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Enhancing EFL Academic Collocation Learning through Integrated Concept-Based and Task-Based Instructional Techniques

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ABSTRACT: *This study investigated the effectiveness of four concept-based instructional (CBI) techniques - concept mapping, verbalization games, contextual clues, and visual strategies - integrated with task-based instruction for enhancing Vietnamese EFL learners' academic collocation knowledge and controlled productive ability. Seventy-three third-year English majors participated in a within-subject repeated-measures sequential intervention across ten weeks. An Academic Collocation Test, a Vocabulary Knowledge Scale-Academic Collocation Test, and post-intervention interviews (n = 10) measured productive knowledge, knowledge depth, and learner perceptions, respectively. Results revealed substantial improvements with large effect sizes for overall performance and phase-specific gains. While techniques demonstrated differential gain trajectories, Friedman analysis confirmed equivalent post-test achievement across phases, complemented by mixed-effects modelling that attributes these differences to baseline variation rather than technique-specific effectiveness, suggesting the integrated model functions as a self-compensating system rather than any single technique driving outcomes. Knowledge depth progressed from recognition-level to productive use. Qualitative findings revealed universal recognition of collocation significance, divergent technique preferences, and sophisticated pedagogical insights. These findings support a multi-technique integrated approach with implications for collocation-focused instruction that emphasizes visual strategies and verbalization games within academic writing curricula in EFL contexts.*

KEYWORDS: **academic collocations, concept-based instruction, task-based instruction, Vietnamese EFL learners.**

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1. Introduction

Academic collocations, conventional word combinations such as "conduct research", "draw conclusions", and "significant findings", constitute essential building blocks of scholarly discourse (Nesselhauf, 2005). Despite their ubiquity and functional importance, these multi-word units pose persistent challenges for English as a Foreign Language (EFL) learners, particularly those from non-Indo-European linguistic backgrounds (Laufer & Waldman, 2011). Vietnamese EFL learners demonstrate pronounced difficulties with academic collocations, achieving accuracy rates below 15% on productive measures (Lei & Liu, 2018; My & Loi, 2025; Nguyen & Webb, 2017), substantially limiting their capacity to participate effectively in international academic discourse communities.

The persistent challenge of collocation acquisition reflects multiple converging factors. Unlike single-word vocabulary, collocations involve complex form-meaning-function mappings that resist incidental acquisition through exposure alone (Boers & Lindstromberg, 2009). Vietnamese learners receive minimal explicit collocational instruction within grammar-translation-oriented pedagogical traditions, leaving these patterns invisible despite frequent encounters during reading. Additionally, conventional preferences often lack transparent semantic motivation, creating arbitrary associations that first-language transfer patterns cannot predict (Durrant & Schmitt, 2010).

Recent pedagogical innovations have explored two instructional approaches in language instruction. Concept-Based Instruction (CBI), grounded in Vygotskian sociocultural theory (Lantolf & Thorne, 2006), emphasizes the importance of providing explicit metalinguistic explanations, visual concept mapping, and contrastive analysis to render invisible patterns salient and systematic. On the other hand, Task-Based Instruction (TBI) emphasizes meaningful communication (Ellis, 2003), providing authentic contexts for deploying target forms within purposeful language use. While both approaches show promise independently (Ellis, 2003; Lantolf & Thorne, 2006), a review of the literature on collocation instruction (e.g., Nation, 2013; Webb & Nation, 2017) reveals that their systematic integration for academic collocation teaching and learning remains underexplored (My & Loi, 2025), with no research examining which specific CBI-derived techniques contribute most effectively within integrated frameworks.

This study addresses this gap by investigating: (1) how each CBI technique contributes to collocation learning within the integrated TBI-CBI instruction, and (2) how Vietnamese EFL learners perceive this pedagogical integration. Two research questions guided the study:

RQ1: How does each specific CBI-derived technique (concept mapping, verbalization games, contextual clues, visual strategies) contribute to collocation learning within the sequential integrated TBI-CBI framework?

RQ2: What are Vietnamese EFL learners' perceptions of the four CBI techniques for learning academic collocations within the integrated approach?

2. Literature Review

2.1 Academic Collocations: Theoretical Foundations and Acquisition Challenges

Academic collocations represent conventionalized word combinations that occur with a frequency greater than chance in scholarly discourse, exhibiting restricted substitutability despite the semantic plausibility of alternatives (Sinclair, 1991). Sinclair's foundational idiom principle established that words occur predominantly in semi-preconstructed phrases rather than as freely combinable elements, fundamentally challenging traditional grammar-plus-vocabulary models of language. Building on this foundation, Benson *et al.* (1986, 2012) distinguished two primary collocation types: grammatical collocations (e.g., *depend on*, *account for*) involving verbs with specific prepositions or clause structures, and lexical collocations (e.g., *conduct research*, *draw conclusions*) comprising content word combinations. This taxonomic distinction proves pedagogically significant as the two types demonstrate differential learnability patterns and respond differently to instructional interventions.

Academic registers demonstrate substantially higher collocational density than conversational discourse (Hyland, 2008), with frequency distributions varying systematically across rhetorical sections of research articles. Corpus analyses reveal that Introduction sections favour collocations signalling research gaps (e.g., *previous research*, *limited attention*), Method sections employ procedural collocations (e.g., *collect data*, *administer tests*), Results sections utilize presentation collocations (e.g., *significant difference*, *strong correlation*), and Discussion sections deploy interpretive collocations (e.g., *implications for*) (Durrant, 2016). This functional specialization implies that effective collocation instruction must address not merely form-meaning mappings but also contextual appropriateness across rhetorical contexts.

Despite their prevalence and functional importance, academic collocations pose particular acquisition challenges for EFL learners (Laufer & Waldman, 2011; Nesselhauf, 2005). The arbitrariness problem reflects that conventional preferences often lack transparent semantic motivation, with "conduct research" preferred over semantically plausible "make research" or "do research" because of register convention rather than logical necessity (Nesselhauf, 2005). Cross-linguistic variation creates interference, as translation equivalents in learners' first languages frequently select different verbs. Vietnamese speakers might literally translate "làm nghiên cứu" (make research), producing

non-conventional English combinations (Durrant & Schmitt, 2010). The recognition-production asymmetry documents that learners often recognize appropriate collocations during reading yet fail to deploy them spontaneously during writing, reflecting fundamentally different cognitive demands (Laufer & Waldman, 2011). Contextual appropriateness constraints require understanding not merely form-meaning mappings but also functional distributions, with learners frequently deploying collocations in rhetorically inappropriate contexts (Durrant, 2016). These converging factors create persistent learning difficulties requiring systematic pedagogical intervention beyond incidental exposure.

2.2. Concept-Based Instruction for Vocabulary Learning

Concept-Based Instruction employs explicit metalinguistic frameworks to render abstract linguistic patterns concrete and systematic (Negueruela, 2003). Rather than treating vocabulary as isolated items requiring rote memorization, CBI organizes lexical knowledge through principled categorization reflecting semantic relationships (e.g., research-related actions: conduct research, carry out analysis), functional purposes across rhetorical sections (e.g., methodology: collect data, administer tests; results: present findings, report outcomes), and register constraints distinguishing formal academic from informal conversational usage (Lantolf & Thorne, 2006). CBI techniques involve:

(1) Visual strategies, informed by Paivio's (1990) Dual Coding Theory, which posits that information encoded through both verbal and visual channels forms complementary memory representations, thereby enhancing retention and retrieval;

(2) Verbalization grounded in Swain's (2006) Output Hypothesis, which emphasizes the role of learner output in facilitating the noticing of form–meaning gaps, hypothesis testing, and metalinguistic reflection;

(3) Contextual clues, based on usage-based learning (N. Ellis, 2002; Tomasello, 2003), which highlight the importance of frequency, salience, and meaningful exposure in authentic communicative contexts; and

(4) Concept mapping, informed by Sociocultural Theory (Lantolf & Thorne, 2006), which conceptualizes learning as mediated through cultural tools that externalize and organize conceptual knowledge. Visual concept mapping externalizes organizational structures, reducing working memory demands while providing stable external representations that learners can reference and progressively internalize (Van Compernolle, 2014).

Empirical investigations demonstrate CBI effectiveness in various linguistic domains. Negueruela (2003) documented that concept-based instruction in the Spanish aspect produced superior outcomes compared to traditional grammar teaching, with learners developing a more systematic understanding, enabling flexible deployment across diverse contexts. Van Compernolle (2014) found that explicit sociopragmatic concepts enhanced French learners' register-appropriate language use through dialogic scaffolding, connecting forms to conceptual meanings, with sustained effects at delayed post-tests.

For academic collocations specifically, CBI offers potential advantages by organizing conventionalized combinations through conceptual frameworks that highlight functional patterns (e.g., grouping collocations by rhetorical purpose or semantic fields) rather than presenting them as arbitrary pairings requiring rote memorization. This systematic organization may help learners recognize underlying patterns and make principled choices during production. However, CBI applications to academic collocations remain relatively underexplored, with existing studies requiring further methodological development and larger sample sizes to establish robust evidence-based practices for this specific linguistic domain.

2.3. Task-Based Instruction and Meaningful Practice

Task-Based Instruction (TBI) emphasizes learning through meaningful communication where linguistic forms serve authentic purposes

rather than constituting isolated practice targets (Ellis, 2003; Long, 1996). Long's (1996) foundational work distinguished tasks or activities that require learners to use language communicatively to achieve non-linguistic outcomes from exercises and activities that focus on practicing specific linguistic forms. The fundamental TBI principle holds that language develops most effectively when learners focus on conveying meaning rather than practicing forms, with attention to linguistic features emerging naturally during communicative challenges when gaps between intended and actual expression become apparent.

Tasks create optimal conditions for acquisition through several interrelated mechanisms. Drawing on Long's Interaction Hypothesis (1996), meaning negotiation occurs when communication breaks down, prompting clarification requests and reformulations that make input comprehensible and salient. During such interactions, learners notice gaps when recognizing mismatches between their interlanguage and target language norms, test hypotheses by experimenting with forms during production attempts, and receive contextualized feedback embedded in authentic communication (Ellis, 2003). Complementing this interactionist perspective, Swain's Output Hypothesis (2006) emphasizes that producing language during meaningful tasks serves multiple functions beyond mere practice: noticing linguistic gaps when expression proves difficult, hypothesis testing about appropriate forms through production attempts, and metalinguistic reflection when discussing language with peers or responding to feedback.

Research has demonstrated the effectiveness of TBI across multiple linguistic domains. Meta-analytic evidence indicates that TBI yields overall moderate effects on L2 development, including measures related to fluency, complexity, and accuracy, although effect sizes vary across outcomes and instructional conditions (Plonsky & Kim, 2016). However, critics note that meaning-focused practice alone may prove insufficient for acquiring arbitrary form-meaning mappings lacking transparent semantic motivation (Laufer, 2005). This limitation proves particularly relevant for academic collocations, where conventional preferences (e.g., why "conduct" rather than "make" research?) resist discovery through communicative practice alone. Learners focused on message conveyance may successfully communicate despite non-conventional collocations, receiving insufficient negative feedback to notice errors. This suggests that TBI benefits from integration with explicit instruction, providing organizational frameworks that guide attention, reduce trial-and-error demands, and highlight conventionalized preferences that are invisible during meaning-focused communication.

2.4. Integrating Approaches: Theoretical Rationale and Empirical Evidence

The potential synergy between CBI and TBI reflects their complementary functions in addressing distinct dimensions of language acquisition. CBI establishes explicit declarative foundations through metalinguistic explanation, providing organized schemas that direct attention during subsequent exposure and practice. TBI enables proceduralization through repeated meaningful deployment in authentic contexts, transforming declarative knowledge into increasingly automatic productive competence. Neither approach alone optimally addresses both knowledge dimensions.

Ellis's (2003, 2015) Weak Interface Position provides further theoretical rationale for integrating explicit instruction with meaningful practice, proposing that explicit knowledge facilitates implicit learning when followed by extensive, meaningful practice in communicative contexts. Usage-based theory (N. Ellis, 2002; Tomasello, 2003) further emphasizes that robust automatic knowledge requires both frequent exposures, enabling statistical pattern extraction, and meaningful deployment wherein forms serve authentic communicative functions rather than appearing in decontextualized drills. This theoretical convergence suggests that optimal collocation instruction must combine explicit conceptual frameworks with numerous meaningful encounters across varied authentic contexts.

Recent investigations highlight the promise of instructional integration. Boers *et al.* (2014) demonstrated that explicit collocation instruction combined with opportunities for meaningful language use led to more durable learning effects than isolated approaches, with advantages maintained at delayed post-tests. However, existing research examined integration at macro levels, entire courses, or semester-long interventions—without systematically investigating which CBI-derived techniques contribute most effectively within integrated frameworks. This leaves practitioners without evidence-based guidance regarding optimal resource allocation when time constraints prevent implementation of all possible techniques. Additionally, learner perceptions and experiential dimensions of integrated instruction remain underexplored, despite widespread recognition that learner agency, metacognitive awareness, preferences, and motivational orientations significantly influence learning outcomes and implementation success (Oxford, 2017). Understanding learner perspectives is critical because learners are active agents whose interpretations shape how interventions function; their input can reveal implementation challenges invisible to researchers; and divergent perceptions may explain within-group variability in outcomes. The present study addresses these critical gaps by systematically comparing four theoretically grounded CBI techniques within an integrated TBI-CBI framework. This systematic comparison enables evidence-based recommendations for prioritizing techniques in resource-constrained contexts, while examining learner perceptions to understand the experiential dimensions that may influence learning outcomes in integrated instructional frameworks.

3. Methodology

3.1. Research Design

This study employed a convergent parallel mixed-methods design (Creswell & Plano Clark, 2017) integrating a within-subject repeated-measures sequential intervention design (Field, 2018) with qualitative exploration. Unlike between-subjects designs, where different participant groups receive different treatments, introducing uncontrolled variance from individual differences in proficiency, motivation, and learning style, the within-subject design required all participants to experience each of the four CBI-derived techniques sequentially, serving as their own controls. This approach eliminates between-group variance attributable to stable individual characteristics, substantially increasing statistical power and ensuring that observed phase-specific gains reflect instructional conditions rather than pre-existing participant differences. Quantitative findings were complemented by semi-structured interviews with ten purposively selected participants, enabling examination of both learning outcomes and experiential dimensions of the integrated intervention.

3.2. Participants

Participants were 73 third-year English majors from a public university in Vietnam's Mekong Delta, aged 20–21, with upper-intermediate proficiency (equivalent to CEFR B2). Third-year students represented an ideal population, as they had developed sufficient proficiency to engage with academic language features but lacked explicit instruction in collocations, placing them at a critical developmental juncture (Gyllstad, 2007). Following the intervention, ten participants stratified by ACT pre-test quartiles were recruited for semi-structured interviews. All provided informed consent followed institution-approved protocols.

3.3. Instructional Intervention

The integrated TBI-CBI intervention comprised eight 50-minute sessions delivered over ten weeks (one session per week during Weeks 2–9), with each technique receiving two consecutive weekly sessions and ten target collocations (40 total). Target collocations were selected from Durrant's (2009) Academic Collocation List and Gardner and Davies's (2014) Academic Vocabulary List, balanced across eight functional categories aligned with a research paper structure.

Four CBI-Derived Techniques:

- **Weeks 2–3: Concept Mapping**. Collaborative construction of visual networks organizing collocations by semantic relationships, grammatical patterns, and discourse functions (Novak, 2010)
- **Weeks 4–5: Verbalization Games**. Structured communicative activities ("Lucky Wheels," "Lucky Boxes") requiring explicit articulation of collocation knowledge (Swain, 2013)
- **Weeks 6–7: Contextual Clues**. Systematic training in inferring collocational patterns from authentic academic texts through identifying semantic prosody, grammatical structures, and writing conventions (Nation, 2001)
- **Weeks 8–9: Visual Strategies**. Creating visual mnemonics and multimedia representations to enhance retention through dual coding (Paivio, 2014)

All sessions followed a consistent five-phase cycle: Introduction (5 minutes), Explicit Instruction with conceptual presentation (10 min), Guided Practice with conceptually organized exercises (10 min), Task Performance in authentic academic writing contexts (20 min), and Reflection on conceptual understanding (5 min).

3.4. Instruments

The 40-item Academic Collocation Test (ACT), adapted from My and Loi (2025), measured controlled productive collocational knowledge via constrained production with initial-letter cues, comprising 20 lexical and 20 grammatical collocations across eight functional categories. The 40 assessed collocations were identical to those taught during instruction, ten per technique, selected from Durrant's (2009) Academic Collocation List and Gardner and Davies's (2014) Academic Vocabulary List. This criterion-referenced design intentionally measured learning of targeted collocations consistent with vocabulary intervention research (Nation, 2001; Webb & Nation, 2017), with teaching-test alignment acknowledged as an inherent feature rather than a confound; transfer to untaught items requires future investigation. This represents an important scope limitation: the ACT and VKSACT primarily demonstrate item-specific acquisition within a carefully scaffolded instructional context. Future studies incorporating freer writing tasks (e.g., paragraph composition using target collocations in novel prompts) or corpus-based production measures would provide stronger evidence of genuine productive transfer beyond the instructional context. Parallel pre-test and post-test forms used equivalent item distributions across collocation types and functional categories with different item arrangements to minimize ordering effects. Constrained production items were scored dichotomously (1 = correct, 0 = incorrect/absent) by two independent raters blind to participant identity (inter-rater agreement > 94%, Cohen's κ = .93), with discrepancies resolved by consensus. Internal consistency was high across all forms (α = .846–.896).

Vocabulary Knowledge Scale – Academic Collocation Test (VKSACT). Four parallel 10-item forms assessed knowledge depth using Paribakht and Wesche's (1996) five-level scale (1 = no familiarity to 5 = confident productive use), administered in staggered pre-post cycles (Weeks 2–3, 4–5, 6–7, 8–9) with equivalent item difficulty and unique collocations per phase to minimize practice effects. Self-reported levels were verified against demonstrated performance. Reliability ranged from α = .869 to .917. However, familiarity with the VKS response format across four administrations represents a potential practice effect that cannot be fully eliminated in repeated-measures designs.

Semi-structured interviews. Post-intervention 25–35-minute interviews explored: (1) beliefs about collocation importance, (2) technique effectiveness and preferences with rationales, (3) technique-specific challenges, and (4) metacognitive awareness of learning processes. Protocols employed open-ended prompts with visual materials to aid recall and randomized technique discussion order, preventing bias.

3.5. Data Collection

Data collection occurred over 12 weeks following a systematic sequence:

Week 1: ACT pre-test administration and VKSACT-1 pre-instruction survey

Weeks 2–3: Concept Mapping instruction (2 weeks)

End of Week 3: VKSACT-1 post-instruction survey and VKSACT-2 pre-instruction survey

Weeks 4–5: Verbalization Games instruction (2 weeks)

End of Week 5: VKSACT-2 post-instruction survey and VKSACT-3 pre-instruction survey

Weeks 6–7: Contextual Clues instruction (2 weeks)

End of Week 7: VKSACT-3 post-instruction survey and VKSACT-4 pre-instruction survey

Weeks 8–9: Visual Strategies instruction (2 weeks)

End of Week 9: VKSACT-4 post-instruction survey

Week 10: ACT post-test administration

Weeks 11–12: Semi-structured interviews with purposively selected participants

All assessments occurred under standardized conditions with bilingual instructions and consistent timing. Interviews were conducted in Vietnamese, audio-recorded with participant consent, transcribed verbatim by three independent transcribers, and forward-translated into English with back-translation verification to ensure accuracy.

3.6. Data Analysis

Repeated-measures ANOVA examined overall pre-post changes with partial η^2 as effect size indicators. Paired-samples t tests with Bonferroni correction (adjusted $\alpha = .0125$) examined phase-specific gains, with 95% CIs reported throughout. Given the ordinal nature of VKSACT scores, Wilcoxon signed-rank tests examined knowledge depth progression for each instructional phase, with effect size $r = Z/\sqrt{N}$ reported following Cohen's (1988) benchmarks. A Friedman test then examined rank-ordered phase differences given confirmed ceiling effects in post-test distributions (Mdn = 9.00/10 across all phases). A linear mixed-effects model with instructional phase as a fixed effect and participant as a random intercept (ICC = .305; Baayen *et al.*, 2008) complemented these analyses by accounting for individual baseline differences. Effect sizes followed Plonsky and Oswald's (2014) benchmarks. All p values are reported as $p < .001$ per APA 7th edition conventions. Post-hoc power analysis confirmed adequate power ($1-\beta = .99$; G*Power 3.1.9.7).

Interview transcripts underwent Braun and Clarke's (2006) six-phase thematic analysis. Independent coding of 30% of transcripts yielded strong inter-rater reliability ($\kappa = .89$). Analysis emphasized both convergence and divergence, with negative case analysis strengthening interpretations. Quantitative and qualitative strands were then integrated through iterative cross-examination, with convergence strengthening conclusions and divergence revealing a nuanced understanding.

3.7. Validity and Trustworthiness

Quantitative validity was established through standardized protocols, multiple measurement points, blind independent scoring, and strong construct validity (ACT-VKSACT convergence: $r = .62–.78$). Qualitative trustworthiness (Lincoln & Guba, 1985) was ensured through prolonged engagement, triangulation, member checking, peer debriefing, and negative case analysis. Also, researcher bias from the dual instructor-investigator role was mitigated through objective instruments, independent scoring, neutral protocols, independent coding ($\kappa = .89$), and external monitoring.

4. Results

Seventy-three third-year English majors participated in eight sessions over ten weeks, experiencing each of four CBI techniques sequentially as their own controls. The ACT measured controlled productive knowledge, the VKSACT assessed knowledge depth, and post-intervention interviews with ten participants provided qualitative insights.

4.1. Overall Academic Collocation Performance

The ACT assessed grammatical collocations (maximum 20 points) and lexical collocations (maximum 20 points), yielding a total score

Table 1. Overall ACT Performance: Pre-test to Post-test Gains (n = 73)

Measure	Pre-test M (SD)	Post-test M (SD)	Mean Gain	95% CI	t value	*df*	p value	Cohen's d
Total Score	7.03 (5.20)	33.64 (6.33)	26.61	[25.38, 27.85]	-43.006	72	< .001	4.59
Grammatical Collocations	4.01 (3.29)	16.42 (3.51)	12.41	[11.73, 13.09]	-36.204	72	< .001	3.65
Lexical Collocations	3.01 (2.34)	17.22 (3.19)	14.21	[13.47, 14.94]	-38.598	72	< .001	5.08

Note. *Maximum scores: Total = 40 points; Grammatical = 20 points; Lexical = 20 points. 95% CI = confidence interval for mean gain.*

of 40 points. Table 1 presents comprehensive performance results.

Prior to intervention, participants demonstrated limited baseline collocational knowledge (total M = 7.03, SD = 5.20, 17.6% of maximum), indicating that the majority of target collocations were unfamiliar at the outset. Grammatical collocations (M = 4.01, SD = 3.29, 20%) showed marginally higher baseline performance than lexical collocations (M = 3.01, SD = 2.34, 15%), suggesting slightly greater prior familiarity with grammatical patterns such as verb-preposition combinations.

Following the intervention, all measures showed substantial improvements. Total scores reached M = 33.64 (SD = 6.33), representing 84% achievement and a mean gain of 26.61 points — indicating that participants progressed from minimal familiarity to near-mastery of target collocations. Grammatical collocations improved to M = 16.42 (SD = 3.51, 82% achievement, gain = 12.41 points) and lexical collocations to M = 17.22 (SD = 3.19, 86% achievement, gain = 14.21 points). Lexical collocations demonstrated the largest absolute gain and highest post-intervention achievement, suggesting they may be more amenable to the instructional approaches employed, although lower baseline scores may have contributed to this pattern.

Paired-samples t tests confirmed highly significant improvements with exceptionally large effect sizes across all measures (all p < .001, Cohen's d = 3.65–5.08), indicating that the magnitude of learning gains was statistically significant. Repeated-measures ANOVA confirmed robust time effects: total score (F(1, 72) = 1849.50, p < .001, partial η^2 = .963), grammatical collocations (F(1, 72) = 1310.72, p < .001, partial η^2 = .948), and lexical collocations (F(1, 72) = 1489.83, p < .001, partial η^2 = .954), indicating the intervention accounted for 94.8–96.3% of variance in performance changes — a finding reflecting the comprehensive impact of the integrated instructional program on both collocation types. The large F values reflect minimal error variance consistent with substantial floor-to-ceiling gains, verified against original SPSS output. Together, these findings provide evidence that the ten-week integrated intervention produced substantial and consistent gains in both grammatical and lexical collocational knowledge.

4.2. Comparative Effectiveness of Individual CBI Techniques

To address RQ1, each technique was assessed using ten ACT items (maximum score = 10), enabling measurement of phase-specific gains. Given the fixed sequential implementation, the following results reflect each technique's contribution within its designated instructional phase rather than isolated technique effectiveness independent of order, cumulative exposure, or maturation effects.

Baseline performance differed across techniques: contextual clues showed the highest pre-test scores (M = 2.26, SD = 1.75), followed by concept mapping (M = 1.93, SD = 1.83), visual strategies (M = 1.52, SD = 1.58), and verbalization games (M = 1.32, SD = 1.30). Post-

intervention, all techniques converged to similar post-test means: concept mapping (M = 8.26, SD = 2.22), verbalization games (M = 8.49, SD = 1.94), contextual clues (M = 8.38, SD = 1.76), and visual strategies (M = 8.51, SD = 1.51). Table 2 presents the full comparative data for each technique.

Phase-wise analysis revealed substantial gains within each instructional phase, with effect sizes ranging from d = 3.11 to d = 4.52. However, direct comparison warrants caution, as the fixed sequential implementation means phase-specific gains are potentially influenced by order effects, cumulative exposure, learner maturation, and repeated testing familiarity. These findings are therefore best interpreted as evidence that each technique contributed meaningfully within its designated phase rather than as a definitive comparative ranking. Visual strategies (Phase 4) achieved the highest post-test mean (M = 8.51, d = 4.52) with the lowest variability (SD = 1.51). Verbalization games (Phase 2) exhibited the most dramatic absolute gain (7.18 points, 544%), advancing from the lowest baseline to the second-highest post-test mean (d = 4.34). Contextual clues (Phase 3) maintained strong performance (M = 8.38, d = 3.49), with lower improvement (271%) reflecting its higher pre-test baseline rather than reduced efficacy. Concept mapping (Phase 1) demonstrated significant gains (d = 3.11, 328%) with greater variability (SD = 2.22), suggesting learner-dependent responses.

Confirmed ceiling effects (Mdn = 9.00/10 across all phases; Mean + SD ≈ 40) limited instrument sensitivity at higher proficiency levels. These effects particularly attenuated gains for contextual clues, which began from the highest pre-test baseline (M = 2.26), reducing floor-to-ceiling movement regardless of technique efficacy. To examine phase differences from complementary analytical perspectives, both a Friedman test and a linear mixed-effects model were employed, each addressing a distinct analytical question. The Friedman test, which compares rank-ordered post-test performance directly, confirmed no significant differences across phases ($\chi^2(3) = 1.709$, $p = .635$, Mean Ranks = 2.40–2.64), indicating that all techniques achieved statistically equivalent post-test levels — a finding consistent with confirmed ceiling effects that compress score distributions toward the maximum. The linear mixed-effects model addressed a different question: whether gain trajectories differed across phases after controlling for individual baseline differences (ICC = .305). This model revealed a significant overall phase effect ($F(3, 216) = 7.405$, $p < .001$), with verbalization games above the grand mean ($\beta = 0.524$, $p = .001$) and visual strategies marginally above ($\beta = 0.332$), while concept mapping ($\beta = -0.325$, $p = .045$) and contextual clues ($\beta = -0.531$, $p = .001$) fell below it. These gain differences are largely attributable to baseline variation — techniques beginning from

Table 2. Comparative Effectiveness of CBI Techniques on the ACT: Learning Gains and Statistical Significance (n = 73)

Technique	Pre-test M (SD)	Post-test M (SD)	Mean Gain	95% CI	% Improvement	t value	Cohen's d
Concept mapping	1.93 (1.83)	8.26 (2.22)	6.33	[5.84, 6.82]	328%	-25.971	3.11
Verbalization games	1.32 (1.30)	8.49 (1.94)	7.18	[6.73, 7.63]	544%	-31.867	4.34
Contextual clues	2.26 (1.75)	8.38 (1.76)	6.12	[5.69, 6.55]	271%	-28.782	3.49
Visual strategies	1.52 (1.58)	8.51 (1.51)	6.99	[6.56, 7.42]	460%	-33.041	4.52

Note. *Maximum = 10. All $p < .001$ following Bonferroni correction ($\alpha = .0125$). Techniques listed in implementation order.*

lower pre-test scores had greater floor-to-ceiling movement — rather than differential technique efficacy. Critically, the two analyses are therefore complementary rather than contradictory: the mixed-effects model captures differential gain trajectories from heterogeneous baselines, while the Friedman test confirms endpoint equivalence under ceiling conditions. Together, they support the interpretation that the integrated model as a whole, rather than any single technique, constitutes the primary driver of collocation gains.

4.3. Depth of Knowledge Development

The VKSACT assessed knowledge depth using a five-level scale: (1) unfamiliar, (2) recognize but unsure of meaning, (3) understand but cannot use, (4) understand and can use with confidence, (5) can use naturally in academic writing. Table 3 summarizes knowledge depth progression across all four phases.

Before intervention, participants demonstrated limited knowledge (overall $M = 1.84$, $SD = 0.33$), predominantly at levels 1–2. Post-intervention, all phases demonstrated substantial knowledge depth gains. Visual strategies (Phase 4) achieved $M = 4.82$ ($SD = 0.19$, improvement = 3.27 points), contextual clues (Phase 3) $M = 4.80$ ($SD = 0.22$, improvement = 3.22 points), verbalization games (Phase 2) $M = 4.73$ ($SD = 0.28$, improvement = 2.90 points), and concept mapping (Phase 1) $M = 4.77$ ($SD = 0.37$, improvement = 2.39 points), indicating progression to levels 4–5, demonstrating productive use capability.

Posttest standard deviations decreased substantially across all phases, with visual strategies and contextual clues showing the lowest variability ($SD = 0.19$ and 0.22), indicating the most consistent knowledge development. All participants achieved minimum level 3 (meaningful understanding), with most reaching levels 4–5, representing a fundamental qualitative shift from recognition to productive use.

The concentration of post-test VKSACT scores at levels 4–5 ($M = 4.73$–4.82 out of 5) suggests potential ceiling effects in knowledge depth measurement. While this convergence demonstrates that all participants achieved productive competence, the five-level scale may have insufficient resolution to capture finer-grained distinctions in advanced collocational knowledge. A more granular instrument or additional productive writing measures would provide stronger evidence of knowledge depth differentiation at higher levels.

Wilcoxon signed-rank tests confirmed significant knowledge depth progression across all four instructional phases, with all 73 participants demonstrating improvement (0 negative ranks across all phases): concept mapping ($Z = -7.428$, $p < .001$, $r = .869$), verbalization games ($Z = -7.432$, $p < .001$, $r = .870$), contextual clues ($Z = -7.431$, $p < .001$, $r = .870$), and visual strategies ($Z = -7.430$, $p < .001$, $r = .870$). Effect sizes were uniformly large ($r = .869$–$.870$), confirming systematic advancement from recognition-level familiarity (levels 1–2) to confident productive use (levels 4–5) across all

Table 3. Depth of Knowledge Development by the CBI Techniques: VKSACT progression (n = 73)

Technique	Pre-test M (SD)	Post-test M (SD)	Mean Gain	Pre-test Range	Post-test Range
Concept mapping	2.38 (0.63)	4.77 (0.37)	2.39	1.00–4.00	3.00–5.00
Verbalization games	1.83 (0.42)	4.73 (0.28)	2.90	1.10–3.20	3.30–5.00
Contextual clues	1.58 (0.36)	4.80 (0.22)	3.22	1.00–2.30	4.00–5.00
Visual strategies	1.55 (0.42)	4.82 (0.19)	3.27	1.00–2.70	4.30–5.00
OVERALL	1.84 (0.33)	4.78 (0.20)	2.94	1.18–2.73	4.13–5.00

Note. *VKSACT Scale: 1 = unfamiliar; 2 = recognize but unsure of meaning; 3 = understand but cannot use; 4 = understand and can use with confidence; 5 = can use naturally in academic writing.*

phases. The near-identical Z-values and effect sizes across phases corroborate the convergence of post-test VKSACT means (4.73–4.82), indicating that all four techniques equivalently supported knowledge depth progression within the sequential integrated model.

4.4. Learner Perceptions of TBI-CBI Integration

4.4.1. Recognition of Collocation Significance

Universal consensus (10/10) emerged regarding the importance of collocation for academic writing success. Participants recognized that appropriate use enhanced fluency, coherence, and register appropriateness: "Using collocations has made it easier for me to write academic essays" and "Tasks help me learn English more practically, rather than just theory," indicating valued functional competence development.

4.4.2. Technique Preferences

Preferences varied considerably, however. Contextual clues was most preferred (5/10), followed by concept mapping and verbalization games (2/10 each), and visual strategies (1/10). However, concept mapping received polarized responses, being most frequently the least preferred (4/10), possibly due to cognitive demands. Visual strategies received negative evaluations (3/10), while verbalization games showed the most consistent positive reception (only 1/10 least preferred). These divergent preferences underscore that while all techniques proved statistically effective, individual learners experienced them differently, highlighting the integrated approach's function in accommodating diverse learning styles.

4.4.3. Learning Challenges and Solutions

Despite general acceptance, participants identified challenges: cognitive overload from extensive vocabulary (2/10), limited application time (2/10), retention difficulties (2/10), and reduced motivation with long-term assignments (2/10). Only one participant reported no difficulties. Table 4 presents these challenges and learner-proposed solutions.

Most frequent recommendations included progressive difficulty adjustment (3/10): "I suggest providing more varied exercises and gradually increasing difficulty," and practical exercises (3/10): "Practical activities like discussions help link knowledge." Divergent perspectives emerged regarding domain-specificity versus general application, optimal challenge levels, and collaborative versus individual learning preferences.

In summary, Vietnamese EFL learners broadly valued TBI-CBI integration, though experiences varied by cognitive style, proficiency, and motivation. Divergent preferences underscore the need for differentiated instruction, while learners' recommendations — emphasizing scaffolding, authentic practice, and balanced form-meaning attention — align with research principles and should inform ongoing refinement. Qualitative findings complement quantitative results by revealing how individual learners experience techniques within their developmental trajectories.

5. Discussion

This study investigated the contribution

Table 4. Learning Challenges and Learner-proposed Solutions (n = 10)

Challenge	n	Proposed Solution	n
Large collocation inventory is overwhelming	2	Adjust exercise difficulty progressively	3
Limited application time in writing	2	Incorporate more practical exercises	3
Difficulty remembering/differentiating	2	Provide extended practice time	2
Pressure from long-term assignments	2	Offer flexible learning materials	2
Confusion between similar collocations	1	Reduce vocabulary load	1
No significant difficulty	1	Combine individual/group formats	1

Note. *Participants could report multiple challenges and propose multiple solutions.*

of four concept-based instructional (CBI) techniques within an integrated task-based framework for enhancing Vietnamese EFL learners' academic collocation knowledge and controlled productive ability. The findings provide compelling evidence that each technique contributes significantly to collocation learning, albeit through distinct cognitive pathways and with differential effectiveness profiles.

5.1. Differential Effectiveness of CBI Techniques: Theoretical Implications

Phase-wise effect sizes ranged from d = 3.11 (concept mapping, Weeks 2–3) to d = 4.52 (visual strategies, Weeks 8–9). While these differences may partially reflect genuine variation in technique effectiveness, they must be interpreted cautiously, given the fixed sequential design. Order effects, cumulative exposure across 40 target collocations, learner maturation, and repeated testing familiarity likely contributed to the larger gains observed in later phases. With this important caveat, the theoretical mechanisms potentially underlying each phase's contribution are discussed below.

Visual strategies demonstrated the highest phase-specific gain within this sequential design, a pattern consistent with dual coding theory (Paivio, 1990), whereby dual-channel encoding may enhance retention and retrieval. However, given the cumulative instructional context, this gain likely reflects not only the visual technique itself but also prior learning, increased familiarity, and repeated testing effects accumulated across phases. The highest post-test achievement (M = 8.51), largest phase-specific effect size, and lowest variability (SD = 1.51) suggest that visual representations provided effective scaffolding for collocational form-meaning connections within this phase, although this result should not be interpreted as evidence of its inherent superiority over other techniques when delivered in isolation.

Verbalization games' remarkable 544% improvement, despite starting from the lowest baseline, the role of verbalization in concept development. The game-based metalinguistic activities (Lantolf & Thorre, 2026) created optimal conditions for noticing (Schmidt, 2001), metalinguistic awareness development, and transformation of implicit knowledge into explicit, accessible representations — consistent with its above-grand-mean mixed-effects estimate ($\beta = 0.524$), indicating strong gain trajectories even after controlling for individual baseline differences.

Contextual clues' effectiveness, characterized by the highest pre-test scores (M = 2.26) and strong consolidation effects (d = 3.49), aligns with usage-based theories (N. Ellis, 2002; Tomasello, 2003). Its below-grand-mean mixed-effects estimate ($\beta = -0.531$) reflects limited floor-to-ceiling movement from a higher baseline rather than reduced technique efficacy, consistent with the ceiling effect observed at post-test.

Concept mapping's significant but more variable effectiveness (d = 3.11, SD = 2.22) illuminates individual differences in spatial-visual reasoning. The wider score range suggests cognitive demands may exceed some learners' working memory capacity (Sweller, 2011) or conflict with preferred cognitive styles, underscoring the importance of multiple pathways to collocational competence.

5.2. Synergistic Effects of Integrated TBI-CBI Instruction

The convergence of post-test means (8.26–8.51) despite substantial baseline differences (1.32–2.26) suggests the integrated TBI-CBI approach creates synergistic learning where complementary techniques compensate for individual differences. The overall effect size (d = 4.59) far exceeds typical vocabulary intervention studies, indicating that TBI-CBI integration produces effects greater than either approach independently. The complementary pattern between mixed-effects and Friedman findings further illuminates this synergy: techniques differed in gain trajectories after controlling for baseline differences (mixed-effects: $F(3, 216) = 7.405$, $p < .001$) yet converged to equivalent post-test endpoints (Friedman: $p = .635$) — complementary rather than contradictory findings reflecting two distinct analytical questions — suggesting the integrated model functions as a

self-compensating system ensuring universal attainment regardless of starting point (Ellis, 2015).

The exceptionally large effect sizes (d = 3.11–5.08) require a cautious interpretation and should not be treated as directly generalizable to other instructional contexts. Three factors likely contributed to inflated magnitudes: (1) close alignment between instructional content and test items (criterion-referenced design) directly amplifies measured gains; (2) the constrained production format with initial-letter cues does not reflect spontaneous language use and may overestimate genuine productive competence; and (3) low baseline scores created floor-to-ceiling movement that mathematically inflates effect size calculations. These results are therefore best interpreted as evidence of strong learning within the instructional context, rather than as effect sizes directly comparable to those from transfer-oriented or naturalistic production measures.

The VKSACT progression from levels 1–2 (M = 1.84) to levels 4–5 (M = 4.78), alongside decreased post-test variability (SD = 0.20 vs. 0.33), confirms that multiple technique exposure benefits all learners regardless of proficiency or learning style, although transfer to authentic writing remains to be established (Anderson, 1982).

5.3. Learner Agency

Participants' shared recognition of the importance of academic collocations, together with their differentiated preferences and pedagogically informed suggestions, reflects active learner engagement rather than passive reception of instruction. Divergent views regarding domain-specificity, perceived difficulty, and collaborative learning further indicate that learners interpret instructional approaches, considering their individual goals, experiences, and epistemological beliefs (Mercer, 2011; Oxford, 2017).

Notably, learner preferences did not consistently align with quantitative outcomes: visual strategies yielded the highest phase-specific gain yet ranked among the least preferred techniques. This divergence is theoretically significant and merits deeper examination. One explanation is that visual strategy activities involving diagram creation and dual-channel encoding imposed greater cognitive demand, leading learners to perceive them as less enjoyable or intuitive despite producing stronger measurable outcomes. This pattern aligns with the desirable difficulties framework (Bjork & Bjork, 2011), which posits that cognitively demanding tasks often yield effective learning even when learners do not subjectively recognize their benefit. Future mixed-methods research could explore this perception–performance gap more systematically. The finding underscores the need for explicit metacognitive monitoring development (Flavell, 1979; Schraw & Dennison, 1994; Wenden, 1998) so that learners can better calibrate their judgements of technique effectiveness against actual learning outcomes.

The challenges reported—cognitive overload, limited opportunities for application, retention difficulties, and motivational constraints—reflect common tensions in intensive academic vocabulary learning. Learners' proposed solutions, including progressive scaffolding, extended practice, and flexible materials, demonstrate an emerging capacity for reflective evaluation of learning conditions, consistent with perspectives on learner autonomy and self-regulated learning (Holec, 1981; Little, 2007; Zimmerman, 2002).

5.4. Theoretical Mechanisms: Noticing and Weak Interface

Schmidt's (2001) Noticing Hypothesis provides substantial theoretical support for the integrated model's effectiveness. Concept-based instruction explicitly directed learners' attentional awareness toward form-meaning-function mappings through metalinguistic explanation, visual concept mapping, and contrastive analysis. These activities transformed collocations from background features into focal

targets receiving conscious attention. Task-based instruction alone maintained learners' attentional focus on message conveyance rather than linguistic form, explaining why task-based gains proved substantially smaller despite equivalent practice quantity.

Ellis's (2003, 2015) Weak Interface Position illuminates how enhanced noticing transforms into durable competence through explicit instruction followed by meaningful practice. Explicit frameworks enhanced noticing, hypothesis formation, error detection, and generalization — validated by VKSACT progression from recognition-level (Levels 2–3) to confident productive use (Level 5).

Usage-Based Theory (Tomasello, 2003; N. Ellis, 2002) illuminates how repeated meaningful encounters enabled pattern abstraction and entrenchment. Explicit conceptualization dramatically accelerated pattern abstraction by making the underlying patterns explicitly salient immediately. Task-based practice provided repeated meaningful encounters necessary for entrenchment across eight weeks of authentic communicative activities.

5.5. Cognitive Load Theory and Equity Implications

Sweller's (2011) Cognitive Load Theory distinguishes three types of mental effort: intrinsic load (inherent task complexity), extraneous load (poor instructional design), and germane load (productive learning effort). The integrated model reduced extraneous load through explicit metalinguistic explanation, visual concept maps, systematic categorization, and explicit contrastive analysis. Simultaneously, integration optimized germane load through activities requiring productive schema construction.

Integration's equity-enhancing effects — reflected in lower post-test variability (SD = 1.51–2.22), elimination of below-threshold performers, and universal gains — stem from reduced extraneous load that made learning accessible regardless of individual cognitive capacity, unlike task-based practice alone which disproportionately disadvantaged struggling learners.

5.6. Pedagogical Implications

These findings suggest optimal instruction should incorporate multiple complementary approaches rather than relying on a single method. Visual strategies and verbalization games warrant particular emphasis given robust effectiveness, while contextual clues and concept mapping provide valuable alternatives for learners struggling with visual-verbal approaches.

The progression from recognition to controlled productive use documented in VKSACT results suggests collocation instruction must move beyond exposure to provide structured opportunities for meaningful output and strategic practice. The integration of form-focused CBI techniques with meaning-focused TBI activities creates optimal conditions for this progression.

The finding that lexical collocations showed larger gains than grammatical collocations (14.21 vs. 12.41 points) suggests that different collocation types may benefit from different instructional emphases, warranting further investigation into whether particular techniques are optimally suited to certain collocation types.

5.7. Limitations

Several limitations warrant consideration. First, the fixed sequential implementation without counterbalancing confounds phase-specific gains with order effects, cumulative exposure, learner maturation, and repeated assessment familiarity. This means observed effect size differences cannot be confidently attributed to differential technique effectiveness. While the mixed-effects model partially addressed individual baseline differences (ICC = .305), sequential order confounds remain a structural limitation that statistical modelling cannot fully resolve. Findings are therefore best interpreted as evidence for the overall sequential integrated model. Future research should employ counterbalanced or dismantling designs with independent groups to isolate individual technique contributions.

Second, the criterion-referenced design, constrained production format, and low baseline scores likely inflated effect sizes (d = 3.11–5.08). Ceiling effects were confirmed by uniform post-test medians (Mdn = 9.00/10) and Mean +

SD approaching maximum (39.97 ≈ 40), with the non-significant Friedman test ($p = .635$) confirming endpoint equivalence, and mixed-effects gain differences ($F(3, 216) = 7.405$, $p < .001$) attributable to baseline variation rather than technique-specific effectiveness — both indicating insufficient instrument sensitivity to discriminate technique effectiveness under ceiling conditions. More discriminating instruments and unconstrained writing assessments are, therefore, recommended.

Finally, the ten-week intervention addresses neither long-term retention nor transfer to naturalistic writing contexts. Longitudinal designs with delayed post-tests and authentic writing corpus analyses are further recommended for future investigation.

5.8. Conclusions

This study provides evidence that integrating concept-based and task-based activities substantially enhances Vietnamese EFL learners' academic collocation knowledge and controlled productive ability. All four techniques, visual strategies, verbalization games, contextual clues, and concept mapping, produced significant gains with exceptional effect sizes and qualitative transformation from recognition to productive knowledge. Visual strategies, implemented in the final phase, produced the largest effect size and greatest consistency. However, this should be interpreted within the sequential model context where cumulative learning, maturation, and practice effects may have contributed to later-phase advantages. Crucially, the convergence of post-test achievement despite baseline differences suggests that integration itself, providing multiple complementary cognitive pathways, constitutes the most significant pedagogical innovation.

Vietnamese learners' divergent preferences underscore that effective instruction must balance evidence-based technique selection with responsive adaptation to individual needs. Practitioners are recommended to adopt an integrated approach emphasizing visual strategies and verbalization games, with contextual clues and concept mapping as alternatives, to address both declarative knowledge and procedural fluency.

The theoretical contribution of the study lies in demonstrating that vocabulary acquisition perspectives emphasizing dual coding (Paivio, 1990), output (Swain, 2006), noticing (Schmidt, 2001), usage-based learning (N. Ellis, 2002; Tomasello, 2003), and cognitive load management (Sweller, 2011) are not competing but complementary, productively integrated within coherent frameworks. The synergistic effects suggest that optimal instruction leverages multiple cognitive mechanisms simultaneously.

Ultimately, this study advances knowledge of how concept-based and task-based approaches integrate to address academic collocation learning in EFL contexts. When theoretically informed techniques are systematically implemented within meaning-focused frameworks, and learner agency and diversity are respected, substantial transformative outcomes become achievable. Developing EFL learners' collocational knowledge of academic registers represents an important pedagogical goal with broader implications for educational equity and access to global knowledge communities, although authentic writing competence ultimately requires sustained exposure and practice beyond controlled instructional contexts. Future research that addresses the limitations of this study is encouraged to advance understanding of instructed second language acquisition within EFL settings.

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