguistic conventions of argumentative discourse. Samad et al. (2024) showed that scaffolded genre-based pedagogy supported students' control of argumentative-text stages and sub-stages, improving their ability to construct more coherent argumentative texts. This demonstrates that genre instruction reframes argumentation as a set of analysable rhetorical choices rather than merely an externally imposed writing requirement, thereby supporting more informed and purposeful writing practices.

Another key mechanism is metacognitive strategy instruction. When learners engage in planning, monitoring, and evaluating their own reasoning processes, they develop greater awareness of how claims, evidence, and counterarguments function within argumentative structures. Murtadho (2021) reported that integrating metacognitive and CT-oriented instruction into writing pedagogy facilitates the development of argumentative writing competence. This aligns with the broader view that effective writing is not confined to the production of a finished text, but involves sustained regulation of thinking across planning, drafting,

revising, and editing stages. Peer interaction also constitutes an important pedagogical resource. Collaborative discussion provides learners with opportunities to test and refine their claims, identify gaps in reasoning, and encounter alternative perspectives prior to individual writing. Evidence from Li and Zhang (2021); (Li & Zhang, 2022) indicates that structured small-group interaction can significantly enhance both overall writing performance and the quality of specific argumentative components among Chinese EFL university students. These findings are consistent with sociocultural theory, which posits that dialogue functions as a form of external mediation through which reasoning processes are developed and later internalised in individual writing.

Finally, feedback mechanisms represent a crucial element in the development of argumentative competence. Teacher and peer feedback can be directed towards the evaluation of evidence quality, logical coherence, stance construction, and the effectiveness of counterarguments and rebuttals. While automated writing evaluation systems can provide immediate feedback on surface-level linguistic features, they are generally less effective in capturing the depth and quality of reasoning underlying argumentative texts. Accordingly, feedback in EFL writing instruction should combine human judgement with analytically structured rubrics that explicitly address both language accuracy and argumentative quality. In this way, learners are guided not only to improve grammatical correctness, but also to critically evaluate the relevance of evidence, clarity of warrants, and adequacy of rebuttal structures within their writing.

Theoretical Framework

The theoretical framework of this article is constructed upon four complementary perspectives. First, Toulmin's model of argument conceptualises argumentative structure in terms of its internal logic, particularly how claims are justified, supported, and qualified through interrelated components. Second, CT theory is employed to explain the cognitive operations involved in argument construction, including interpretation, inference, analysis, and evaluation. Third, sociocultural theory accounts for the role of mediation in developing reasoning, emphasising the importance of teacher scaffolding, peer interaction, and classroom-based resources in shaping learners' argumentative performance. Fourth, genre theory highlights the influence of audience expectations, communicative purpose, discourse community norms, and textual conventions on how arguments are constructed in academic writing.

Taken together, these perspectives form an integrated analytical framework. CT provides the cognitive foundation for judgement and reasoning, while Toulmin's model offers a structural means of translating

these cognitive processes into identifiable argumentative components. Sociocultural theory explains how these processes are supported and developed through interaction, dialogue, and feedback, and genre theory situates argumentative writing within broader academic and disciplinary expectations, guiding how reasoning is shaped for rhetorical contexts. In combination, this framework rejects a reductive or formulaic conception of argumentative writing. Instead, it positions EFL argumentative writing as a dynamic interplay of cognitive processing, linguistic realisation, social mediation, and rhetorical action within a specific genre context.

Literature Gap

Three key gaps can be identified within the existing literature. First, there remains a need for further micro-level analyses of textual features through which CT is operationalised and expressed in EFL writing. Finer-grained examination of how reasoning is embedded in linguistic choices and argumentative moves is still underdeveloped. Second, empirical research continues to exhibit a methodological divide between quantitative scoring approaches and qualitative discourse analyses, with limited integration between these two perspectives. Greater methodological convergence is required to capture both measurable performance outcomes and the underlying reasoning processes reflected in written texts. Third, there is a shortage of theory-driven investigations that conceptualise argumentation simultaneously as observable textual behaviour and as an instantiation of cognitive reasoning processes. In response to these limitations, the present article offers an integrative synthesis of relevant theoretical frameworks and empirical findings and proposes a structured agenda for future research in EFL writing. This includes directions for bridging methodological divides and strengthening the conceptual alignment between theory, analysis, and pedagogical application.

Research Methodology

The study adopts a qualitative secondary research design grounded in an integrative literature review. This approach is appropriate given that the objective is not to calculate effect sizes or conduct statistical synthesis, but rather to integrate and interpret theoretical and empirical evidence across related domains. The review draws on scholarship from applied linguistics, educational psychology, writing research, and argumentation theory to develop a coherent account of the interaction between CT and argumentation in EFL writing contexts.

Research Method and Research Design

An integrative review design was selected because it enables the synthesis of conceptual, methodological, and empirical sources within a single coherent explanatory framework. Unlike narrowly defined systematic reviews, which are typically designed to address highly specific research questions, an integrative review is better suited to complex, transdisciplinary constructs. CT and argumentation fall into this category, as they intersect with multiple fields including psychology, language pedagogy, discourse analysis, assessment, and classroom interaction. Accordingly, the review is both structured and interpretive in nature. It is guided by transparent inclusion criteria and employs thematic analysis to identify recurring patterns and relationships across literature. The empirical component is derived from a synthesis of intervention studies, correlational research, qualitative investigations, and mixed methods designs. In parallel, the theoretical foundation draws on established models of argumentation, CT, sociocultural mediation, and genre-based pedagogy. The integration of theoretical and empirical strands represents the central focus of the study. Importantly, the article does not present original empirical data; instead, it critically examines how existing research supports, challenges, or refines theoretical claims regarding argumentative writing in EFL contexts.

Data Collection

The literature was identified through structured searches conducted across major open-access scholarly databases, including Google Scholar, ERIC, ScienceDirect, SAGE Journals, Frontiers, MDPI, as well as selected archives in applied linguistics and educational psychology. The search strategy employed a set of predefined keywords and phrases, including critical thinking and EFL writing, argumentative writing and critical thinking, Toulmin model EFL writing, argumentation instruction EFL, genre-based argumentative writing, small-group talk argumentative writing, and metacognitive strategies EFL argumentative writing. Priority was given to peer-reviewed journal articles, with a primary temporal focus on studies published from 2010 onwards. However, seminal and foundational works were also incorporated where they were deemed theoretically relevant and necessary for framing the conceptual development of the field. Table 1 presents a summary of the inclusion criteria applied in selecting literature for the integrative synthesis. The criteria emphasise studies that explicitly examine the relationship between argumentative writing and CT, as well as those addressing argument structure, instructional approaches, or assessment practices within EFL and broader second-language learning contexts.

Table 1
Inclusion and Exclusion Criteria

Criteria Dimension	Inclusion Criteria	Exclusion Criteria
Publication Type	Peer-reviewed journal articles, academic books, and high-quality research reports used for theory	Non-academic blogs, commercial writing guides, and unsourced teaching materials
Time Frame	Main empirical literature from 2010-2026; older foundational theory retained where necessary	Outdated empirical studies with limited relevance unless conceptually foundational
Language	English-language publications	Non-English publications not available in translation
Topic Relevance	Argumentation, critical thinking, EFL/ESL writing, genre pedagogy, metacognition, peer interaction, assessment	Studies unrelated to writing, reasoning, or second-language learning
Methodological Relevance	Empirical, intervention, correlational, qualitative, mixed-methods, systematic review, or conceptual studies	Opinion pieces without clear academic grounding

Review Selection Framework

Figure 1 illustrates the logic underpinning the literature selection and organisation process. The review was not designed as a comprehensive bibliometric mapping of the field, but rather as a purposive synthesis aimed at identifying high-relevance theoretical and empirical studies that could inform a focused conceptual integration. The selection framework prioritised three key dimensions: relevance to EFL writing contexts, explicit engagement with argumentation and/or CT, and methodological or theoretical utility in explaining the construction and analysis of written argumentation. This approach ensured that the included literature directly supported the development of the study’s analytical and interpretive objectives.

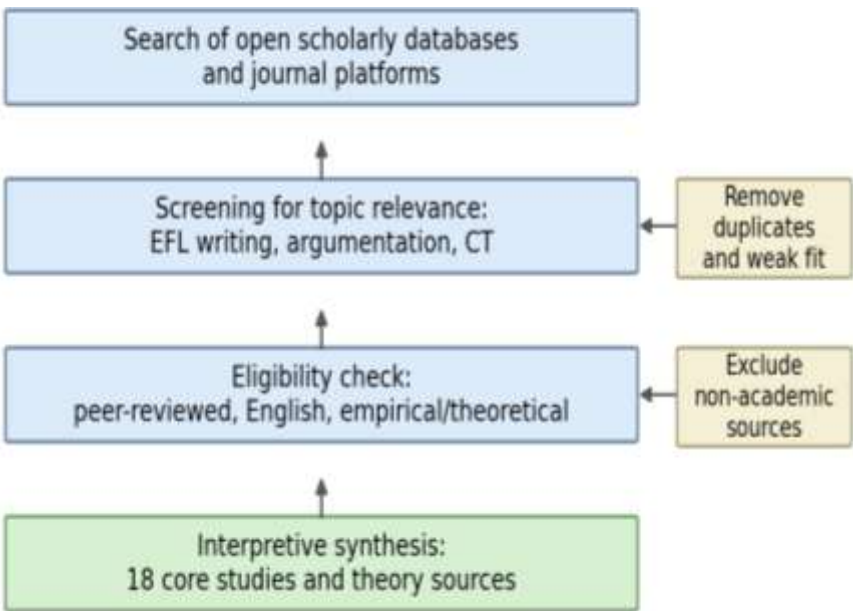


Figure 1: Review Selection Framework

Data Analysis Method

The selected literature was analyzed using thematic synthesis. Each study was systematically examined in terms of its conceptual orientation, research design, participant context, assessment approach, and principal findings. An initial coding process was conducted, during which recurrent concepts were identified, including quality of claims, use of evidence, construction of counterarguments, formulation of rebuttals, metacognitive processes, peer interaction, genre awareness, and teacher scaffolding. These initial codes were subsequently organised into higher-order categories and broader analytical themes aligned with the study’s research objectives. This process facilitated the identification of patterns across diverse strands of literature and enabled a structured interpretation of findings.

Thematic analysis was particularly appropriate for this review due to the heterogeneity of the included studies. Literature encompasses a wide range of methodological approaches and outcome measures, including statistical comparisons of writing scores, textual analyses of written products, interview-based investigations of learner perceptions, and observational studies of classroom interaction. Thematic synthesis therefore allows these varied forms of evidence to be interpreted collectively, rather than being reduced to a single quantitative metric. In

this context, the primary evaluative criteria guiding the analysis were conceptual coherence, methodological transparency, and explanatory adequacy. These criteria ensured that the synthesis not only summarised existing findings but also generated a coherent interpretive account of the relationship between CT, argumentation, and EFL writing.

Ethical Considerations

This article does not involve primary data collection from human participants or the generation of new personal datasets. Accordingly, the ethical considerations are primarily concerned with responsible scholarship practices, including accurate citation of sources, faithful representation of prior findings, avoidance of plagiarism, and transparent reporting of the review procedures adopted. Where empirical studies are discussed, the synthesis distinguishes between robust, mixed, and interpretative forms of evidence to maintain analytical clarity. Caution is taken to avoid overgeneralisation from small-scale or context-specific classroom interventions, as such extrapolation may lead to misleading implications for both researchers and practitioners in the field of EFL writing.

Table 2 summarises the thematic analysis steps, showing how the selected literature was familiarised, coded, reviewed, defined, and synthesised.

Table 2
Thematic Analysis Steps

Step	Description
Familiarisation	Repeated reading of selected theoretical and empirical sources
Code Generation	Identification of meaningful concepts such as claim quality, counterargument, evidence use, and metacognitive control
Initial Themes	Grouping related codes into broader categories linked to the research objectives
Theme Review	Checking coherence across studies and distinguishing strong, mixed, and theoretical evidence
Theme Definition	Clarifying the meaning and explanatory contribution of each theme
Synthesis	Connecting themes to implications for pedagogy, assessment, and future research

As presented in Table 3, each research objective is aligned with a corresponding dominant analytical theme. Collectively, these themes

establish a coherent interpretive structure for examining the theoretical and empirical interrelationship between CT and argumentation in EFL writing.

Table 3
Themes Aligned with Research Objectives

Research Objective	Theme	Description
R01	Argumentative Writing as Visible Critical Thinking	How reasoning operations become observable through claims, evidence, warrants, and rebuttals
R02	Toulmin, Genre, and Social Mediation	How empirical studies show improvement through structured argumentation instruction and dialogic support
R03	Assessment and Research Design Implications	How future studies can measure argument quality more precisely and design stronger interventions

Data Analysis

As summarised in Table 3, each research objective is mapped onto a corresponding dominant analytical theme. Together, these themes establish an integrated structure for interpreting the theoretical and empirical links between CT and argumentation in EFL writing. Table 4 indicates that the reviewed literature does not support any simplistic or linear mechanism linking CT and argumentation in EFL writing. Instead, the evidence consistently points to a multifaceted interaction shaped by multiple pedagogical and cognitive factors. Notably, the most robust findings emerge from studies that combine explicit instruction in argument structure with genre awareness, opportunities for social interaction, systematic feedback, and metacognitive reflection. Collectively, these elements appear to work in conjunction to support more effective development of argumentative competence in EFL contexts.

Table 4
Integrative Literature Synthesis of Selected Studies

In-Text Citation	Focus and Method	Main Findings	Relevance to this Article
(Qin & Karabacak, 2010)	Textual analysis of Toulmin elements in Chinese EFL	Argument quality was linked to the use and interaction of claims, data, warrants, and rebuttal-related elements.	Supports the use of argument-component analysis rather than only holistic scoring.

	argumentative essays		
(Pei et al., 2017)	Correlational and textual study of critical thinking and EFL argumentative writing in China	Overall correlation was weak, but stronger critical thinkers produced clearer, more logical, and more flexible essays.	Shows that critical thinking may appear in micro-level textual qualities.
(Zainuddin & Rafik-Galea, 2016)	Toulmin-based training for ESL argumentative writing and critical thinking	Structured guidance helped lower-proficiency learners develop reasoning and argumentative writing skills.	Supports explicit scaffolding for learners who need cognitive and linguistic support.
(Yang, 2022)	Quasi-experimental study using Toulmin scaffolding with Chinese university students	The Toulmin model significantly affected several argumentative elements in students' writing.	Provides recent empirical evidence for Toulmin-based intervention.
(Yang & Pan, 2023)	Ten-week action research using whole-to-part Toulmin instruction	Students improved in overall writing and in quantity and quality of argumentative elements.	Shows that staged instruction can develop argument quality over time.
(Samad et al., 2024)	Action research on scaffolded genre-based pedagogy for undergraduate EFL argumentative writing	Scaffolded genre-based pedagogy helped students understand argumentative-text stages and improve the organisation and effectiveness of their arguments.	Demonstrates the mediating role of genre knowledge and scaffolded writing stages.
(Li & Zhang, 2021)	Quasi-experimental study of small-group student talk as collaborative prewriting	Structured talk improved content, organisation, vocabulary, language use, and holistic writing scores.	Supports sociocultural mediation and peer interaction as writing supports.

(Li & Zhang, 2022)	Study of small-group talk and quality of argument in Chinese tertiary EFL writing	Talk had immediate and sustained effects on counterargument claim, counterargument data, and rebuttal claim.	Shows that social interaction can influence specific argument elements.
(Murtadho, 2021)	Action research on metacognitive and critical thinking practices in argumentative writing	Metacognitive and critical thinking practices supported the development of argumentative writing skills.	Supports self-regulation as a mechanism in critical writing development.
(Yin et al., 2023)	Systematic review of CT instructional pedagogies in EFL writing	Identified explicit CT teaching, social learning, scaffolding, questioning, feedback, and technology as key techniques.	Provides current review evidence and validates the need for integrated pedagogy.
(Ferretti & Graham, 2019)	Theoretical and instructional review of argumentative writing	Argumentative writing requires theory-informed assessment and instruction focused on reasoning and composition.	Connects EFL research with broader writing theory and assessment.
(Graham, 2018)	Revised writer(s)-within-community model of writing	Writing is shaped by cognitive, social, community, and contextual factors.	Supports the article's integrated cognitive-behavioural framework.

Theme 1: Argumentative Writing as Visible Critical Thinking

The first theme proposes that argumentative writing renders CT processes observable in textual form. Elements such as claims, reasons, warrants, evidence, qualifiers, and rebuttals provide traceable indicators of how learners interpret problems and construct justification for their positions. In this sense, CT is reflected in the cognitive operations required in writing, including interpretation, inference, analysis, evaluation, and explanation. However, the relationship between CT and written argumentation is neither direct nor mechanistic. Learners may possess strong reasoning abilities but struggle to express them due to limited linguistic resources, while others may produce fluent texts that lack depth of reasoning. Accordingly, EFL argumentative writing is better understood as a mediated manifestation of CT rather than a direct or complete representation of it. This conceptualisation also helps explain the mixed

findings reported in empirical studies regarding the correlation between CT and writing performance. Traditional writing rubrics often prioritise grammar, cohesion, and task fulfilment, whereas CT is more closely reflected in aspects such as evidence selection, argumentative balance, and rebuttal quality. As illustrated by Pei et al. (2017), although no significant relationship was found between CT skills and overall writing scores, textual analysis revealed that learners with higher CT ability produced arguments that were clearer, more logically coherent, and more flexible in perspective. This evidence supports the need to complement holistic writing assessment with argument-specific indicators that more accurately capture the manifestation of CT in EFL writing.

Theme 2: Toulmin-Based Scaffolding Improves Argument Components

The second theme highlights that explicit argumentation scaffolding can significantly improve learners' control over the structural components of an argument. Toulmin's model is particularly effective in this regard because it provides a clear metalanguage for both constructing and analysing argumentative discourse. Instead of relying on vague instructional prompts such as "write more logically," teachers can guide learners through targeted evaluative questions, for example: whether a claim is sufficiently precise, whether supporting data are relevant, whether the warrant is explicitly articulated, and whether the rebuttal meaningfully engages with opposing perspectives. In this way, scaffolding transforms CT into a structured and teachable classroom practice.

This perspective is strongly supported by intervention-based empirical studies. Yang (2022) reported that Toulmin-based scaffolding positively influenced multiple dimensions of students' argumentative writing. Similarly, Yang and Pan (2023) demonstrated that a staged whole-to-part instructional approach led to measurable improvements in both overall writing quality and the development of individual argumentative components. Zainuddin and Rafik-Galea (2016) further showed that Toulmin-informed training can enhance both argumentative writing competence and CT skills, particularly among learners with lower levels of language proficiency. Collectively, these findings suggest that explicit instruction in argument structure is especially beneficial in EFL contexts, where learners may not acquire academic argument conventions implicitly through content exposure alone. At the same time, the literature emphasises important pedagogical limitations. Toulmin's framework should not be reduced to a mechanical template for essay construction. Learners may become adept at inserting structural elements without fully understanding their rhetorical or logical function. For instance, a rebuttal may be presented in a superficial form that merely rejects an opposing view without explaining the underlying reasoning. Therefore, effective

instruction should extend beyond identification of components and include modelling, exemplification through both strong and weak cases, guided practice, and feedback that addresses not only structural completeness but also the quality and coherence of reasoning itself.

Theme 3: Genre Knowledge Mediates Argument Quality

The third theme emphasises the interrelationship between genre knowledge and reasoning, with written performance functioning as the mediating space through which this relationship becomes visible. EFL learners do not produce argumentative texts in isolation; rather, their writing is shaped by specific academic purposes, institutional expectations, and, frequently, assessment-driven contexts. Within a genre-based pedagogical framework, learners are guided to recognise that argumentative writing is organised through conventional rhetorical stages, including the introduction of a problem, formulation of a claim, development of supporting reasons, engagement with alternative perspectives, and presentation of concluding implications. In addition, this approach increases learners' awareness of the linguistic resources required to enact argumentation effectively, particularly in relation to stance-taking, concession, causal reasoning, and evaluative language.

Empirical support for this perspective is provided by Samad et al. (2024), whose study of scaffolded genre-based pedagogy demonstrated that explicit work on stages and sub-stages helped undergraduate EFL students organise argumentative texts more effectively. Importantly, their findings suggest that learners' understanding of argumentation extends beyond recognition of structural components, encompassing awareness of discourse moves, linguistic realisations, communicative purpose, audience orientation, and reflective awareness of writing choices. From this perspective, genre-based instruction extends and complements Toulmin's model by situating argumentative components within a broader rhetorical and discursive ecology. It highlights that argumentation is not merely a structural arrangement of claims and evidence, but a socially situated practice shaped by genre conventions and communicative demands. This has important pedagogical implications. Argument instruction should not be reduced to rigid templates such as the five-paragraph essay, particularly in EFL contexts. While simplified structures may be useful at early stages of learning, overreliance on formulaic models can constrain deeper critical engagement. A genre-informed approach should therefore expose learners to a range of authentic argumentative texts, encourage systematic comparison of rhetorical strategies, and support adaptation of argumentation to different audiences and communicative purposes. Such an approach fosters more flexible, context-sensitive critical writing rather than memorised or mechanical production.

Theme 4: Social Mediation and Metacognition Support Reasoning

The fourth theme emphasises that social mediation and metacognitive regulation are central mechanisms through which learners develop critical argumentative writing. From a sociocultural perspective, reasoning is strengthened when learners are given structured opportunities to explain claims, challenge evidence, negotiate perspectives, and test counterarguments through dialogue before writing. These dialogic practices make tacit reasoning visible and help learners recognise gaps in their arguments before they commit them to text.

Metacognitive support complements this social mediation by encouraging learners to plan, monitor, evaluate, and revise their reasoning. Evidence from Li and Zhang (2021) and Li and Zhang (2022) indicates that structured small-group talk can improve overall writing performance and specific argumentative elements such as counterargument claims, counterargument data, and rebuttal claims. Similarly, Murtadho (2021) shows that metacognitive and CT-oriented practices support learners in regulating their argumentative writing process. Together, these studies suggest that EFL learners benefit when argumentation instruction combines social interaction with reflective self-regulation rather than treating writing as an isolated individual activity.

Theme 5: Assessment Shapes What Counts as Critical Writing

The fifth theme underscores the significant influence of assessment design on how CT is represented and valued in EFL writing. When assessment rubrics prioritise surface-level features such as grammar accuracy, lexical range, and basic organisational structure, learners are more likely to focus on linguistic correctness and memorised formats rather than on the quality of reasoning underpinning their arguments. In contrast, rubrics that explicitly incorporate criteria for argument components provide clearer signals to students that elements such as evidence, warrants, counterarguments, and rebuttals are central to effective argumentative writing. Accordingly, the evaluation of EFL argumentative writing should integrate both linguistic and reasoning-based criteria. Analytic rubrics grounded in the structural components of argumentation are particularly useful in this regard, as they make assessment expectations more transparent and pedagogically actionable. However, such rubrics must be carefully designed to go beyond counting the presence of argumentative elements. The quality of these elements is equally, if not more, important. For instance, rebuttals should be relevant, substantively developed, and meaningfully engaged with opposing perspectives, rather than being superficial rejections. Similarly, evidence should not merely be included, but evaluated in terms of credibility,

sufficiency, and relevance to the claim it supports.

This perspective implies that assessment should capture both the use of argumentative moves and the quality with which they are executed. While automated writing evaluation systems can assist learners by providing feedback on surface-level linguistic features such as cohesion, lexical complexity, and grammatical accuracy, their capacity to evaluate deeper levels of reasoning remains limited. In particular, they struggle to reliably assess the strength of evidence use or the adequacy of rebuttal structures. As a result, human judgement remains essential in evaluating the quality of argumentative reasoning in EFL writing. Future assessment practices are therefore likely to benefit from a blended approach, in which technological tools are used to support language development, while human raters apply analytic criteria to assess the substantive quality of argumentation and critical thinking.

Discussion

The findings of this integrative review indicate that CT and argumentation in EFL writing are closely interconnected, yet their relationship is neither direct nor uniform. Instead, it is best characterised as conditional, mediated, and context dependent. While argumentative writing provides a productive site in which CT can be externalised through textual form, this translation from cognition to discourse is shaped by multiple influencing factors. In particular, the realisation of CT in written argumentation depends on learners' L2 proficiency, their rhetorical awareness, the nature and quality of instructional scaffolding, task design features, and the criteria used for assessment. These variables collectively determine the extent to which underlying cognitive processes are successfully manifested as observable argumentative behaviour. Accordingly, the following sections address each of the research objectives in turn, synthesising how these dimensions are reflected in the theoretical and empirical literature reviewed.

Discussion of R01: Theoretical Relationship between Argumentation, Critical Thinking, and EFL Writing

R01 focused on the theoretical relationships among CT, argumentation, and EFL writing. The synthesis indicates that while these constructs are interrelated, they remain conceptually distinct. CT is characterised as disciplined judgement and self-regulated cognition, argumentation as a communicative practice involving the justification and contestation of claims, and EFL writing as the production of written discourse through a second-language system. Taken together, these elements converge in a complex performance that requires learners to simultaneously engage in thinking, organising, and linguistic realisation.

Within the integrated framework, EFL argumentative writing is understood as more demanding than conventional essay writing because it involves the coordination of cognitive, linguistic, and rhetorical processes. Toulmin's model contributes to this understanding by clarifying the structural organisation of reasoning, yet it does not fully account for how such reasoning abilities are developed over time. Similarly, CT theory explains underlying cognitive operations but does not sufficiently address linguistic constraints, while sociocultural theory accounts for mediated development through interaction and scaffolding. Genre theory further complements this perspective by explaining how argumentative writing is shaped by audience expectations, communicative purposes, and discourse conventions. Collectively, these perspectives provide a comprehensive account of EFL argumentative writing as cognitive-linguistic behaviour. From this standpoint, argumentative texts can be interpreted as observable artefacts of reasoning behaviour. They reflect how learners represent problems, evaluate evidence, manage uncertainty, and respond to opposing viewpoints. Although written discourse does not directly represent cognition itself, it functions as a structured behavioural output through which thinking can be inferred. This positioning extends the relevance of the study beyond language pedagogy into broader domains of learning theory, cognition, and communicative behaviour research.

Discussion of RO2: Empirical Evidence on Critical Thinking and Argumentative Performance

RO2 addressed the empirical evidence concerning CT and argumentation in EFL writing. The synthesis indicates a clear distinction between correlational and intervention-based findings. Correlational studies often report weak, inconsistent, or mixed relationships between CT and writing performance, largely because they rely on global indicators of writing achievement and generalised measures of CT. In contrast, intervention studies tend to provide stronger support for the instructional development of argumentation, particularly when they incorporate structured pedagogical approaches such as Toulmin-based scaffolding, genre-based instruction, metacognitive strategy training, and structured small-group interaction.

A key implication of this distinction is methodological rather than conceptual. The findings do not suggest that CT is unrelated to writing; rather, they indicate that its influence becomes visible only when examined at an appropriate level of analytical granularity. When studies rely solely on overall writing scores, improvements in specific argumentative dimensions—such as claim precision, awareness of counterarguments, or quality of evidential support—may remain obscured. However, when writing is analysed at the level of its constituent

argumentative components, CT-related behaviours become more observable and measurable. This suggests that future empirical research should adopt a multi-layered approach to assessment, combining holistic scoring with analytic, Toulmin-informed rubrics and qualitative discourse analysis. Such triangulation would provide a more accurate representation of how CT is manifested in written argumentation.

The evidence further indicates that EFL learners benefit from explicit instructional mediation in argumentation. Argumentative competence does not typically emerge as an incidental outcome of general language instruction. Learners may produce grammatically accurate essays while still demonstrating weak or underdeveloped reasoning. As such, effective pedagogy should include modelling of strong arguments, guided practice in evaluating evidence, opportunities for structured debate and perspective-taking, and targeted feedback on the quality of reasoning. Despite differences in design, context, and methodology across the reviewed studies, there is a consistent convergence towards the importance of explicit support for developing argumentative writing skills in EFL contexts.

Discussion of R03: Instructional, Assessment, and Methodological Implications

R03 focused on implications for future research and pedagogical practice. From an instructional perspective, the review supports an integrated pedagogical approach combining Toulmin-based scaffolding, genre analysis, metacognitive questioning, collaborative interaction, and formative feedback. Each component contributes a distinct function: Toulmin's framework structures argument construction; genre pedagogy situates writing within social and rhetorical contexts; metacognitive strategies support self-regulation; peer interaction enables dialogic perspective-taking; and feedback provides guidance for revision. While each of these elements is necessary, none is sufficient in isolation for developing robust CT-oriented argumentative writing.

The implications for assessment are equally significant. Evaluation frameworks should incorporate criteria that reflect both linguistic and reasoning dimensions of writing, including claim clarity, relevance and sufficiency of evidence, explicitness of warrants, quality of counterarguments, strength of rebuttals, overall coherence, and control of language. This dual emphasis helps ensure that assessment does not become overly focused on surface linguistic accuracy on the one hand, or excessively abstract reasoning criteria on the other. Instead, it prioritises how effectively learners construct and communicate thinking through language. Future research directions point towards the need for mixed methods designs that integrate quantitative and qualitative approaches. A

robust empirical study in this area may include pre-test and post-test argumentative writing tasks, CT measurement instruments, analytic Toulmin-based rubrics, inter-rater reliability testing, classroom observation, learner interviews, and thematic analysis of reflective journals. Quantitative techniques such as paired-samples t-tests, ANCOVA, correlation, and regression analysis can be used to identify patterns of change, while qualitative analysis can provide explanatory insight into the nature of those changes and learners' experiences of argumentative development. Together, these designs offer a more comprehensive and methodologically rigorous approach than reliance on either statistical outcomes or qualitative interpretation alone.

Conclusion and Recommendations

Conclusion

This article has undertaken a theoretical and empirical synthesis of argumentation and CT in EFL writing. The central conclusion is that EFL argumentative writing operates simultaneously as a linguistic product and as an observable expression of reasoning behaviour. CT is evidenced in written discourse through features such as the formulation of clear and precise claims, selection of relevant evidence, logical linkage between reasons and conclusions, acknowledgement of uncertainty, consideration of alternative perspectives, and refinement of weaker lines of argument. However, these manifestations do not emerge spontaneously. They are contingent upon explicit instruction, social mediation, genre awareness, metacognitive regulation, and appropriate assessment practices. The review indicates that pedagogical approaches incorporating Toulmin-based scaffolding, genre-informed instruction, metacognitive strategies, collaborative discussion, and formative feedback can enhance EFL learners' argumentative writing, particularly in relation to the quality of individual argumentative components.

At the same time, literature cautions against overly deterministic interpretations of the relationship between CT and writing performance. This relationship is mediated by factors such as language proficiency, task design, measurement sensitivity, and classroom context, which collectively influence how CT is expressed in written form. Consequently, research in EFL writing should avoid broad generalisations and instead focus on how specific pedagogical conditions facilitate specific reasoning behaviours within writing tasks. Theoretically, the article advances an integrated cognitive-behavioural framework for understanding EFL argumentative writing. Within this model, CT is conceptualised as a cognitive output, argumentation as the structured organisation of reasoning, genre as the socio-rhetorical context shaping communicative expectations and writing

as the observable behavioural realisation of these interrelated processes. This framing clarifies why argumentation constitutes a productive domain for interdisciplinary inquiry spanning cognition, language, and behaviour.

From a pedagogical perspective, the article argues for the explicit teaching of argumentation in EFL writing instruction rather than if learners will implicitly infer argumentative principles from exposure to model texts. Classroom practice should therefore include systematic analysis of argumentative components, comparison of strong and weak evidence, guided development of counterarguments, structured peer discussion, and reflective revision activities. In parallel, assessment practices should be designed to evaluate not only linguistic accuracy but also the quality of reasoning embedded in student writing. Collectively, these instructional and assessment strategies support learners in moving beyond formulaic essay production towards more critically engaged and academically oriented forms of communication.

Recommendations

The article proposes several pedagogical implications for EFL writing curricula. First, writing instruction should include explicit teaching of argumentative structure so that learners develop a clear understanding of the roles of claims, evidence, warrants, qualifiers, counterarguments, and rebuttals in academic discourse. This explicit focus enables students to internalise the functional logic of argumentation rather than relying on implicit exposure. Second, genre-based instructional activities should be incorporated to expose learners to authentic argumentative texts and to develop their awareness of how argumentation varies across disciplinary and communicative contexts. Such exposure helps students recognise that argumentative writing is context-sensitive rather than formulaic.

Third, structured pre-writing discussion should be embedded into classroom practice. Engaging in guided peer interaction prior to drafting allows learners to encounter alternative perspectives, test the strength of their reasoning, and refine their arguments before producing written texts. Fourth, metacognitive reflection should be systematically integrated into the writing process through tools such as planning sheets, revision logs, and self-assessment checklists. These strategies encourage learners to monitor and regulate their own reasoning throughout the stages of writing. Fifth, assessment practices should combine holistic scoring approaches with analytic criteria that specifically evaluate argument quality. This dual approach ensures that both overall writing proficiency and the effectiveness of reasoning are adequately captured.

In terms of future research, the article recommends longitudinal and mixed method designs to examine not only immediate improvements but also the durability and transferability of CT and argumentation skills.

Short-term interventions may demonstrate gains in performance, but they are insufficient for determining long-term retention or transfer across contexts. Future biliteracy research should also explore combinations of instructional interventions, such as Toulmin-based scaffolding with peer interaction, genre pedagogy with metacognitive training, or automated feedback systems combined with human evaluation of argumentative quality. Finally, there is a need for expanded research in underrepresented EFL contexts, particularly in South Asia, the Middle East, and Africa, where examination-oriented educational cultures and language policy environments may shape CT development and argumentative writing in distinct ways.

Limitations and Future Research

The secondary review design adopted in this study necessarily imposes certain limitations. While it enables the integration of existing theoretical and empirical literature, it does not involve the collection or analysis of original classroom data. Moreover, the interpretive nature of the review privileges conceptual synthesis over exhaustive quantitative aggregation across databases. In addition, a substantial proportion of the empirical studies reviewed originate from university contexts in Asia, particularly China, which may limit the extent to which the findings can be generalised to other EFL settings with different educational, cultural, and assessment traditions. Accordingly, future research should prioritise primary empirical investigations aimed at testing the integrated framework proposed in this article. Robust research designs would ideally include experimental or quasi-experimental interventions, validated measures of CT, analytic writing assessments grounded in Toulmin-based frameworks, inter-rater reliability procedures, and complementary qualitative data from learners. Such studies would enable a more precise evaluation of which instructional strategies most effectively strengthen specific components of argumentation. In addition, future research should examine how learners transfer argumentative competencies beyond classroom-based essay writing, particularly into disciplinary writing contexts, workplace communication, and digitally mediated academic environments.

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