# Bridging CLIL and CALLA for English Academic Writing in Chinese Universities: A Critical Synthesis and the Metacognitive Academic Writing Model

Runqiao Zhang[1*] 🆔, Mohd Haniff Bin Mohd Tahir[2*] 🆔

[1] *Universiti Pendidikan Sultan Idris, 35900, Tanjong Malim, Perak, Malsysia, https://orcid.org/0009-0005-9568-6731*
[2] *Universiti Pendidikan Sultan Idris, 35900, Tanjong Malim, Perak, Malsysia, https://orcid.org/0000-0002-5411-1000*

*Corresponding Author: tgzhuanyong2025@163.com

## ABSTRACT

This narrative review synthesizes theoretical frameworks and empirical evidence to address persistent challenges in academic writing instruction for Chinese university EFL learners. Despite extensive English education, Chinese students struggle with extended academic writing, particularly when managing disciplinary content alongside language production. The review identifies constraints at linguistic, cognitive, and cultural-rhetorical levels, compounded by systemic issues including assessment misalignment and inadequate teacher preparation. The review advances a Metacognitive CLIL orientation that integrates three established traditions: Content and Language Integrated Learning for authentic purposes, the Cognitive Academic Language Learning Approach for explicit strategy instruction, and self-regulated learning for metacognitive development. This framework maps Coyle's Language Triptych directly to genre-specific moves while embedding planning, monitoring, and evaluation as routine lesson components rather than supplementary additions. The contribution is a theoretically coherent framework that addresses the fragmentation characterizing current practice, where content, strategies, and metacognition are treated separately. By providing operational principles for aligning content objectives, genre expectations, and process regulation, the framework offers practical guidance for curriculum design in Chinese universities. The research agenda prioritizes mixed-method evaluations capturing both writing products and composing processes to validate the integrated approach.

**Keywords:** Content and Language Integrated Learning; Cognitive Academic Language Learning Approach; Self Regulated Metacognition; Academic Writing; Chinese University EFL; Narrative

## INTRODUCTION

Amid the deepening internationalization of Chinese higher education, competence in academic English writing has become a salient indicator of students' readiness for scholarly participation and exchange. Despite sustained exposure to English instruction, many university learners continue to experience pronounced difficulties with academic writing. A recent national mixed-methods study of 1,525 Chinese college students found that writing was named as the most challenging area by 27.5% of respondents, confirming that writing presents persistent obstacles relative to other skills (Huang, Li, Shu, & Zhang, 2022).

Evidence from English-medium programs at eight Chinese universities similarly shows that writing-related tasks are among the most difficult, with 63.3% of students reporting difficulty using appropriate academic style and 56.4% reporting difficulty with references and bibliographies (Zhou, McKinley, Rose, & Xu, 2022). Beyond classroom performance, high journal rejection and desk-rejection rates are widely reported across fields, with large-scale editor data indicating average desk-rejection rates around 63–73% in recent years and selective journals reporting overall rejection rates as high as 79% (McKenzie, 2022; Frontiers, 2023). Within this landscape, recent

survey research on Chinese academics in science and engineering highlights sentence construction, vocabulary choice, coherence, and cohesion as prominent sources of difficulty that can contribute to requests for major revision or rejection, underscoring that challenges extend beyond surface accuracy to rhetorical construction and cognitive orchestration (Zhang, Eto, & Cui, 2025).

The challenges facing Chinese university learners can be understood as a mutually reinforcing triad. Multi-institutional studies consistently show constraints in linguistic resources for academic writing, including limited breadth and depth of vocabulary knowledge and uneven development of syntactic complexity; these limitations impede sustained argumentation and genre-appropriate style in English-medium tasks (Fan, 2020; Pu, Heng, & Xu, 2023; Zhang & Kang, 2022). Process-oriented strategies are also underdeveloped: surveys and model-based studies with Chinese undergraduates report only moderate or infrequent use of planning, monitoring, and revising routines, and demonstrate that self-regulated writing strategies and writing self-efficacy are reliable predictors of performance (Shen & Bai, 2022; Sun & Wang, 2020; Wang, Ma, Li, & Shen, 2023). Cross-cultural rhetorical transfer further complicates performance as learners negotiate stance, evidentiality, and coherence conventions of English academic discourse; corpus and comparative studies document difficulties with hedging, stance marking, and cohesive organization that can mute authorial voice and weaken argument structure (Tso, 2024; Zhang & Kang, 2022; Zhao & Ding, 2019). These three dimensions interact to constrain progress and make it difficult to meet the expectations of international academic genres.

In response, Chinese university English teaching has experimented with a range of reforms. The Guidelines for College English Teaching issued in 2020 emphasize content and language integration and the cultivation of learner autonomy, catalyzing innovation across institutions (Ministry of Education of the People's Republic of China, 2020). Content and Language Integrated Learning, task oriented pedagogies, and technology enhanced writing platforms have each shown promise in localized implementations, with reports of gains in academic lexis, accuracy, and selected sub skills (Coyle, Hood, & Marsh, 2010; Llinares, Morton, & Whittaker, 2012). Empirical work with Chinese EFL writers further suggests that comprehensive feedback and automated feedback can improve performance and grammatical accuracy, complementing content oriented approaches (Cheng & Zhang, 2021; Wei, Wang, & Dong, 2023). Yet two persistent concerns emerge when the evidence is examined across studies. Methodological heterogeneity is substantial, with variation in design features, instructional intensity, and assessment criteria limiting comparability and synthesis, while outcomes are context dependent and shaped by institutional resources, teacher expertise, and proficiency distributions (Dalton Puffer, 2011). Finally, although language focused and technology supported interventions are common, explicit metacognitive strategy instruction remains comparatively underrepresented in higher education writing, and studies that embed such work within CLIL are still relatively scarce despite promising results (Han, 2024; Shen & Bai, 2022; Hashim, 2023).

This state of the field reveals the need for theoretical integration. Research and practice have tended to coalesce around three orientations that are rarely synthesised in a principled way. Content and language integrated learning situates language development within disciplinary learning and thereby provides rich contexts for academic writing, yet the management of composing processes often remains implicit within classroom practice (Coyle, Hood, & Marsh, 2010; Dalton Puffer, 2011; Llinares, Morton, & Whittaker, 2012). The cognitive academic language learning approach offers a structured pathway for explicit strategy instruction that makes planning, monitoring, and evaluation visible, but its effectiveness can be constrained when learners confront unfamiliar disciplinary knowledge without sufficiently activated schemata (Chamot, 2009; O'Malley & Chamot, 1990). Self regulated learning, with metacognitive regulation at its core, shows robust links to writing development in tertiary EFL settings, where strategy use and regulation are associated with gains in writing quality and motivation; however, operational models that embed these mechanisms coherently inside CLIL lessons remain under specified (Graham & Harris, 2018; Teng & Zhang, 2020; Han, 2024; Pintrich, 2000; Zimmerman, 2002). The central problem, therefore, is how to cultivate metacognitive strategy use systematically in content driven environments so that learners can coordinate the dual demands of content comprehension and language production.

The present narrative review addresses this problem by synthesizing research on content and language integrated learning, the cognitive academic language learning approach, self regulated learning, and explicit metacognitive strategy instruction as they pertain to EFL academic writing in Chinese universities and in comparable international contexts (Coyle, Hood, & Marsh, 2010; O'Malley & Chamot, 1990; Pintrich, 2000; Zimmerman, 2002; Teng & Zhang, 2020; Han, 2024). The contribution is threefold. It interrogates the internal logic of these frameworks and evaluates their contextual adaptability in China, drawing on overviews and research agendas that emphasise the contextualised nature of CLIL implementation (Dalton Puffer, 2011; Dalton Puffer & Smit, 2013). It identifies methodological and practical gaps that recur across studies and that account for the unevenness of reported outcomes (Dalton Puffer, 2011; Dalton Puffer & Smit, 2013). It advances a theory informed integrative pathway that places metacognitive strategy instruction at the centre of content and language integrated writing pedagogy. The core claim is that explicit metacognitive training, systematically embedded within content and language integrated units, can connect content understanding with the regulation of composing

processes; by enabling learners to plan, monitor, and adjust their writing while engaging with disciplinary ideas, such integration supports the concurrent development of content mastery and academic writing competence (Teng & Zhang, 2020; Shen & Bai, 2022; Han, 2024).

Following this introduction, the review unfolds in six main sections. First, the methodology section outlines the narrative review approach, describing the literature selection principles and synthesis framework. Second, the theoretical framework examines content and language integrated learning, the cognitive academic language learning approach, and self regulated learning as complementary architectures for understanding academic writing development. Third, the review synthesizes empirical evidence from Chinese and international contexts, analysing how these frameworks have been applied and identifying patterns in outcomes. Fourth, the analysis identifies critical gaps in current research and practice, establishing the need for theoretical integration. Fifth, the review advances a metacognitive content and language integrated orientation that aligns content engagement, strategy instruction, and metacognitive regulation, followed by operational principles for translating theory into practice. Finally, the review presents implications for teaching and a research agenda for validating the integrated framework in Chinese university settings, and concludes by summarizing the contribution and priorities for future development.

### Theoretical Background

This review advances a theoretical framework that integrates three established traditions, namely Content and Language Integrated Learning (CLIL), the Cognitive Academic Language Learning Approach (CALLA), and self regulated learning (SRL), to address persistent challenges in Chinese EFL academic writing. The integration responds to a fundamental tension: academic writing requires conventionalised forms and genre specific moves for evaluation, yet its generative core lies in creative and independent thinking. Recent studies show that highly procedural or template driven instruction can suppress initiative and higher order reasoning, which clarifies the need for a framework that keeps standardisation and creativity in productive tension (ten Peze, Janssen, Rijlaarsdam, & van den Bergh, 2024; Zhang & Zhang, 2021; Zhang, 2022).

### Content and Language Integrated Learning: The Activity Context

Content and Language Integrated Learning provides the foundational context in which academic writing develops through authentic disciplinary engagement. Guided by principles of rich input, meaningful tasks, and progressive cognitive demand, CLIL widens learners' discourse repertoires while maintaining genuine purposes for communication (Coyle, Hood, & Marsh, 2010; Krashen, 2003). Rather than treating language as an isolated skill, CLIL embeds writing within content exploration so that linguistic development directly serves disciplinary thinking. Three design tools operationalize CLIL's dual focus (see Figure 2). The 4Cs Framework integrates content, communication, cognition, and culture to maintain balanced attention to subject matter and language development. The Language Triptych specifies three dimensions: language of learning (subject-specific vocabulary and concepts), language for learning (classroom discourse and task management), and language through learning (emergent language from inquiry). The CLIL Pyramid sequences instruction from topic selection through input scaffolding, task design, and consolidation activities, ensuring progressive cognitive challenge (Coyle et al., 2010; Meyer, 2010; Banegas & Mearns, 2023).
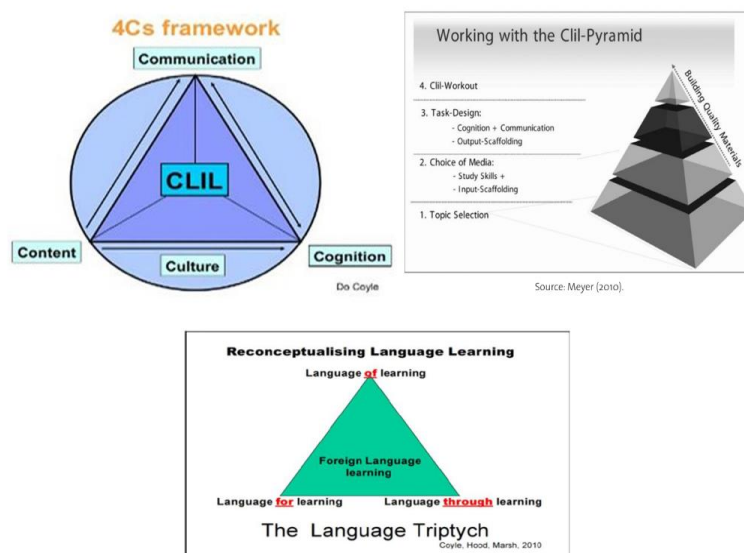


**Figure 1.** CLIL design tools that operationalise content–language alignment.

These tools enable systematic alignment between content objectives and language targets, ensuring that genre requirements and cognitive demands remain visible throughout instruction. In academic writing contexts, this means that argument structures, evidence integration, and stance expressions emerge from disciplinary engagement rather than being taught as decontextualized skills.

## The Cognitive Academic Language Learning Approach: The Instructional Pathway

While CLIL provides authentic contexts, the Cognitive Academic Language Learning Approach specifies how strategy instruction is made explicit and systematic within content tasks. The CALLA lesson cycle comprises five phases: preparation, presentation, practice, self evaluation, and expansion, which together translate abstract strategy knowledge into concrete procedural skill (Chamot & O'Malley, 1994; Chamot, 2009). The cycle begins with preparation, activating prior knowledge and establishing task purposes. During presentation, teachers explicitly name and model strategies in authentic contexts. Practice provides guided application with scaffolded support that gradually fades. Self-evaluation prompts learners to assess strategy effectiveness, while expansion facilitates transfer to new contexts (see Figure 3). This sequence ensures that strategies are not merely mentioned but systematically developed through graduated responsibility release.
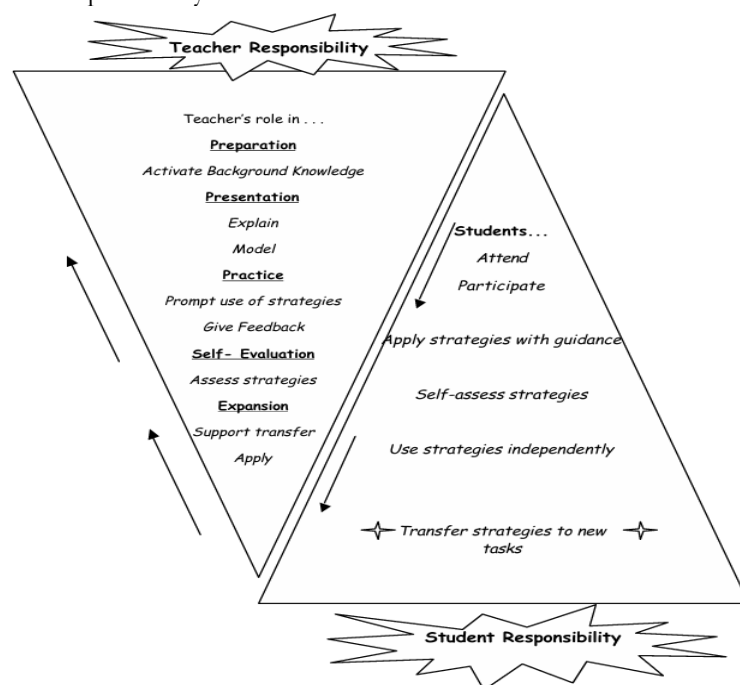


Figure 2. CALLA lesson cycle with gradual release of responsibility and SRL checkpoints.

The CALLA sequence (centre) moves from preparation to expansion, with teacher responsibility decreasing as student responsibility increases. SRL overlays the cycle: forethought aligns with preparation/presentation, monitoring with practice, and reflection with self-evaluation/expansion; transfer to new tasks completes the cycle. Adapted from Chamot and O'Malley (1994) and Chamot (2009). Critical to CALLA's effectiveness is the explicit naming and modeling of both cognitive strategies (summarizing, inferencing, elaborating) and metacognitive strategies (planning, monitoring, evaluating). In academic writing, this dual focus enables learners to manage both content processing and composing processes simultaneously. Evidence from meta-analyses confirms that such explicit strategy instruction, particularly when embedded in meaningful tasks, reliably improves performance (Belland, Walker, Kim, & Lefler, 2017; Double, McGrane, & Hopfenbeck, 2020).

## Self-Regulated Learning and Metacognition: The Regulatory Mechanism

Self-regulated learning provides the mechanism through which strategy knowledge transforms into adaptive performance. SRL conceptualizes learning as a cyclical process of forethought, performance monitoring, and reflective adaptation, with learners actively managing their motivation, behavior, and cognition toward goals (Pintrich, 2000; Zimmerman, 2002).

Central to this process is metacognition, which operates through three interrelated domains (see Figure 1). Metacognitive knowledge encompasses awareness of persons (individual capabilities and limitations), tasks (demands and difficulty), and strategies (when and why to use specific approaches). Metacognitive experiences comprise the feelings and judgements that arise during performance, including confidence, confusion, and a sense of progress. Metacognitive skills realise regulation by supporting planning, monitoring, evaluation, and reflection (Flavell, 1979; Efklides, 2008; Schraw & Dennison, 1994).
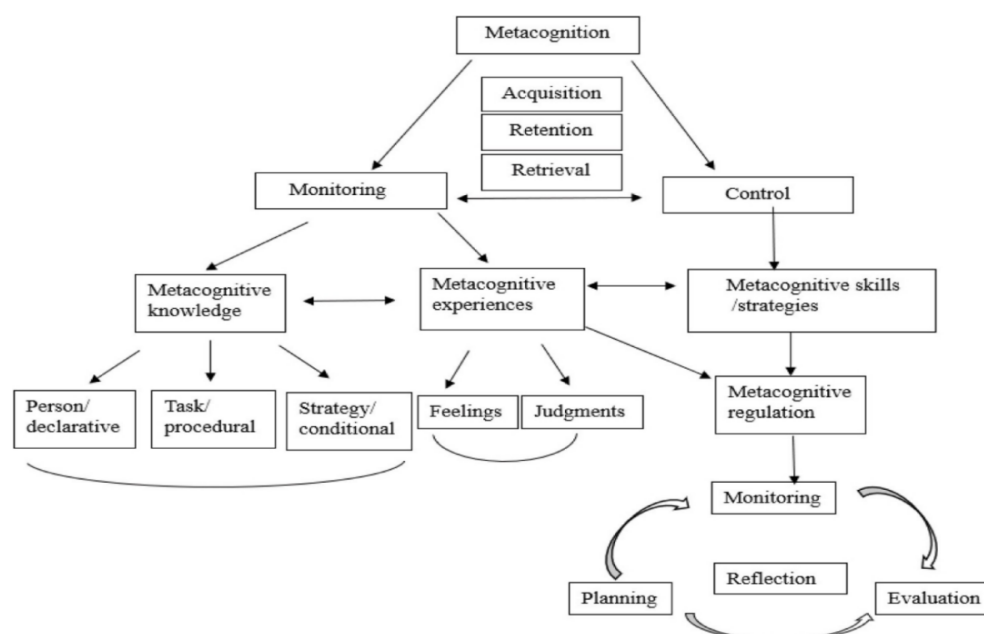
**Figure 3** A model on the multifaceted elements of metacognition.

A critical mechanism linking metacognition to writing improvement is calibration, defined as the accuracy of learners' self assessments (Teng & Zhang, 2020). Well-calibrated monitoring enables writers to recognize when thesis and evidence misalign, when arguments lack coherence, or when revision is needed. Conversely, miscalibrated judgments lead learners to persist with ineffective strategies or abandon effective ones prematurely (Dunlosky & Metcalfe, 2009). In academic writing, calibration particularly affects revision quality: accurate self-assessment signals the need for global restructuring rather than surface editing (Zimmerman, 2002; Teng & Zhang, 2020).

Research in Chinese university contexts demonstrates that when metacognitive regulation is explicitly developed through structured opportunities for planning, monitoring, and reflection, writing quality improves across multiple dimensions. However, these opportunities must be embedded within content tasks rather than taught separately to ensure transfer (Shen & Bai, 2022; Han, 2024).

### Empirical Studies on CLIL, Strategy Instruction, and Metacognitive Regulation in EFL Academic Writing

Studies of Content and Language Integrated Learning indicate that meaningful engagement with disciplinary concepts can support advanced language growth when materials, tasks, and evaluation are intentionally aligned with dual aims. University-level implementations report gains in participation and discourse functions, and show that writing improves when input scaffolding and cognitively demanding tasks are sequenced with consolidation activities that target genre moves in explicit ways (Coyle, 2007; Coyle et al., 2010; Meyer, 2010; Llinares et al., 2012; Llinares & Morton, 2017). Large-scale and program-level analyses also caution that one aim can crowd out the other when planning and teacher preparation are thin, producing uneven higher-order writing outcomes even where oral participation rises (Dalton-Puffer, 2011; Fortanet-Gómez, 2013; Oattes et al., 2018; Nikula et al., 2016; Ball et al., 2015). Critical reviews underline the risk of over-attributing broad competence gains to CLIL without careful attention to design features and assessment; mixed effects often emerge once writing is evaluated for argument structure, integration of sources, and stance (Bruton, 2011; Pérez Cañado, 2012, 2016; Villabona & Cenoz, 2021). Evidence from Chinese contexts echoes these tensions, showing interest in integration and authenticity while noting that composing processes are frequently left implicit, which helps explain why benefits do not consistently transfer to extended academic genres (Gao & Wang, 2023; Hu, 2002).

### Explicit Strategy Instruction / CALLA

Research on explicit strategy instruction provides a complementary picture. The cognitive academic language learning approach links content based work to integrated language development and to the teaching of strategies that make planning, monitoring, evaluation, and transfer visible within lessons (O'Malley & Chamot, 1990; Chamot, 2005; Chamot, 2009; Chamot & Harris, 2019). Classroom studies show that when teachers model strategies, provide guided practice, and prompt reflection tied to task goals, learners improve performance on complex academic tasks and show better maintenance of gains across assignments that differ in topic and text type. In university EFL writing, this approach has been associated with more purposeful outlining, closer thesis–

evidence alignment, and a shift from surface editing to global revision once students internalise a small repertoire of transferable moves (Teng & Zhang, 2020; Shen & Bai, 2022; Wang, Ma, Li, & Shen, 2023).

**Self-Regulated Learning Mechanism**

Work on self regulated learning provides the mechanism that explains durable change in writing performance. The literature identifies forethought, monitoring, and reflection as phases through which learners set goals, track progress, and adapt strategies under varying task conditions (Pintrich, 2000; Zimmerman & Risemberg, 1997; Zimmerman, 2002). Evidence across school and university settings links metacognitive awareness and self regulation to higher writing quality, more efficient revision cycles, and greater resilience when working with unfamiliar sources or genres (Graham & Harris, 2018; Zimmerman & Moylan, 2009; Zimmerman & Schunk, 2011). Studies in Chinese university contexts emphasise that metacognition is frequently treated as an add on rather than embedded in content tasks; interventions that schedule brief planning prompts, mid task monitoring checks, and post task evaluation at predictable lesson points yield stronger effects and better generalisation than one off training disconnected from disciplinary communication (Teng & Zhang, 2020; Shen & Bai, 2022; Han, 2024; Wang et al., 2023).

Taken together, these three strands illuminate both possibilities and constraints. Content and language integrated learning situates writing in authentic disciplinary activity and can raise the communicative ceiling, but it does not by itself ensure that composing processes will be managed in ways that produce argumentatively strong academic texts. The cognitive academic language learning approach demonstrates that explicit strategy instruction can be taught and transferred, but it risks generic treatment unless it is fused with discipline specific purposes and language demands. Self regulated learning explains how knowledge about strategies becomes operational in real time and why durable change requires regular opportunities to plan, monitor, and evaluate at the point of need. The Chinese university evidence base adds the observation that institutional resources, teacher expertise, and assessment design mediate outcomes, which cautions against one size fits all recommendations and calls for an integration that is sensitive to local conditions (Hu, 2002; Gao & Wang, 2023; Coyle, Hood, & Marsh, 2010).

The synthesis therefore motivates a design stance that places explicit metacognitive strategy work inside content and language integrated units. In practical terms this means that language of learning, language for learning, and language through learning are mapped to concrete writing moves in each assignment and that cognitive academic language learning style modelling, guided practice, and transfer are planned alongside content tasks. It also means that forethought, monitoring, and reflection are scheduled within lesson timelines so that regulation is learned as part of the work rather than as a separate activity. The studies reviewed above provide precedents for each element and explain why the combination is likely to yield stronger and more sustainable gains than any single strand on its own (Coyle, Hood, & Marsh, 2010; Meyer, 2010; O'Malley & Chamot, 1990; Chamot, 2009; Zimmerman, 2002; Teng & Zhang, 2020). The empirical evidence reviewed above reveals a paradox: while each approach demonstrates promise in isolation, their separate implementation fails to address the interconnected nature of academic writing challenges. This fragmentation motivates the identification of specific gaps that an integrated approach must address.

**Critical Gaps and the Integrated Solution**

*Identifying the Gaps*

The empirical record indicates three interconnected gaps that constrain the development of extended academic writing in content rich contexts. Operating at the pedagogical, instructional, and regulatory levels, these gaps interact to limit durable gains in argument structure, source integration, and stance. First, the pedagogical gap in CLIL implementation. While content and language integrated learning successfully promotes oral participation and discourse functions, its impact on extended academic writing remains inconsistent. Reviews consistently document improvements in communicative fluency alongside persistent weaknesses in argument structure, source integration, and stance management (Bruton, 2011; Dalton-Puffer, 2011; Fortanet-Gómez, 2013). This disparity intensifies when teacher preparation and institutional support are limited, leading to situations where content mastery crowds out advanced language development or vice versa (Nikula, Dafouz, Moore, & Smit, 2016; Villabona & Cenoz, 2021). The core issue is that composing processes typically remain implicit within CLIL courses, leaving learners without explicit guidance for managing the dual cognitive demands of content processing and language production.

Second, an instructional gap in strategy transfer persists. Although explicit strategy instruction, including CALLA, reliably shifts learners from surface editing to global revision, the gains frequently do not generalise across assignments and genres. The problem lies not in the strategies themselves but in their disconnection from disciplinary purposes and specific genre demands (Chamot, 2005; Chamot, 2009; Chamot & Harris, 2019). When strategies are taught as generic procedures rather than as tools for achieving particular rhetorical goals within content areas, learners struggle to adapt them to new writing contexts (Teng & Zhang, 2020; Shen & Bai, 2022).

Third, a regulatory gap persists in the embedding of metacognitive processes. Although planning, monitoring, and reflection are consistently associated with higher writing quality, they are rarely scheduled at predictable points within content tasks, so strategy knowledge fails to become real-time regulation and gains do not persist across genres (Zimmerman, 2002; Teng & Zhang, 2020). However, these processes are typically treated as supplementary additions rather than integral components of content learning (Zimmerman & Moylan, 2009; Zimmerman, 2002; Han, 2024). Without scheduled opportunities for metacognitive engagement at predictable lesson points, strategy knowledge fails to translate into real-time regulation during composing. This peripheral treatment explains why gains from isolated metacognitive training rarely persist across genres or transfer to new writing tasks (Teng & Zhang, 2020; Shen & Bai, 2022). Evidence from Chinese university settings adds that institutional resources, teacher expertise, and assessment design mediate outcomes, which cautions against one-size-fits-all recommendations and supports integration sensitive to local conditions (Hu, 2002; Gao & Wang, 2023).

### The Chinese University Context

These universal gaps intersect with specific challenges facing Chinese university learners, creating a complex web of constraints that operate across linguistic, cognitive, and cultural-rhetorical dimensions. Linguistically, Chinese EFL writers demonstrate constrained academic vocabulary breadth, underdeveloped syntactic complexity, and persistent cohesion problems that undermine sustained argumentation (Zhang & Kang, 2022; Bi & Jiang, 2020). These limitations persist across proficiency levels and resist form-focused remediation when disconnected from meaningful writing purposes.

Cognitively, the tendency to rely on L1-to-L2 translation elevates processing demands and reduces fluency. Problems with thesis-evidence alignment, global organization, and stance deployment persist even among advanced learners. Without structured metacognitive support, revision remains at the surface level, focusing on local errors rather than restructuring arguments or reconsidering evidence paths (Wang & Wen, 2002; Teng & Zhang, 2020; Shen & Bai, 2022). Cultural-rhetorical differences add another layer of complexity. Preferences for indirectness and circular development in Chinese academic traditions can conflict with the linear, explicit argumentation expected in English academic writing. These differences manifest in weakened authorial voice and unclear positioning, particularly in argumentative genres (Tso, 2024; Liu, Hu, & Liu, 2022).

System-level factors compound these individual challenges. Reviews and programme-level studies repeatedly note that the dual aims of content mastery and advanced academic language are hard to balance in classrooms; when planning time, teacher preparation, materials, and institutional support are thin, one aim tends to crowd out the other and writing outcomes become uneven (Morton & Llinares, 2017; Nikula, Dafouz, Moore, & Smit, 2016; Villabona & Cenoz, 2022). Assessment practices that prioritize grammatical accuracy over genre-appropriate argumentation provide misaligned incentives (Ball, Kelly, & Clegg, 2015; Villabona & Cenoz, 2022). Studies in Chinese universities consistently report that metacognitive work remains peripheral, delivered as brief interventions disconnected from content learning rather than embedded within disciplinary tasks (Teng & Zhang, 2020; Shen & Bai, 2022).

## The Integrated Framework as Solution

In response to these interconnected gaps, this review advances an integrated framework that coordinates three established traditions to create a coherent pedagogical orientation. The framework operates through complementary mechanisms that address each identified gap while remaining sensitive to contextual constraints.

Content and Language Integrated Learning provides the foundational layer, supplying authentic purposes for academic writing through disciplinary engagement. CLIL's principles of authenticity, multiple focus, and progressive cognitive demand ensure that writing emerges from genuine communicative needs rather than artificial exercises. Its design tools, particularly the Four Cs framework and the Language Triptych, enable systematic alignment between content objectives and language development, ensuring that linguistic targets emerge naturally from the thinking and communication required by disciplinary tasks (Coyle et al., 2010; Meyer, 2010). This directly addresses the pedagogical gap by making composing processes explicit within content-rich contexts.

The Cognitive Academic Language Learning Approach forms the instructional layer, transforming abstract strategies into operational tools within disciplinary work. The CALLA lesson sequence comprises five phases: preparation, presentation, practice, self evaluation, and expansion. Together these phases ensure that strategies are explicitly named, modelled in authentic tasks, practised with graduated support, and transferred to new contexts (Chamot & O'Malley, 1994). This systematic approach prevents strategies from remaining generic abstractions, instead anchoring them to specific genre moves and disciplinary purposes. The instructional gap is thus bridged by connecting strategy use directly to the rhetorical demands of academic writing within content areas.

Self-regulated metacognition provides the regulatory layer, supplying the mechanism that transforms strategy knowledge into adaptive performance. When forethought, monitoring, and reflection phases are scheduled as routine components within CLIL units and supported through CALLA instructional sequences, learners develop

the capacity to manage composing processes autonomously (Pintrich, 2000; Zimmerman, 2002). This embedded approach contrasts sharply with supplementary metacognitive training that fails to transfer, directly addressing the regulatory gap by making metacognition an integral part of content learning rather than an optional addition.

## Core Principles for Implementation

The synthesis of these three frameworks yields two fundamental principles that guide practical implementation. First, alignment must be explicit and systematic. The language of learning, for learning, and through learning must map directly onto the specific genre moves that assignments assess. This principle corrects the persistent misalignment between instruction that emphasizes general language development and evaluation that demands genre-specific performance. Second, metacognitive engagement must be routine rather than supplementary. Planning, monitoring, and reflection checkpoints must be positioned as standard components within content units, appearing at predictable moments in lesson sequences. This principle ensures that regulation develops alongside content mastery and language growth, rather than being treated as an isolated skill. These principles work synergistically: explicit alignment provides the structure within which metacognitive regulation can develop, while routine metacognitive engagement enables learners to navigate the complex demands of content and language integration autonomously. Together, they offer a theoretically coherent and practically viable response to the persistent challenges facing Chinese university learners in academic English writing.

## The Proposed Model: Metacognitive Academic Writing Model (MAWM)

Building on the integrated framework's core principles, the Metacognitive Academic Writing Model (MAWM) operationalizes the theoretical synthesis into a coherent pedagogical architecture specifically designed for Chinese undergraduate EFL contexts.

The model operates through three interconnected dimensions that correspond to the framework's layered structure. At its foundation, academic content drives purposeful English writing, leveraging CLIL's principles of multiple focus, authenticity, active learning, scaffolding, and cooperation. The Four Cs framework and Language Triptych systematically specify the language of learning, for learning, and through learning within each instructional unit, ensuring that linguistic targets emerge organically from disciplinary engagement (Coyle, Hood, & Marsh, 2010; Mehisto, Marsh, & Frigols, 2008).

At the instructional level, MAWM embeds CALLA's five-phase lesson cycle to systematize strategy instruction within content-driven tasks. This operational sequence unfolds as follows: lessons begin by activating prior knowledge and clarifying task demands (preparation), proceed with explicit modeling of cognitive and metacognitive strategies (presentation), provide guided practice with gradually fading support (practice), incorporate structured self-evaluation (evaluation), and facilitate transfer to new contexts (expansion). This sequence ensures that strategy instruction remains visible and purposeful throughout the unit, integrating disciplinary reading and discussion with staged writing activities (Chamot & O'Malley, 1994; Chamot, 2009).

At the regulatory level, the model embeds metacognitive engagement as routine practice rather than supplementary addition. Aligning with self-regulated learning research, MAWM positions forethought, monitoring, and reflective adaptation as integral components of each lesson sequence (Zimmerman, 2002; Pintrich, 2000). Strategy reflection logs, brief think-alouds, and post-task evaluations are scheduled at predetermined unit checkpoints, transforming metacognition from abstract concept to concrete practice. This embedded approach directly addresses the gap identified in Chinese university settings, where metacognitive work typically remains peripheral to content learning (Teng & Zhang, 2020; Shen & Bai, 2022).

The model's design specifications ensure alignment between theoretical principles and classroom implementation. Materials development follows the Language Triptych and Meyer's CLIL Pyramid, systematically planning input scaffolding, output scaffolding, and consolidation activities alongside genre-specific writing demands (Meyer, 2010). This structured approach ensures that classroom discourse, discipline-aligned lexis, and emergent language from inquiry map directly onto targeted writing moves in each assignment.

Assessment integration represents a critical design feature. Unlike traditional approaches that separate language accuracy from content mastery, MAWM aligns evaluation criteria with the instructional targets specified through the Language Triptych. This alignment corrects the persistent mismatch between instruction emphasizing process and assessment privileging product, a problem widely documented in Chinese EFL contexts (Hu, 2002; Gao & Wang, 2023).

The Metacognitive Academic Writing Model specifically addresses challenges documented in Chinese undergraduate settings. Where CLIL implementation has shown promise but remains uneven, MAWM provides explicit structure for managing dual objectives. Where strategy instruction has remained generic, the model anchors strategies to disciplinary purposes and genre demands. Where metacognition has been treated as optional, the model positions regulation as essential to academic writing development. By integrating CALLA's instructional sequences and self-regulated learning principles within CLIL's content-rich architecture, MAWM prioritises three

domains that Chinese learners commonly find most challenging under traditional product oriented instruction: accuracy, argumentation, and source integration (Shen & Bai, 2022; Zhang & Kang, 2022).The model thus offers a theoretically grounded yet practically viable response to the persistent difficulties facing Chinese university learners in academic English writing.
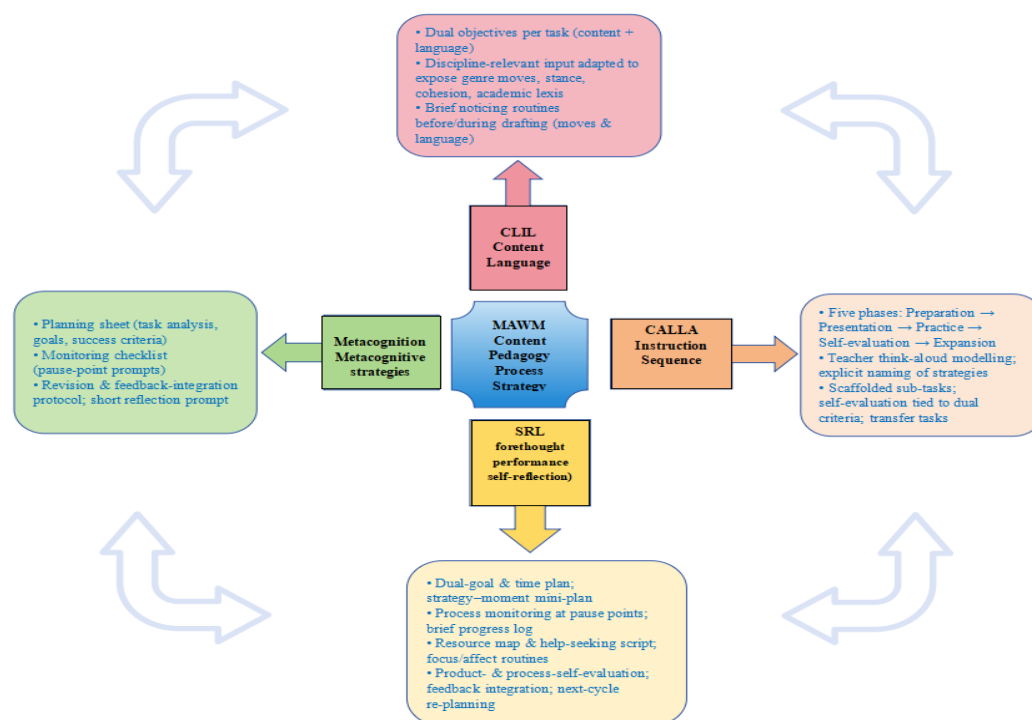


**Figure 4** The Metacognitive Academic Writing Model (MAWM): An Integrated Framework for Chinese EFL Academic Writing

Figure 4 illustrates the three-layered architecture of MAWM and its operational flow. At the center, MAWM integrates Content and Language Integrated Learning (CLIL) principles, Cognitive Academic Language Learning Approach (CALLA) instructional sequences, and Self-Regulated Learning (SRL) phases of forethought, performance, and self-reflection. The model operates through bidirectional flows: top-down goal specification (pink) drives content-language alignment, while bottom-up performance outcomes (yellow) inform strategy refinement. The left pathway (green) shows how metacognitive strategies emerge from planning and goal-setting processes, including task analysis, success criteria, and revision protocols. The right pathway (orange) details CALLA's five-phase implementation sequence. Arrows indicate the dynamic interplay between components, emphasizing that metacognitive regulation is embedded throughout rather than appended to content-language instruction. This integrated architecture addresses the fragmentation in current practice by ensuring that content objectives, language targets, strategy instruction, and metacognitive regulation operate synergistically within each instructional unit.

## CONCLUSION

Translating the MAWM's theoretical principles into classroom practice requires strategic alignment rather than rigid prescription. The model's three-layered architecture provides a flexible framework that adapts to local contexts while maintaining theoretical coherence. In content-rich courses, disciplinary questions supply authentic purposes for writing, with CALLA routines positioned at predictable moments to make strategy instruction visible and systematic. Metacognitive regulation develops through normalized checkpoints for planning, progress monitoring, and post-task reflection embedded within lesson sequences. This integrated approach ensures that assessment reinforces instruction, addressing the persistent misalignment between local correctness and extended argumentation documented in Chinese university settings.

Successful implementation of MAWM depends on four key alignments. First, content-language mapping. Course planning must explicitly connect the Language Triptych dimensions to specific genre moves that assignments assess. Lexical depth, syntactic complexity, and stance expressions should be specified in relation to claims, evidence, and reasoning rather than treated as isolated language features. CLIL design tools facilitate this

mapping while maintaining authentic purposes and progressive cognitive demand (Coyle, Hood, & Marsh, 2010; Llinares, Morton, & Whittaker, 2012; Meyer, 2010).

Second, visible strategy instruction. CALLA's five-phase sequence must be embedded within content tasks, ensuring strategies are named, modeled, practiced, evaluated, and transferred in relation to actual writing demands. This prevents strategy instruction from remaining generic or disconnected from disciplinary purposes (O'Malley & Chamot, 1990; Chamot, 2009).

Third, scaffolded support systems. Teacher and peer feedback function as external supports that make regulation learnable before gradually fading as students gain autonomy. Meta-analytic evidence confirms that well-designed scaffolding and feedback reliably improve performance, particularly when supports are systematically withdrawn (Belland, Walker, Kim, & Lefler, 2017; Double, McGrane, & Hopfenbeck, 2020).

Fourth, assessment alignment. Evaluation criteria must mirror instructional targets through analytic rubrics that assess genre moves, evidence configuration, and stance alongside language accuracy. When assessment language reflects CLIL constructs, students receive consistent signals about how language resources support argumentative progression (Coyle et al., 2010; Morton & Llinares, 2017).

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