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Exploring the Relationships between Cognitive Presence and Meaningful Learning Outcomes among Undergraduate EFL Students in Blended Learning

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Abstract

This study explored the impact of a cognitive presence (CP)-aligned blended community of inquiry (BCoI) intervention on undergraduate English as a foreign language (EFL) students' meaningful learning outcomes (MLOs, operationalized as English proficiency via items adapted from the College English Test Band 4, a national English proficiency test in China) and the relationship between CP and MLOs. Using a single-group pretest-posttest design with 37 participants, MLOs were measured before and after a 11-week intervention, with CP assessed post-intervention. Analyses included paired-samples t-tests (with effect sizes) and Spearman's rank-order correlations. Post-intervention MLOs (M= 40.79, 95% CI [37.08, 44.30]) significantly exceeded pre-intervention scores (M=31.85, 95% CI [28.11, 35.41]), with a large effect (Cohen's d = 1.004). Total CP correlated moderately with post-intervention MLOs (r_s = 0.361, p = .028), with resolution (CP4: r_s = 0.379, p = 0.021) showing the most prominent association, followed by exploration (CP2: r_s = 0.338, p = 0.041) and integration (CP3: r_s = 0.325, p = 0.050); triggering (CP1) was non-significant (r_s = 0.261, p = 0.118). Findings suggest phase-aligned BCoI interventions may enhance EFL meaningful learning outcomes, with later CP phases (e.g., resolution) potentially playing key roles, though the single-group design limits causal inference. These offer implications for practical blended learning design in EFL contexts.

Keywords: Cognitive Presence, Meaningful Learning Outcomes, English Proficiency, Blended Community of Inquiry, EFL Instruction

Introduction

Meaningful learning (ML)—grounded in theories of deep cognitive processing—refers to the active integration of new knowledge with existing schemas, enabling learners to understand, retain, and apply information beyond rote recall (Shuell, 1990; Mayer, 2002). Distinct from rote learning which focuses on memorization or task-specific performance, ML is characterized by integration (i.e., connecting new and prior knowledge), transferability (i.e., applying learning to novel contexts), and durability (i.e., retaining understanding over time)(Ausubel, 1968; Ausubel, 1977). In English as a Foreign Language (EFL) education, this translates to meaningful learning outcomes (MLOs)—tangible indicators of such deep integration, such as the ability to flexibly use linguistic structures in authentic communication, synthesize information across texts, or resolve context-specific language dilemmas (Gilakjani, 2012; Phu, 2019). Fostering MLOs remains a critical goal, yet traditional EFL instruction often prioritizes discrete skill drills or exam preparation, limiting opportunities for the meaningful cognitive engagement required to achieve them (Jeon, 2022; Cheng, 2022; Sitthitikul, 2020; Vargas-Hernández & Vargas-González, 2022).

This gap between the goal of meaningful learning and the reality of instructional practice is particularly problematic in an era where undergraduate students are expected to use English as a tool for global communication and problem-solving, not merely to pass examinations. To address the challenge of fostering MLOs, scholars have turned to frameworks that model collaborative, inquiry-driven learning environments. The Community of Inquiry (CoI) framework, for instance, posits that meaningful learning emerges from the dynamic interplay of three core elements: teaching presence, social presence, and cognitive presence(Garrison et al., 2000). Together, these presences create a supportive learning environment where learners move beyond passive reception to active knowledge building (Cleveland-Innes, 2019).

Within this framework, cognitive presence (CP) is often regarded as the cornerstone of meaningful learning, as it directly describes the cognitive processes through which learners develop deep understanding(Akyol & Garrison, 2011). CP unfolds in four sequential phases: (1) triggering events aiming at identifying a problem or dilemma that sparks curiosity, (2) exploration focusing on gathering, sharing, and discussing relevant information to address the problem, (3) integration featuring synthesizing fragmented insights into a coherent understanding, and (4) resolution highlighting applying this understanding to solve the problem or test its validity (Garrison, 2017). This phased progression mirrors the cognitive steps inherent in ML—from initial engagement to purposeful application—making CP a natural scaffold for fostering MLOs. In EFL contexts, where language learning inherently involves navigating communication challenges and constructing meaning, structuring instruction around CP phases can systematically guide learners toward deeper, more transferable language proficiency.

The structured, phased nature of CP makes it well-suited to implementation in blended learning environments, which merge online and in-person instructional components. Blended learning's flexibility, combining asynchronous online platforms with synchronous in-person interactions(Garrison & Kanuka, 2004), allows for intentional alignment of activities with each CP phase: pre-class online modules can introduce triggering events and guide initial exploration, in-person sessions can deepen integration through collaborative discussion, and post-class digital reflections can support resolution by prompting application of new insights.

This alignment capitalizes on the strengths of both modalities: online spaces for self-paced inquiry and in-person settings for dynamic, social knowledge construction(Vaughan & Garrison, 2005).

Despite this theoretical synergy, empirical research examining the intersection of blended learning, CP phases, and EFL learners' MLOs remains limited (Martin et al., 2022; Maddrell et al., 2017; Rourke & Kanuka, 2009). Without such direct empirical evidence linking instructional design to objective measures of proficiency, educators and instructional designers are left with a compelling theory but insufficient guidance for practical application. This lack of evidence represents a critical barrier to implementing effective blended learning strategies at scale. Specifically, two critical gaps persist: first, whether a blended intervention explicitly designed to scaffold the full progression of CP (from triggering to resolution) actually enhances MLOs among undergraduate EFL students; second, which specific CP phases, when operationalized through blended activities, demonstrate the strongest associations with post-intervention MLOs. Addressing these questions is essential to translating the theoretical promise of CP-aligned blended instruction into actionable EFL pedagogical practices.

Given the theoretical potential of CP-aligned blended learning to foster meaningful learning in EFL contexts, coupled with the gaps in empirical evidence outlined above, the present study seeks to address these underexplored areas. Specifically, this research aims to investigate the potential impact of a purposefully designed blended intervention—structured to align with the sequential phases of cognitive presence—on undergraduate EFL students' meaningful learning outcomes, while also clarifying how different dimensions of cognitive presence relate to these outcomes. To achieve this purpose, the study addresses two core research questions:

RQ1: How do undergraduate EFL students' meaningful learning outcomes change after participating in a blended intervention designed to align with the phases of cognitive presence?

RQ2: What is the relationship between cognitive presence (including its four subdimensions: triggering events, exploration, integration, and resolution) and post-intervention meaningful learning outcomes among these students?

By addressing these questions, the study aims to clarify whether and how structured cognitive engagement within blended EFL contexts contributes to meaningful learning outcomes, providing targeted insights for instructional design. Consequently, this study holds practical significance for key stakeholders in EFL education. For instructors and instructional designers, it offers a potential model for structuring blended courses that promote deeper learning. For policy-makers and administrators, it provides empirical rationale for investing in professional development focused on pedagogical design rather than mere technology integration. And for students, it aims to create more engaging and effective learning experiences that lead to tangible improvements in language proficiency.

Methodology

Research Design

The present study employed a quasi-experimental pre-test and post-test design to explore the relationships between undergraduate EFL students' cognitive presence (CP) and meaningful learning outcomes (MLOs) in a blended learning context. Quasi-experimental

design was selected due to the inability to randomly assign participants to groups—all participants were enrolled in the same compulsory College English course, ensuring a naturalistic learning environment that enhanced ecological validity. The design included two key data collection points: an pre-test to measure baseline English proficiency administered at Week 6 before the intervention starts, and a post-test to assess MLOs and a Cognitive Presence Scale to measure students' perception of CP at Week 17 after the intervention This longitudinal structure allowed for the examination of associations between CP (measured post-intervention) and MLOs (assessed via post-test scores), with pre-test scores serving as contextual data to characterize participants' initial proficiency.

Research Setting and Participants

The study was situated in a compulsory College English course at a private university in Shaanxi Province, China. Participants were made up by an intact class of 37 first - year undergraduate students, all majoring in STEM - related disciplines. As detailed in Table 1. Participant Demographics (N=37), 28 (75.68%) were enrolled in Computer Science and Technology, 7 (18.91%) in Data Science and Big Data Technology, and 2 (5.41%) in Internet of Things.

Table 1
Participant Demographics (N=37)

Variable	Description
Gender	Male = 17 (45.95%); Female = 20 (54.05%)
Age (years)	M ± SD = 18.38 ± 0.59; Range = 18–20
Gaokao English	M ± SD = 112.08 ± 6.84 (Max = 150); Range = 105–134
Academic Major	Computer Science = 28 (75.68%); Data Science = 7 (18.91%); Internet of Things = 2 (5.41%)
Retention Rate	Final n = 37 (100%)

In terms of demographics, the class consisted of 17 males (45.95%) and 20 females (54.05%), with a mean age of 18.38 years (SD = 0.59, range 18–20). Their English proficiency, as indicated by China's nationwide standardized National College Entrance Examination (*Gaokao*) scores, was intermediate, with a mean score of 112.08 out of 150 (SD = 6.84, range 105–134). Complete data sets were obtained from all participants, resulting in a 100% retention rate, which ensured the integrity of the study sample for subsequent analyses. The selection of this class was strategic, as their STEM backgrounds and intermediate English proficiency aligned with the study's focus on exploring the BCoI approach within a typical EFL learning context for non - English - major undergraduates.

Intervention Design: Blended Community of Inquiry (BCoI) Approach

This study operationalizes a CP-aligned BCoI approach via a flipped classroom model over 11 weeks (Weeks 7–17). The design typically weaves pre-class asynchronous, in-class synchronous, and post-class asynchronous activities into a cohesive cycle, with each phase

explicitly mapping to Cognitive Presence (CP) sub-dimensions: Triggering Event, Exploration, Integration, and Resolution. This interconnected structure scaffolds Meaningful Learning Outcomes (MLOs) by ensuring the asynchronous pre-class groundwork feeds into synchronous in-class collaboration, which in turn informs asynchronous post-class refinement—creating a continuous CP-driven learning loop.

The pre-class asynchronous phase, supported by the university's official smart learning management system (LMS, referring to XuetangX in our study), initiates the cycle by providing CP's Triggering Event. Initially, students engaged with topic-relevant texts (e.g., *Taking to the road* for a travel writing unit) and skill-focused instructional videos (e.g., on scanning techniques for speed reading). Then, they completed the self-assessment quizzes to apply new knowledge (e.g., extracting key details from *Taking to the road*), with LMS feedback revealing their gaps. An alternative of the CP's trigger is asking students to make comments on their confusions or problems (e.g., "I can scan for facts but struggle to balance pros and cons in writing"). These asynchronous activities lay the foundation for in-class work by surfacing focused uncertainties.

Building directly on this asynchronous groundwork, the in-class synchronous phase was designed to deepen CP by advancing from Exploration to Integration. In the classroom sessions, the instructor typically would first present common problems or confusions collected from LMS data to guide small-group discussions, fostering collaborative exploration of uncertainties (e.g., how to structure balanced reflections). Then the instructor introduced the class to an authentic task that applies the explored concepts (e.g., writing a 180-200-word reflective travel experience essay). During this task, instructors facilitate peer interaction to refine work—including activities like mind mapping, split drafting, and peer review—before concluding with formative assessment (e.g., unit tests with teacher feedback). This synchronous collaboration transforms pre-class questions into applied understanding, setting the stage for post-class refinement.

To close the cycle, the post-class asynchronous phase returns to LMS to solidify CP's Resolution. Building on the outputs of in-class synchronous activities, students revisit and refine their work based on teacher or peer feedback (e.g., polishing the travel essay). They also create collaborative reflective notes to consolidate learning (e.g., co-writing tips for balancing positive and negative views), address errors from quizzes and tests, and share revised insights in forums to inform future cycles (e.g., posting updated strategies for balancing pros and cons).

This iterative loop—from asynchronous pre-class preparation to synchronous in-class collaboration to asynchronous post-class refinement—contrasts with the 6-week conventional teaching baseline (instructor-led lectures) and creates a measurable pathway to analyze how CP-aligned BCoI activities influence MLOs (e.g., writing quality, critical reflection).

Table 2
CP-aligned BCoI Intervention Procedures

Time Phase	BCoI Activities	Dominant CP Stages
Pre - class	1. Reading assigned materials → Triggering Event 2. Watching instructional videos → Triggering Event 3. Completing self - assessment quizzes → Exploration 4. Participating in online discussion forums → Exploration	Triggering Event ↓ Exploration
In - class	1. Group/class discussions (building on pre - class forum ideas) → Exploration 2. Problem - solving exercises (clarifying problems & individual exploration) → Exploration 3. Peer teaching (sharing problem - solving tactics) → Integration 4. Group presentations (synthesizing discussion outcomes) → Integration 5. Unit tests (applying integrated knowledge) → Resolution	Exploration ↓ Integration ↓ Resolution
Post - class	1. Completing collaborative reflective learning notes (documenting integrated knowledge) → Integration 2. Reviewing self - assessment quizzes/unit test feedback (refining errors) → Resolution 3. Revisiting online discussion forums (extending post - class reflections) → Integration	Integration ↓ Resolution

Data Collection Instruments and Procedures

Cognitive Presence Scale. Cognitive presence (CP) was measured using a 12-item scale adopting the CP scales from Arbaugh et al.'s (2008) Community of Inquiry survey instrument. The scale underwent rigorous translation validation, involving forward/back-translation by one EFL doctoral researcher, followed by reviewing of two CoI specialists and a TESOL associate professor to ensure cultural fit for Chinese undergraduates (e.g., context adjustments to EFL settings). The scale comprises 12 items across four subdimensions (3 items each): Triggering Event, Exploration, Integration, and Resolution, scored on a 5-point Likert scale (1 = *Strongly Disagree* to 5 = *Strongly Agree*). For reliability, a pilot study with 30 demographically matched undergraduates confirmed strong internal consistency for the CP dimension ($\alpha = 0.962$). In the main study, analyses yielded consistent high reliability at pretest (Week 6: $\alpha = 0.967$) and posttest (Week 17: $\alpha = 0.964$), all exceeding Nunnally's (1978) recommended threshold of 0.70.

English Proficiency Tests. Meaningful learning outcomes (MLOs) were operationalized as English proficiency, measured via two parallel tests developed for pre- and post-intervention assessment, which, except for excluding the listening section, aligned fully with the College English Test Band 4 in question types, difficulty, and structure, covering Reading (35 points), Writing (15 points), and Translation (15 points). The exclusion of listening was due to its lesser alignment with the study's focus on deep cognitive processing (reflected more directly in reading, writing, and translation, which connect to cognitive presence phases) and practical

constraints in ensuring consistent assessment conditions. Using CET4-aligned tests as a proxy for MLOs was justified by CET4's established reliability and validity in measuring EFL learners' ability to understand, integrate, and apply language in academic and real-world contexts (Ying Zheng & Liying Cheng, 2008), which is core to MLOs. Both pre-intervention (Cronbach's α = 0.801) and post-intervention (Cronbach's α = 0.776) tests demonstrated good internal consistency, confirming reliable measurement.

Ethical approval for the study was granted by Universiti Teknologi Malaysia Research Ethics Committee (Reference No. UTMREC-2024-102), and written informed consent forms were obtained from all participants prior to data collection.

Data Analysis

Data analyses were performed using SPSS 29.0. For RQ1, Shapiro-Wilk tests confirmed normality of pre- and post-intervention MLOs ($p > 0.05$) in the sample (n = 37), so a paired-samples t-test compared scores, with Cohen's d and Hedges' g calculating effect sizes. For RQ2, Shapiro-Wilk tests indicated non-normality of CP total and subdimension scores ($p < 0.001$), thus Spearman's rank-order correlations examined associations between CP (and subdimensions) and post-intervention MLOs, with 95% confidence intervals reported.

Results

Changes in Students' Cognitive Presenc and Meaningful Learning (RQ1)

To address RQ1, we investigated the changes in undergraduate EFL students' Meaningful Learning Outcomes (MLOs) scores before and after the implementation of the blended Community of Inquiry (CoI) approach. A paired-samples t-test, along with effect size analyses, was utilized to assess the statistical significance and practical magnitude of these changes.

Descriptive statistics (see Table 3) revealed notable shifts in ML scores across the pre - intervention (MLOs_pre) and post - intervention (MLOs_post) phases. At baseline, the mean MLOs_pre score was 31.85 (95% CI [28.11, 35.41]), with a standard deviation of 11.04 and a range of 8.0–49.5. Following the blended CoI intervention, the mean MLOs_post score increased to 40.79 (95% CI [37.08, 44.30]), accompanied by a standard deviation of 11.15 and a range of 21.0-60.5. This preliminary trend may suggest a substantial upward shift in students' meaningful learning outcomes, warranting more rigorous research design to unveil the real factors driving this change.

Table 3
Descriptive Statistics for MLOs_pre and MLOs_post (N = 37)

Variable	Min	Max	Mean	Std. Deviation	95% Confidence Interval
MLOs_pre	8	49.5	31.85	11.04	[28.11-35.41]
MLOs_post	21	60.5	40.79	11.15	[37.08-44.30]

The normality of MLOs_pre and MLOs_post scores was assessed using the Shapiro-Wilk test, which is more robust for small to moderate sample sizes (n = 37). Results (see Table 4) indicated that both MLOs_pre (Shapiro-Wilk statistic = 0.963, p = 0.254) and MLOs_post (Shapiro-Wilk statistic = 0.965, p = 0.281) scores were approximately normally distributed (p > 0.05). Thus, the assumption of normality for the paired-samples t-test was satisfied.

Table 4
Tests of Normality for MLOs_pre and MLOs_post

	Shapiro-Wilk		
	Statistic	df	Sig.
MLOs_pre	.963	37	.254
MLOs_post	.965	37	.281

A paired - samples t - test was then conducted to determine if the observed changes in MLOs scores were statistically significant. The results (see Table 5) indicated a significant difference between MLOs_post and MLOs_pre scores (t(36) = 6.105, two - sided p < 0.001). The mean difference in scores (MLOs_post-MLOs_pre) was 8.94, suggesting that, on average, ML scores increased by approximately 8.94 points post - intervention.

Table 5
Paired Samples Test for MLOs_pre and MLOs_post

	Paired Differences							Significance	
				95% Confidence Interval of the Difference					
Pair 1	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
MLOs_post - MLOs_pre	8.94	8.91	1.46	5.97	11.91	6.105	36	<.001	<.001

To contextualize the practical significance of this difference, effect size analyses were performed (see Table 6). Using Cohen's d, the effect size was calculated as 1.004 (95% CI [0.603, 1.396]). Meanwhile, Hedges' g (accounting for small - sample bias) yielded an effect size of 0.983 (95% CI [0.590, 1.366]). Both effect sizes fall within the "large effect" range (Cohen, 1988), reflecting a potential substantial practical impact of the CP-aligned bCoI approach on students' meaningful learning outcomes.

Table 6
Effect Sizes for the Difference Between MLOs_pre and MLOs_post

Pair	**Standardizer**	**Point Estimate**	**95% Confidence Interval**
MLOs_post-MLOs_pre	Cohen's *d*	1.004	[0.603, 1.396]
	Hedges' *g*	0.983	[0.590, 1.366]

Relationship between Cognitive Presence and Meaningful Learning Outcomes (RQ2)
To address RQ2, we examined the relationship between undergraduate EFL students' cognitive presence (CP) and its subdimensions) and their post-intervention Meaningful Learning Outcomes (MLOs) using Spearman's rho correlation analysis.

As presented in Table 7, students exhibited relatively high CP after the intervention, with mean scores across CP dimensions ranging from 4.29 to 4.35 on a 5-point scale. Standard deviations (0.62–0.79) indicated moderate variability in students' cognitive engagement, while 95% confidence intervals further supported the stable estimates of these central tendencies.

Table 7
Descriptive Statistics for Cognitive Presence (CP) Dimensions (N = 37)

Variable	Mean (95% CI)	Std. Deviation
CP_post	4.32 [4.08–4.56]	0.71
CP1_post	4.31 [4.05–4.57]	0.78
CP2_post	4.29 [4.02–4.55]	0.79
CP3_post	4.32 [4.06–4.57]	0.77
CP4_post	4.35 [4.14–4.55]	0.62

Normality of CP data were examined using Shapiro-Wilk tests which are robust for small to moderate sample sizes (n = 37). Results (Table 8) revealed that all CP dimensions significantly deviated from a normal distribution (Shapiro-Wilk statistic = 0.704–0.819, $p < 0.001$). These findings violated the normality assumption required for parametric correlation analyses, thus justifying the use of nonparametric Spearman's rho to explore relationships between CP and MLOs_post.

Table 8
Shapiro-Wilk Tests of Normality for CP and Subdimensions

Variable	Shapiro-Wilk Statistic	df	Sig.
CP_post	0.784	37	< 0.001
CP1_post	0.704	37	< 0.001
CP2_post	0.752	37	< 0.001
CP3_post	0.734	37	< 0.001
CP4_post	0.819	37	< 0.001

Post-intervention analysis via Spearman's rank-order correlations (Table 9) further revealed a statistically significant positive, moderate correlation between overall CP and MLOs, r_s = 0.361, p = 0.028 (95% CI [0.028, 0.636]). Furthermore, subdimensions of CP showed varying degrees of moderate associations with the MLOs. Among them, Resolution (CP4_post) demonstrated the strongest relationship with MLOs_post (r_s = 0.379, p = 0.021, 95% CI [0.045, 0.643]), followed by Exploration (CP2_post; r_s = 0.338, p = 0.041, 95% CI [-0.005, 0.623]) and Integration (CP3_post; r_s = 0.325, p = 0.050, 95% CI [-0.020, 0.624]). In contrast, Triggering Event (CP1_post) showed a non-significant association with MLOs_post (r_s = 0.261, p = 0.118, 95% CI [-0.101, 0.572]).

Table 9
Spearman Correlations Between MLOs_post and CP_Post and Subdimensions (N = 37)

Pair	Spearman's Rho (r_s)	p-Value (2-tailed)	95% Confidence Interval
MLOs_post–CP_post	0.361*	0.028	[0.028–0.636]
MLOs_post–CP1_post	0.261	0.118	[-0.101–0.572]
MLOs_post–CP2_post	0.338*	0.041	[-0.005–0.623]
MLOs_post–CP3_post	0.325*	0.050	[-0.020–0.624]
MLOs_post–CP4_post	0.379*	0.021	[0.045–0.643]

Note.
Spearman's Rho (r_s) effect sizes were interpreted as: weak ($|r_s| < .30$), moderate ($.30 \leq |r_s| < .50$), strong ($|r_s| \geq .50$), following Cohen's (1988) conventions for correlation coefficients.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

95% CIs estimated via Fisher's *r*-to-*z* transformation, reflecting the precision of correlation strength estimates.

Discussion

This study employed a quasi-experimental single-group pretest-posttest design to examine changes in undergraduate EFL students' Meaningful Learning Outcomes (MLOs) following a CP-aligned BCoI intervention, and to explore the relationship between CP and MLOs within this context. Two main observations emerged from the data: Students' MLOs increased after the intervention and that subdimensions of CP showed varying degrees of association with the MLOs. The following sections will interpret these findings in the context of existing literature, discuss their potential implications, and address limitations inherent to the study design, along with directions for future research.

Effects of the Cognitive Presence-aligned Intervention on Meaningful Learning Outcomes (RQ1)

Regarding changes in meaningful learning outcomes (MLOs), students' post-intervention MLOs (M = 40.79) were higher than their pre-intervention scores (M = 31.85), with no overlap in 95% confidence intervals. This indicates a measurable increase in MLOs following the implementation of the CP-aligned intervention, though it is important to note that, due to the single-group design, these changes cannot be definitively attributed to the intervention alone. This observed change aligns with the core premise of the Community of Inquiry (CoI) framework, which posits that intentional design to foster cognitive presence, such as structured critical thinking tasks, collaborative dialogue, and problem-solving activities, can enhance deep and meaningful learning outcomes (Garrison, 2017). Specifically, in our study the CP-aligned BCoI intervention's pre-class, in-class, and post-class phases which were designed deliberately to map to CP's developmental stages. Moreover, Moore and Miller (2022) found that discussion facilitation and structured course frameworks—core to fostering CP—positively shape learning outcomes; in our pre-class phase, activities like guided readings, instructional videos, and low-stakes forums likely mirrored this logic, triggering initial "Triggering Event" and "Exploration" of CP to spark early cognitive engagement. In this line, Nungu, Mukama and Nsabayezu (2023) further demonstrated that structured group discussions in online settings enhance higher-order thinking by deepening CP. Our in-class tasks (collaborative problem-solving, peer teaching, and application-focused tests) appeared to extend this, progressing CP from "Exploration" to "Integration" (via shared synthesis) and "Resolution" (through practical use), aligning with their observation of discussion-driven cognitive gains. Moreover, Mirabolghasemi, Shasti and Hosseinikhah Choshaly (2020) noted that intentional course design in blended EFL contexts strengthens the link between CP and learner outcomes; our post-class reflections (collaborative notes, targeted feedback review) may have reinforced this connection, potentially supporting long-term knowledge internalization. This staged progression seems to provide a plausible explanation for the observed ML gains.

Beyond staged CP activation, the intervention's integration of teaching, social, and cognitive presences aligns with prior work on synergistic effects. Liew, Voon and Leong (2023) found that teaching presence—operationalized through interactive strategies like guided tasks and resource sharing—strengthens CP by fostering social engagement. In our design, teaching presence (e.g., pre-class problem diagnosis activities, targeted in-class discussion) likely anchored cognitive focus, while social presence (graded interactions: pre-class forums, in-

class group work, post-class collaborative notes) may have nurtured the "academic buoyancy" and learner interactions identified by Yang and Lay (2025) as key mediators between presences and learning outcomes. This interplay could have amplified CP's association with MLOs, though without a comparison group, we cannot rule out alternative explanations for the observed shifts.

Cultural adaptations in the BCoI design also resonate with the EFL context-specific research. Cao, Jeyaraj and Razali (2024) highlighted that exam-oriented traditions and teacher-centered dynamics in China's EFL contexts often suppress CP by discouraging open interaction; our intervention addressed this by embedding culturally responsive elements: pre-class quizzes with LMS-automated feedback (to align with exam-oriented habits) while easing into low-pressure forums (to reduce interaction barriers), in-class peer teaching (to respect hierarchical norms while encouraging knowledge sharing), and post-class forum extensions (to sustain informal dialogue). These adjustments may have reduced cultural barriers to CP activation, potentially supporting students' transition from reluctance to engagement, though maturation or external learning opportunities could also contribute to behavioral shifts.

Relationships between Cognitive Presence and meaningful Learning Outcomes (RQ2)
Concerning associations between cognitive presence (CP) and Meaningful Learning Outcomes (MLOs), Spearman's rank-order correlations revealed positive, moderate relationships between CP and post-intervention MLOs (r_s = 0.361, p = 0.028). Meanwhile, a gradient of strength across CP subdimensions also emerged. Resolution (CP4) demonstrated the most prominent correlation with MLOs (r_s = 0.379, p = 0.021). Significant but weaker moderate relationships were observed for Exploration (CP2; r_s = 0.338, p = 0.041) and Integration (CP3; r_s = 0.325, p = 0.050) with MLOs, while Triggering Event (CP1) showed a non-significant association (r_s = 0.261, p = 0.118).

The moderate positive correlation between total cognitive presence (CP) and post-intervention meaningful learning outcomes (MLOs) (r_s = 0.361, p = 0.028) finds theoretical support in Garrison et al.'s (2010) conceptualization of the Community of Inquiry framework, which posits that meaningful learning emerges from the synergistic interplay of all three presences: teaching presence (designing and facilitating inquiry), social presence (fostering collaborative discourse), and cognitive presence (driving the inquiry process itself). The moderate correlation between CP and MLOs after the intervention aligns with Akyol and Garrison's (2011) finding that cognitive presence is associated with both perceived learning and actual learning outcomes, suggesting that collaborative cognitive engagement, such as the structured activities in the present intervention, may potentially contribute to meaningful learning gains. Likewise, Martin et al.'s (2022) meta-analysis of six studies also reported a small but significant association between cognitive presence and actual learning (r = 0.250, p < 0.001). This consistency across studies provides further suggest that cognitive presence might contribute to meaningful learning outcomes, though its influence is neither singular nor overwhelming.

The strongest association between CP4 (Resolution) and MLOs (r_s = 0.379, p = 0.021) resonates with Garrison's (2017, p. 57) framing of Resolution as the culminating phase of practical inquiry, where learners "reduce complexity by constructing order or discovering a

contextually specific solution" to a defined problem. The positioning of Resolution suggests in essence, Resolution is not a passive outcome but a facilitated process that relies on structured guidance, meaningful discourse, and leveraging blended formats to foster the cognitive effort required to apply or resolve the inquiry (Vaughan et al., 2023). Our BCoI intervention explicitly targeted this stage via post - class activities through collaborative reflective learning notes (documenting integrated knowledge) and unit test feedback review (refining errors) which were built upon pre-class and in-class learning. These tasks require applying synthesized knowledge, mirroring the operationalization of resolution in cognitive presence. Such deliberate design (e.g., post - class resolution - focused tasks) might have provided a context for this link.

The significant yet weaker associations of exploration (CP2) and integration (CP3) with meaningful learning outcomes reflect their foundational role in cognitive presence. Garrison (2017) describes exploration as a phase of "iterating between the reflective and shared worlds", where learners collaboratively search for information, brainstorm explanations, and make sense of initial complexity (p.56). In our intervention, pre-class BCoI activities (reading materials, online discussion forums) and in-class group discussions operationalize CP2 (Exploration) by facilitating initial knowledge exchange. In-class peer teaching and group presentations then support CP3 (Integration) through synthesizing exploration outcomes. Such blended design likely reflected this recursive, social exploration by encouraging learners to connect prior knowledge with new inputs, could possibly foster the relational thinking that underpins meaningful learning, which aligns with the observed correlation. Liu et al. (2022) posited that exploration, primarily focusing on information exchange, tend to exert a smaller impact than resolution in their survey study which examined 13 well-structured MOOCs by convenience sampling. Likewise, Sadaf et al. (2021) also identify exploration and integration as frequent yet predominantly precursor stages of CP. Our BCoI's structured sequence, e.g., progressing from pre-class exploration to in-class integration, may suggest these phases establish foundational conditions for resolution, suggesting potential cross-context validity within blended learning environments.

The non-significant relationship between Triggering Event (CP1) and MLOs is consistent with its theoretical characterization as an initial activation stage. Garrison (2017) describes Triggering Event as an initiating phase where a triggering involves identifying a "dilemma or problem" to engage learners. He emphasizes that this phase alone is insufficient for deep learning, arguing it must be followed by Exploration, Integration, and Resolution to foster meaningful outcomes. In our EFL context, pre-class activities like watching instructional videos and completing self-assessment quizzes operationalize triggering events, primarily focusing on surface-level concept identification. Without subsequent phases to explore answers, integrate insights, or resolve confusion, this initial spark is unlikely to translate into measurable MLOs. This probably explains why triggering, as a standalone phase, showed the weakest and non-significant association. Sadaf et al.'s (2021) systematic review noted triggering phases' limited engagement in meaningful learning processes, evidenced by their smaller discourse proportion. This pattern also finds parallels in Liu et al.'s (2022) report of non-significant triggering-performance links. Collectively, these consistencies may suggest that while triggering events may facilitate inquiry initiation, it seems unlikely to suffice independently for meaningful learning outcomes—an interpretation constrained by the correlational nature of both our data and cited studies.

Practical Implications for EFL Instruction

The findings underscore that meaningful learning in EFL contexts is more strongly linked to the later phases of cognitive presence (CP), particularly resolution(CP4), suggesting a key practical principle: design instruction to guide learners through the full arc of practical inquiry, with deliberate emphasis on progressing beyond initial engagement to integration and resolution. Given that Resolution (CP4) showed the strongest association with meaningful learning outcomes (MLOs), EFL instructors should prioritize activities that prompt learners to apply, refine, and consolidate knowledge. For example, post-class tasks could include collaborative revision of collorative works (e.g., learning notes, group works) or peer-led analysis of error patterns in output tasks (using feedback to refine linguistic accuracy). Such tasks align with Garrison's (2017) framing of resolution as "constructing contextually specific solutions" and leverage blended formats (combining in-class discussion with online reflection) to deepen this phase, as highlighted by Vaughan et al. (2023). By anchoring instruction in these resolution-focused activities, educators can capitalize on the phase most closely tied to meaningful learning gains.

To operationalize this aforementioned focus on CP phase progression, it is advisable to structure blended learning (BCoI) phases to systematically scaffold cognitive presence development, aligning pre-class, in-class, and post-class activities with CP's sequential stages. Pre-class tasks (e.g., guided readings with embedded questions, low-stakes forums) can effectively activate Triggering (CP1) and Exploration (CP2) by sparking initial engagement with linguistic or conceptual dilemmas through the quiz and LMS-automated feedback features. In-class sessions can then build on this foundation to foster Integration (CP3), through activities like peer teaching or group presentation, leveraging social interaction to refine understanding. Post-class tasks, as noted, can solidify Resolution (CP4) by prompting application (e.g., mini-projects) and refection (e.g., collabrated reflective learning notes) . This staged design helps establish that earlier phases (triggering event) can serve as building blocks for later, more impactful stages (exploration, integration, resolution), reflecting the gradient of CP-MLO associations observed in the study and aligning with the recursive nature of practical inquiry as described by Garrison (2017).

Meanwhile, varied EFL cultures calls for adapting these phase-aligned strategies to EFL context-specific norms to overcome potential barriers to cognitive engagement. In contexts with strong teacher-centered or exam-oriented traditions (e.g., Cao et al., 2024), for example, frame exploratory pre-class learning activities as "preparation for quizzes" to align with learner expectations, while gradually introducing open-ended discussion prompts. Similarly, structure in-class integration activities as "group presentations for teacher feedback" to respect hierarchical norms while encouraging collaboration. These adaptations reduce resistance to CP-activating tasks, ensuring that the designed progression from triggering to resolution is accessible to learners. By balancing structured phase progression with cultural responsiveness, EFL instructors can create environments where cognitive presence flourishes—and with it, meaningful learning outcomes.

Limitations and Future Research Directions

This study has several limitations that constrain the generalizability and interpretive power of its findings. First, the quasi-experimental single-group pretest-posttest design prevents definitive causal inference regarding the CP-aligned BCoI intervention's effects on meaningful

learning outcomes (MLOs). Without a control group, we cannot rule out alternative explanations for improved MLOs, such as maturation effects (natural skill development over time), test familiarity, or external learning experiences. Second, the correlational nature of the analysis of cognitive presence (CP) and MLOs limits conclusions about directional relationships; while CP subdimensions showed varying associations with MLOs, we cannot confirm whether stronger cognitive presence causes better outcomes or if high-performing learners naturally exhibit greater engagement in CP phases. Finally, the sample was drawn from a single cohort of undergraduate EFL students, potentially restricting the generalizability of findings to other contexts (e.g., different proficiency levels, cultural settings, or educational levels).

Future research should address these limitations to strengthen the evidence base. First, employing a randomized controlled trial with a control group (e.g., traditional EFL instruction without CP-aligned design) would allow more rigorous assessment of the intervention's efficacy, isolating its effects from confounding variables. Second, longitudinal designs tracking CP development and MLOs over multiple courses could clarify the directional relationship between cognitive presence and learning outcomes, potentially revealing how early CP phases (e.g., triggering) lay groundwork for later associations with MLOs. Third, expanding the sample to include diverse EFL populations (e.g., graduate students, pre-service teachers) and incorporating mixed methods (e.g., qualitative interviews, analysis of learner artifacts) would deepen understanding of how CP phases interact with contextual factors (e.g., cultural norms, proficiency) to shape meaningful learning. Finally, exploring the moderating roles of teaching and social presence—core to the CoI framework—could illuminate how their interplay with CP amplifies or constrains MLOs, offering more nuanced guidance for intervention design.

Conclusion

This study examined the impact of a blended Community of Inquiry (BCoI) intervention, intentionally aligned with the phases of cognitive presence (CP), on meaningful learning outcomes (MLOs) among undergraduate EFL students, while also investigating the associations between CP and MLOs. The findings indicated a statistically meaningful increase in MLOs following the intervention, with post-intervention scores demonstrating a substantial and reliable upward shift relative to pre-intervention measures. Concurrently, correlational analyses revealed a positive moderate relationship between overall CP and post-intervention MLOs, with a distinct gradient across CP subdimensions: resolution (CP4) exhibited the strongest association, followed by exploration (CP2) and integration (CP3), whereas the triggering phase (CP1) showed a non-significant trend.

These results contribute empirical support to the CoI framework, underscoring that meaningful learning in EFL contexts is not merely a byproduct of content exposure but is likely associated with structured engagement with the full progression of practical inquiry—from initial problem triggering to collaborative resolution—within a blended learning design. By demonstrating the differential salience of CP phases to MLOs, the study highlights the potential benefits of targeting later stages of cognitive engagement (e.g., resolution) while acknowledging the foundational role of earlier phases (e.g., exploration) in scaffolding deeper learning.

While constrained by the quasi-experimental design and correlational scope, the findings offer valuable insights for EFL pedagogy, emphasizing the potential of phase-aligned, blended CoI interventions to foster meaningful learning. Ultimately, this work reinforces the importance of intentional cognitive presence cultivation in EFL contexts and paves the way for more nuanced explorations of its interplay with teaching and social presence in future research.

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References

Akyol, Z., & Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. British Journal of Educational Technology, 42(2), 233–250.

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. The Internet and Higher Education, 11(3–4), 133–136.

Ausubel, David P. (1977). The facilitation of meaningful verbal learning in the classroom. Educational Psychologist, 12(2), 162–178.

Ausubel, David Paul. (1968). Educational Psychology : A Cognitive View. New York: Holt, Rinehart and Winston Inc.

Cao, Y., Jeyaraj, J. J., & Razali, A. B. (2024). Challenges in Promoting Learner Autonomy in Blended Learning: Perspectives from English as a Foreign Language Teachers in China. International Journal of English Language Education, 12(2), 122–142.

Cheng, G. (2022). Using the community of inquiry framework to support and analyse BYOD implementation in the blended EFL classroom. The Internet and Higher Education, 54, 1–14.

Cleveland-Innes, M. (2019). The Community of Inquiry Theoretical Framework: Designing Collaborative Online and Blended Learning. In Rethinking Pedagogy for a Digital Age (3rd Edition, pp. 85–102). New York: Routledge.

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences (2nd ed.). New York: Routledge. https://doi.org/10.4324/9780203771587

Garrison, D. R. (2017). E-learning in the 21st century: A community of inquiry framework for research and practice (Third edition). New York: Routledge.

Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. The Internet and Higher Education, 13, 31–36.

Garrison, R. D., Anderson, T., & Archer, W. (2000). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. The Internet and Higher Education, 2(2–3), 87–105.

Garrison, R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. The Internet and Higher Education, 7(2), 95–105.

Gilakjani, A. P. (2012). The significant role of multimedia in motivating EFL learners' interest in English language learning. International Journal of Modern Education and Computer Science, 4(4), 57.

Jeon, J. (2022). Exploring a self-directed interactive app for informal EFL learning: A self-determination theory perspective. Education and Information Technologies, 27(4), 5767–5787.

Liew, C. Y., Voon, L. L., & Leong, S. H. (2023). Innovative approach to enhance active online learning: Engagement, feedback and classroom environment. Asian Journal of University Education (AJUE), 19(2), 339–351.

Liu, B., Xing, W., Zeng, Y., & Wu, Y. (2022). Linking cognitive processes and learning outcomes: The influence of cognitive presence on learning performance in MOOCs. British Journal of Educational Technology, 53(5), 1459–1477.

Maddrell, J. A., Morrison, G. R., & Watson, G. S. (2017). Presence and learning in a community of inquiry. Distance Education, 38, 245–258.

Martin, F., Wu, T., Wan, L., & Xie, K. (2022). A Meta-Analysis on the Community of Inquiry Presences and Learning Outcomes in Online and Blended Learning Environments. Online Learning, 26(1), 325–359.

Mayer, R. E. (2002). Rote Versus Meaningful Learning. Theory Into Practice, 41(4), 226–232.

Mirabolghasemi, M., Shasti, R., & Hosseinikhah Choshaly, S. (2020). An investigation into the determinants of blended leaning satisfaction from EFL learners' perspective. Interactive Technology and Smart Education, 18(1), 69–84.

Moore, R. L., & Miller, C. N. (2022). Fostering Cognitive Presence in Online Courses: A Systematic Review (2008-2020). Online Learning, 26(1), 130–149.

Nungu, L., Mukama, E., & Nsabayezu, E. (2023). Online collaborative learning and cognitive presence in mathematics and science education. Case study of university of Rwanda, college of education. Education and Information Technologies, 28(9), 10865–10884.

Nunnally, J. C. (1978). Psychometric Theory (2nd edition). New York: McGraw-Hill.

Phu, H. B. (2019). Meaningful learning and its implications for language education in Vietnam. Journal of Language and Education, 5(1 (17)), 98–102.

Rourke, L., & Kanuka, H. (2009). Learning in Communities of Inquiry: A Review of the Literature. Journal of Distance Education, 23(1), 19–48.

Sadaf, A., Tong, W., & Martin, F. (2021). Cognitive Presence in Online Learning: A Systematic Review of Empirical Research from 2000 to 2019. Computers and Education Open, 2, 100050.

Shuell, T. J. (1990). Phases of Meaningful Learning. Review of Educational Research, 60(4), 531–547.

Sitthitikul, P. (2020). Proposed directions for the meaningful learning in the Thai EFL context. Journal of English Language and Linguistics, 1(1), 1–8.

Vargas-Hernández, J. G., & Vargas-González, O. C. (2022). Strategies for meaningful learning in higher Education. JISTECH: Journal of Research in Instructional, 2(1), 47–64.

Vaughan, N. D., Dell, D., Cleveland-Innes, M., & Garrison, D. R. (2023). Principles of Blended Learning: Shared Metacognition and Communities of Inquiry. Athabasca University Press.

Vaughan, N., & Garrison, D. R. (2005). Creating cognitive presence in a blended faculty development community. The Internet and Higher Education, 8(1), 1–12.

Yang, Y., & Lay, Y. F. (2025). Academic buoyancy and learner interactions as mediators of deep learning in blended learning contexts: The role of teaching, social, and cognitive presence. Education and Information Technologies, 30(5), 6261–6286.

Zheng, Y., & Cheng, L. (2008). Test review: College English Test (CET) in China. Language Testing, 25(3), 408–417.