

## **The Building Blocks of Language Learning via CALL: Practicing Critical Thinking Strategies in Reading Comprehension Instruction and its Reflection on EFL Learners' Mindfulness, Resilience, and Academic Growth**

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### **Abstract**

This study investigates the effects of integrating critical thinking (CT) strategies into Computer-Assisted Language Learning (CALL) environments on English as a Foreign Language (EFL) learners' mindfulness, resilience, and language attainment in academic growth. Drawing on a concurrent mixed-methods design, participants were selected from two intact classes in an Indian language institute, with each class consisting of 20 learners randomly assigned to experimental and control groups. The experimental group received CT instruction in reading comprehension within CALL platforms, while the control group received traditional teacher-fronted sessions in CALL. Semi-structured interviews and a teacher-made test were utilized to collect data on mindfulness, resilience, and language

attainment. Thematic analysis revealed that learners in the experimental group demonstrated improvements in mindfulness, resilience, and language attainment compared to those in the control group. Statistical analysis further supported these findings, indicating significant differences between the two groups on posttest measures. These results suggest integrating CT instruction into CALL-mediated language learning can enhance learners' cognitive and socio-affective dimensions, promoting deeper engagement, critical analysis, and metacognitive awareness. The study contributes to the growing body of literature on the intersection of CT, CALL, and language education, highlighting the potential of CALL platforms to facilitate meaningful learning experiences that foster learners' language proficiency and academic performance. The implications of these findings for language teachers, syllabus designers, materials developers, and policymakers are discussed, emphasizing the importance of integrating CT instruction into language education to prepare learners for today's globalized world better.

**Keywords:** Computer Assisted Language Learning, Critical Thinking, Mindfulness, Resilience, Academic Growth

### **Introduction**

In recent years, the advancement of technology has significantly transformed the field of language learning, with particular emphasis on CALL methodologies. CALL has emerged as a prominent tool in language education, offering innovative avenues for pedagogical practices and learner engagement (Chapelle, 2001). Within this framework, reading comprehension is a cornerstone for effective language acquisition and communication (Grabe, 2009). Proficiency in reading comprehension not only facilitates language comprehension but also fosters CT skills crucial for academic success and real-world communication (Grabe & Stoller, 2019). As such, understanding the dynamics of integrating CT strategies into reading comprehension instruction within CALL is paramount for enhancing EFL learners' language proficiency and cognitive development. This study explores the interplay between practicing CT strategies in CALL-mediated reading comprehension instruction and its impact on learners' mindfulness, resilience, and academic growth in the context of EFL education.

While a uniform definition of CT remains elusive, it is commonly understood as purposeful, self-regulated judgment involving interpretation, analysis, evaluation, inference, and explanations based on evidential, conceptual, methodological, criteriological, or contextual factors (Facione, 1990). This implies that CT encompasses both skills and dispositions. The skill component pertains to higher-order cognitive abilities like inference, analysis, and evaluation, while the disposition aspect reflects an individual's consistent motivation and readiness to employ CT skills (Dwyer, 2017). Numerous studies have highlighted the pivotal role of CT in various domains of university students' endeavors, including academic performance (e.g., Ghanizadeh, 2017; Ren et al., 2020), professional

endeavors (e.g., Barry et al., 2020), and resilience in dealing with life challenges (e.g., Butler et al., 2017).

Derived from ancient spiritual practices, mindfulness has garnered significant attention due to its profound effects on behavior and overall wellness (Baer et al., 2004; Crane, 2017; Namaziandost & Rezai, 2024)). It involves purposefully cultivating a state of presence by non-judgmentally focusing on objectives and fully engaging with the present moment (Brown & Ryan, 2003; Boyce, 2011). This attribute holds particular significance in psychological well-being, as dwelling excessively on past experiences or future uncertainties can heighten anxiety and worry. Recent studies have delved into the complex interplay between mindfulness and various psychological aspects, including neuroticism, depression, and psychological distress (Armstrong & Rimes, 2016).

Academic resilience refers to students attaining favorable educational results despite hardships and obstacles, achieved through modifying existing behaviors or adopting new ones, such as discipline, practice, or planning (Aliyev et al., 2021; Rich et al., 2022). Resilience denotes the capacity to adjust to challenging circumstances, leading to positive adaptation despite unfavorable conditions. It notably diminishes student stress levels and enhances their learning motivation (Namaziandost et al., 2023).

Language growth is a complex process influenced by various factors, including exposure, instruction, and individual learner characteristics (Ellis, 2015; Kargar Behbahani & Razmjoo, 2023). As learners engage with language input through diverse modalities such as reading, listening, speaking, and writing, they undergo a gradual but dynamic development in linguistic proficiency (Lightbown & Spada, 2013). This growth encompasses not only the expansion of vocabulary and grammatical knowledge but also the refinement of communicative competence and pragmatic awareness (Canale & Swain, 1980). Moreover, language growth is intricately intertwined with cognitive and socio-affective dimensions as learners navigate complex linguistic structures while negotiating meaning and expressing their thoughts and emotions in diverse social contexts (Gass et al., 2020). Understanding the mechanisms underlying language growth is essential for educators to design effective instructional strategies that cater to language learners' diverse needs and developmental trajectories.

Despite the recognized importance of CT skills in various educational and professional domains, there remains a gap in understanding how integrating CT strategies into CALL-mediated reading comprehension instruction influences EFL learners' mindfulness, resilience, and academic growth. While CALL has emerged as a prominent tool in language education, offering innovative avenues for pedagogical practices and learner engagement, and reading comprehension is established as a cornerstone skill essential for effective language acquisition and communication, the specific impact of integrating CT strategies within this context remains underexplored. Furthermore, the role of mindfulness in

language learning and its potential interaction with CT strategies in CALL-mediated instruction require elucidation, particularly given mindfulness's known effects on behavior and psychological well-being (Baer et al., 2004; Brown & Ryan, 2003). Additionally, while academic resilience has been recognized as a crucial factor in students' ability to overcome obstacles and achieve favorable educational outcomes, its relationship with CALL-mediated instruction and CT strategies warrants further investigation within the context of EFL education (Aliyev et al., 2021; Rich et al., 2022). Therefore, this study addresses these gaps by examining the interplay between practicing CT strategies in CALL-mediated reading comprehension instruction and its impact on EFL learners' mindfulness, resilience, and academic growth. To this end, the following research questions are raised:

1. How does practicing critical thinking strategies in reading comprehension instruction affect EFL learners' mindfulness?
2. Does practicing critical thinking strategies in reading comprehension instruction affect EFL learners' resilience?
3. To what extent does practicing critical thinking strategies in reading comprehension instruction affect EFL learners' academic growth?

This study has significant implications for both theory and practice in EFL education. Firstly, by investigating the integration of CT strategies into CALL-mediated reading comprehension instruction, the study advances our understanding of effective pedagogical approaches in language education. The findings may offer insights into how technology-enhanced learning environments can be optimized to foster linguistic proficiency and higher-order cognitive skills essential for academic success and real-world communication. Moreover, by examining the impact of CT strategies on EFL learners' mindfulness, resilience, and academic growth, the study sheds light on the interconnectedness of cognitive, socio-affective, and metacognitive dimensions in language learning. These insights can potentially inform educators' instructional practices, curriculum development, and assessment strategies, ultimately enhancing the quality and efficacy of EFL education programs. Furthermore, the study's findings may have broader implications for educational policy and practice, highlighting the importance of integrating CT skills development into language curricula to prepare learners for success in the globalized, knowledge-based society of the 21st century. By addressing these critical issues, the study contributes to advancing the field of EFL education and has the potential to impact learners, educators, and policymakers alike positively.

## **Literature Review**

### **Theoretical framework**

CALL has emerged as a prominent area of research and practice in education, driven by the rapid advancement of technology and its integration into educational settings (Chapelle, 2001). This integration has transformed traditional language learning paradigms,

offering diverse technological tools and applications designed to support language acquisition and proficiency development. CALL encompasses a spectrum of resources, including interactive multimedia software, online platforms, virtual reality simulations, and mobile applications, each tailored to cater to language learners' specific needs and preferences (Levy & Stockwell, 2006). The affordances of CALL afford unique opportunities for language learners to engage with authentic language materials, receive immediate feedback, and access personalized learning resources, thereby promoting learner autonomy and enhancing motivation and engagement in the language learning process (Godwin-Jones, 2014).

Furthermore, CALL facilitates the integration of communicative language skills—reading, writing, listening, and speaking—through interactive tasks and authentic communicative activities, thereby fostering the development of communicative competence in the target language (Warschauer & Meskill, 2013). By providing learners with opportunities to interact with authentic language input and engage in meaningful communication tasks, CALL environments create immersive language learning experiences that mirror real-world language use contexts. Empirical research in the field has demonstrated the effectiveness of CALL in promoting language proficiency and facilitating language learning outcomes across various contexts and learner populations (Stockwell, 2012). Moreover, the flexibility and scalability of CALL technologies make them particularly well-suited for addressing the diverse needs and preferences of language learners, allowing educators to tailor instructional materials and activities to accommodate individual learning styles and proficiency levels. As such, CALL holds significant potential as a pedagogical tool for enhancing language learning experiences and outcomes in both formal and informal educational settings (Lim & Aryadoust, 2022).

### **Critical thinking**

CT, a cornerstone of advanced cognitive abilities, entails actively and purposefully scrutinizing ideas, arguments, evidence, and assumptions to formulate well-founded conclusions and informed decisions (Ennis, 1987; Paul & Elder, 2019). It encompasses various cognitive processes such as analysis, evaluation, inference, interpretation, and problem-solving (Facione, 1990). At its core, CT involves interrogating, challenging, and assessing information critically rather than accepting it uncritically (Brookfield, 1987). Additionally, it involves metacognitive awareness, allowing individuals to reflect on their thinking processes, recognize biases and assumptions, and adapt their thinking accordingly (Halpern, 2013). CT transcends disciplinary boundaries and contexts, facilitating deep comprehension, effective communication, and rational decision-making (Lu & Xie, 2024).

In language acquisition, CT is pivotal in enabling learners to engage deeply with the target language, texts, and cultural norms (Bagheri, 2015). By nurturing CT abilities, educators can empower learners to analyze and evaluate linguistic structures, discourse

patterns, and rhetorical techniques within authentic communicative settings (Lu & Xie). CT enables learners to discern subtle nuances of meaning, identify underlying assumptions, and critically assess arguments and evidence in written and spoken discourse (Lai, 2011). Furthermore, by prompting learners to reflect on their language-learning experiences critically, educators can assist them in developing metacognitive strategies to monitor and regulate their language-learning endeavors (Alsaleh, 2020). Ultimately, integrating CT skills into language education can enhance learners' language proficiency, intercultural competence, and capacity to communicate persuasively and effectively across diverse linguistic and cultural contexts (Paul & Elder, 2019).

### **Mindfulness**

Rooted in ancient spiritual traditions, mindfulness has attracted considerable interest for its profound impact on behavior and overall well-being (Baer et al., 2004; Crane, 2017). It entails intentionally fostering a state of presence by non-judgmentally directing attention to objectives and fully immersing oneself in the present moment (Brown & Ryan, 2003; Boyce, 2011). This quality holds particular relevance in psychological well-being, as excessive rumination on past events or future uncertainties can exacerbate feelings of anxiety and apprehension. Recent research has explored the intricate relationship between mindfulness and various psychological factors, including neuroticism, depression, and psychological distress (Armstrong & Rimes, 2016).

Mindfulness has emerged as a pivotal factor in comprehending and mitigating anxiety and anxiety-related disorders (Bamber & Schneider, 2016). It has demonstrated efficacy in alleviating both the physical and psychological symptoms associated with anxiety. Furthermore, mindfulness has exhibited potential in aiding individuals to confront stressors that may jeopardize their performance and well-being. For instance, research conducted in Thailand revealed a positive association between mindfulness and improvisational behavior among entrepreneurs, particularly during challenging circumstances. Similarly, Charoensukmongkol and Puyod (2022) illustrated mindfulness's capacity to diminish emotional exhaustion among high-demand call center agents. These findings underscore the significance of mindfulness training as a proactive measure for individuals and organizations to mitigate the detrimental effects of stress and enhance overall well-being.

The trajectory of mindfulness research has expanded its horizons beyond its conventional Buddhist origins. Kabat-Zinn (2003), a trailblazer in clinical applications, aptly defines mindfulness as the consciousness that emerges from a purposeful, nonjudgmental concentration on present-moment occurrences. Duan (2014), embracing a positive psychology standpoint, regards mindfulness as a trait blending innate and acquired components intricately associated with attributes such as curiosity, openness, and a receptive attitude toward the present moment (Kabat-Zinn, 2003).

### **Resilience**

Resilience is when certain individuals demonstrate positive psychological outcomes despite facing severe or prolonged stressors typically associated with adverse consequences (Luthar et al., 2000; Rutter, 2006). Over the past two decades, the literature has presented various interpretations of resilience, resulting in notable disparities in its conceptualization (for an exhaustive review, refer to Sarkar & Fletcher, 2013). However, amidst these differences, most definitions revolve around two core elements: adversity and positive adaptation (Windle et al., 2011). As resilience research advances, scholars increasingly focus on identifying specific traits displayed by individuals who thrive despite significant trauma (Rutter, 1985). At the heart of this inquiry lies the exploration of assets acting as buffers, moderating an individual's response to adversity and lessening its impact (Windle et al., 2011). These assets are often termed "protective factors," defined as influences that modify or alleviate an individual's response to environmental threats (Rutter, 1985).

Martin (2013) defined academic resilience as individuals' capacity to confront and overcome significant educational obstacles, whether immediate or enduring. Cassidy (2016) expanded on this notion, suggesting that academic resilience encompasses the development of strategies to bolster educational attainment amidst adversity, focusing on cognitive, behavioral, and emotional responses. Academic resilience involves individuals' adeptness at addressing academic challenges, typically viewed as impediments to educational advancement, by managing their cognitive, behavioral, and emotional reactions.

Academic resilience has gained traction in educational settings in recent years due to its correlation with positive academic outcomes (see Amzil, 2023). Resilient students exhibit adeptness in navigating demanding school circumstances, sustaining motivation, and achieving high performance despite setbacks (Alva, 1991; Martin, 2002). Prior studies (e.g., (Ahmed et al., 2018)) have elucidated the robust and positive association between academic resilience and school engagement, indicating that students leveraging personal resources like resilience display heightened commitment to educational goals, increased vigor in daily tasks and greater engagement compared to their peers (Padron et al., 1999; Salema-Aro & Upadyaya, 2014). Furthermore, research has highlighted the complementary role of external resources alongside personal ones in influencing individuals' engagement (Xanthopoulou et al., 2007, 2009). Individuals with strong personal resources actively seek external support to bolster their chances of success, shaping their perceptions of the environment and the level of social support they receive (Lorente et al., 2014). In line with these findings, recent research has emphasized that external resources, such as perceived academic support, act as a partial mediator in the relationship between students' resources and their level of engagement (Robayo-Tomayo et al., 2020).

### **Language attainment in academic growth**

Language attainment is paramount in second language acquisition as an intricate measure of language proficiency and competency. It encompasses many language skills, such

as speaking, listening, reading, and writing, along with the ability to comprehend and communicate effectively in the target language (Alamer et al., 2023). Language attainment goes beyond mere linguistic knowledge; it serves as a crucial indicator of an individual's cultural understanding and communicative ability within diverse linguistic contexts (Zeilhofer, 2023). This multifaceted aspect of language attainment underscores its significance as a crucial outcome in language learning endeavors, reflecting the culmination of linguistic efforts and experiences. In educational, professional, and social settings, assessments, tests, and evaluations of language attainment are commonly utilized to gauge learners' language proficiency levels, rendering it a pivotal metric in language education research (Sparks & Alamer, 2022).

For EFL learners, language attainment holds particular importance as it signifies their ability to navigate the global landscape of communication and academia. Mastery of English proficiency, a widely used lingua franca (Fazilatfar & Kargar Behbahani, 2018), is often advantageous in international educational and professional arenas. Language attainment among EFL learners indicates their command of English language skills and their capability to engage meaningfully in cross-cultural interactions and pursue global academic and career opportunities. Moreover, language attainment is intricately linked with self-confidence, motivation, and empowerment for EFL learners, as it can impact their sense of belonging and ability to articulate themselves effectively (Dewaele & Li, 2022). Therefore, unraveling the effects of well-structured input on EFL learners' language attainment is crucial, as it holds significant implications for their personal and academic development in an increasingly interconnected world.

While CALL has garnered attention as a promising avenue for language education, a gap exists in understanding the potential interplay between CT skills development within CALL-mediated environments and its impact on learners' mindfulness, resilience, and language attainment. Although CALL has been shown to enhance language proficiency and engagement by integrating diverse technological tools tailored to learners' needs, the specific role of CT strategies in shaping learners' cognitive and socio-affective dimensions within CALL settings remains underexplored. Furthermore, while CT is recognized as a fundamental skill for academic success and real-world communication, its integration into language education has not been systematically examined in CALL-mediated instruction. Likewise, although research has highlighted the potential benefits of mindfulness and resilience in promoting learners' psychological well-being and academic resilience, little is known about how these constructs interact with CT strategies in CALL environments. Additionally, while language attainment is crucial in language learning endeavors, particularly for EFL learners seeking to navigate global communication and academic landscapes, the extent to which CT strategies within CALL environments contribute to language attainment and academic growth remains unclear. Therefore, this study seeks to



address these gaps by investigating the effects of CT strategies in CALL-mediated language instruction on learners' mindfulness, resilience, and language attainment in EFL education.

### **Method**

This study employs a concurrent mixed-methods design, which allows for integrating both quantitative and qualitative data collection and analysis methods within a single research framework. By combining quantitative tests and assessments with qualitative interviews, concurrent mixed-methods designs offer a comprehensive understanding of complex phenomena, allowing researchers to explore relationships, patterns, and underlying mechanisms while capturing the richness and depth of participants' experiences.

The participants in this study were selected from two intact classes enrolled in a language institute in India, each consisting of 20 learners. These learners were randomly divided into an experimental group and a control group. The participants ranged in age from 18 to 23 years old, reflecting a diverse age range within the young adult demographic. Each group comprised an equal number of male and female learners, ensuring gender balance across experimental and control groups. An Oxford Quick Placement Test (OQPT) was administered to assess the participants' proficiency level in English, revealing that all learners were classified as low-intermediate proficiency. This homogeneity in English proficiency level ensured consistency in the participants' baseline language abilities and facilitated accurate comparison between the experimental and control groups throughout the study.

The instruments utilized in this study encompassed a range of measures to assess various aspects of the participants' language learning experiences and outcomes. Firstly, an OQPT was administered to ascertain the participants' proficiency level in English. The OQPT is a standardized assessment tool commonly used to evaluate learners' English language proficiency across different skill areas, including listening, reading, writing, and speaking. The results of the OQPT indicated that all participants were classified as low-intermediate EFL learners, providing a baseline measure of their language proficiency level at the outset of the study.

Semi-structured interviews were conducted to investigate the participants' mindfulness and resilience. Semi-structured interviews allow for flexibility in questioning while ensuring consistency across participants, enabling researchers to delve deeply into participants' experiences, perceptions, and behaviors related to mindfulness and resilience. These interviews provided qualitative insights into participants' subjective experiences and perspectives, shedding light on the role of mindfulness and resilience in language learning processes and outcomes.

Additionally, a teacher-made test assessed participants' language attainment and academic growth. The test was tailored to align with the language objectives and content covered in the Top Notch 2A textbook, which served as the primary instructional material in the study. A known-group technique was employed to ensure the validity of the test, as

recommended by Ary et al. (2019). This technique involves administering the test to a group of learners whose proficiency level is known or predetermined, allowing researchers to evaluate the test's construct validity by comparing performance between groups of known proficiency levels. The teacher-made test was administered as a pretest and a posttest to assess participants' language attainment and academic growth throughout the study.

The treatment in this study involved implementing two distinct instructional approaches within CALL sessions conducted online via the Google Meet platform. The experimental group received CT instruction integrated into reading comprehension activities, while the control group participated in teacher-fronted sessions focused solely on CALL activities without explicit instruction in CT strategies.

For the experimental group, the classes began with an introductory discussion on the importance of CT in language learning and reading comprehension. The instructor provided explicit instruction on various CT strategies, such as identifying main ideas, making inferences, evaluating arguments, and synthesizing information from the text. These strategies were demonstrated through interactive multimedia presentations, online discussions, and collaborative activities using digital resources available on the CALL platform. Following the instructional component, learners engaged in guided reading comprehension exercises where they applied the CT strategies learned to analyze and interpret authentic texts from the Top Notch 2A textbook. The instructor facilitated discussions and provided feedback to scaffold learners' CT skills development throughout the session.

In contrast, the control group's classes were structured as teacher-fronted sessions focusing on CALL activities without explicit instruction in CT strategies. The instructor guided learners through various language learning tasks and activities on the CALL platform, such as vocabulary exercises, grammar drills, and listening comprehension tasks. The emphasis was on practicing language skills and completing assigned tasks within the CALL environment, with minimal opportunities for discussion or reflection on the cognitive processes involved in reading comprehension. While learners in the control group engaged in similar reading comprehension activities as the experimental group, they did so without explicit guidance on employing CT strategies to enhance comprehension and analysis of the texts.

Throughout the treatment period, both the experimental and control groups received equal instructional time and exposure to CALL-mediated activities. The classes were conducted in synchronous online sessions via the Google Meet platform, with learners interacting with the instructor and peers in real time. The instructional materials and resources used in both groups were aligned with the content of the Top Notch 2A textbook, ensuring consistency in curriculum coverage across the experimental and control conditions. Overall, the treatment aimed to investigate the differential effects of integrating CT

instruction into reading comprehension activities within the CALL environment compared to traditional teacher-fronted CALL sessions on learners' mindfulness, resilience, and language attainment in EFL education.

### **Data Analysis Procedures**

The data analysis procedures in this study involved multiple steps to analyze both quantitative and qualitative data collected from the participants. Firstly, the semi-structured interviews conducted to explore participants' mindfulness and resilience were manually transcribed verbatim. These transcripts were then subjected to thematic analysis, following the steps outlined by Braun and Clarke (2006). The thematic analysis involved systematically coding the transcripts to identify recurring patterns, themes, and categories related to participants' experiences, perceptions, and behaviors regarding mindfulness and resilience in language learning. The themes were derived through an iterative process of data familiarization, coding, theme identification, and refinement, ensuring rigor and reliability in the analysis.

Additionally, data from the teacher-made test administered as both a pretest and posttest were analyzed using inferential statistics to measure language attainment in academic growth. Specifically, an independent sample t-test was conducted to compare the mean scores between the experimental and control groups on the posttest, controlling for baseline differences in pretest scores. This statistical analysis aimed to determine whether the two groups had significant differences in language attainment following the treatment intervention. By comparing posttest scores while controlling for pretest scores, the independent sample t-test allowed for a rigorous evaluation of the effectiveness of integrating CT instruction into reading comprehension activities within the CALL environment on language attainment outcomes.

Furthermore, descriptive statistics, such as means, standard deviations, and frequencies, were calculated to summarize participants' demographic characteristics, proficiency levels, and other relevant variables. Qualitative data from the thematic analysis were presented using rich descriptive narratives supported by illustrative quotes from participants to enhance the credibility and trustworthiness of the findings. Integrating quantitative and qualitative findings allowed for a comprehensive understanding of the research questions, enabling triangulation and convergence of results from different data sources. Overall, the data analysis procedures employed in this study aimed to rigorously examine the impact of CT instruction in CALL-mediated language instruction on learners' mindfulness, resilience, and language attainment in EFL education.

## **Findings**

**The effect of practicing critical thinking strategies in reading comprehension instruction on EFL learners' mindfulness**

In the semi-structured interviews conducted with participants from the experimental group, several themes emerged regarding the impact of CT strategies in reading comprehension instruction on their mindfulness. Participants consistently reported heightened awareness and engagement with the reading materials due to applying CT skills. Specifically, participants described how actively employing strategies such as making connections, questioning, and synthesizing information enhanced their ability to focus on and comprehend the texts. One participant remarked, "I found myself more engaged with the text when I started asking questions and making connections. It helped me stay present and really understand what I was reading."

Moreover, participants noted increased metacognitive awareness and reflection during the reading process. By consciously applying CT strategies, participants became more attuned to their cognitive processes and thought patterns while reading. They described moments of self-monitoring and self-correction when encountering challenging passages or unfamiliar vocabulary, indicating a heightened level of mindfulness in their approach to reading comprehension tasks. "I started to notice when I was getting distracted or losing focus while reading," explained one participant. "Using CT strategies helped me stay mindful and redirect my attention back to the text."

Furthermore, participants highlighted the transferability of CT skills beyond the reading context to other aspects of their language learning journey. They reported applying the same analytical and evaluative skills acquired through reading comprehension instruction to other language tasks, such as writing essays or engaging in classroom discussions. This integration of CT into various language learning activities contributed to a more mindful and deliberate approach to language learning. "I've started to approach language learning more strategically," noted one participant. "CT has become a habit for me, not just in reading but in everything I do to improve my English skills."

Conversely, participants from the control group discussed their experiences with reading comprehension instruction without explicit guidance in CT strategies. While participants in the control group reported engaging with the reading materials and completing assigned tasks, they expressed challenges in maintaining focus and comprehension without systematic instruction in CT skills. Many participants described relying on surface-level comprehension strategies, such as skimming or guessing, to navigate the texts. "I found myself just trying to get through the reading without really understanding it," shared one participant. "I didn't know how to approach it differently."

Additionally, participants in the control group noted a lack of metacognitive awareness and reflection during the reading process compared to their counterparts in the experimental group. Without explicit instruction in CT, participants struggled to independently identify and address gaps in their understanding or overcome comprehension obstacles. They described feeling overwhelmed or frustrated when encountering difficult

passages or unfamiliar vocabulary, leading to disengagement or avoidance of challenging texts. "I felt like I was just going through the motions," explained one participant. "I didn't think about how I was reading or what I was supposed to get out of it."

Furthermore, participants in the control group expressed limited transferability of reading comprehension skills to other language learning tasks. Without the systematic development of CT skills, participants found applying analytical or evaluative strategies to writing or speaking activities challenging. They described a disconnect between their reading comprehension abilities and overall language proficiency, highlighting the need for explicit instruction in CT to bridge this gap. "I could understand the individual words and sentences, but putting it all together was difficult," reflected one participant. "I wish I had learned how to approach reading differently."

The themes that emerged from the semi-structured interviews conducted with participants from both the experimental group and the control group regarding the impact of practicing CT strategies in reading comprehension instruction on their mindfulness are manifested in the following diagram:

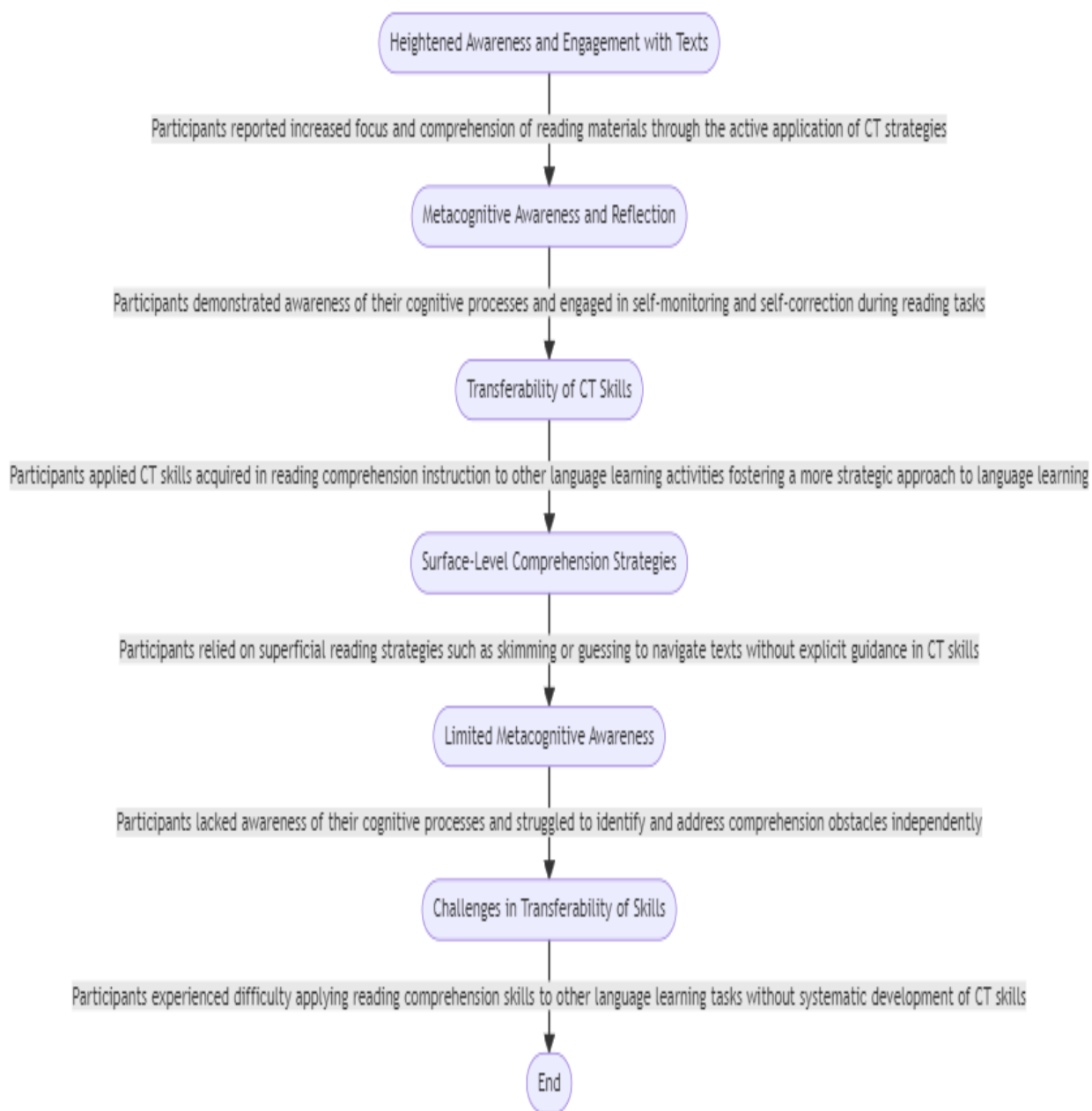


Diagram 1. *Themes regarding the effect of practicing critical thinking strategies in reading comprehension instruction on EFL learners' mindfulness*

### **The effect of practicing critical thinking strategies in reading comprehension instruction on EFL learners' resilience**

In the semi-structured interviews conducted with participants from the experimental group, several themes emerged regarding the impact of practicing CT strategies in reading comprehension instruction on their resilience. Participants consistently reported increased confidence and perseverance in overcoming challenges encountered during the reading

process. Specifically, participants described how the systematic application of CT skills, such as problem-solving and adaptability, helped them navigate complex texts and overcome comprehension obstacles. One participant remarked, "I didn't feel discouraged when I encountered difficult passages. Instead, I tried different strategies like re-reading or breaking down the text, which helped me understand it better and keep going."

Moreover, participants noted a heightened sense of self-efficacy and belief in improving their reading comprehension skills over time. Participants developed a growth mindset towards reading comprehension tasks by actively engaging with CT strategies and receiving feedback from instructors. They viewed challenges as opportunities for learning and growth rather than insurmountable obstacles. "I used to get frustrated when I didn't understand something right away," shared one participant. "But now, I see it as a chance to learn something new and improve my skills."

Furthermore, participants highlighted the role of social support and collaborative learning experiences in fostering resilience. Through group discussions and peer interactions facilitated by the instructor, participants felt encouraged and motivated to persevere through difficult readings. They described how sharing strategies and insights with classmates helped them gain new perspectives and approach reading comprehension tasks more confidently. "Knowing that I wasn't alone in struggling with certain passages made me feel supported," noted one participant. "We helped each other out and cheered on, which made the process less daunting."

Conversely, participants from the control group discussed their experiences with reading comprehension instruction without explicit guidance in CT strategies. While participants in the control group reported engaging with reading materials and completing assigned tasks, they expressed challenges in maintaining resilience and motivation when faced with comprehension difficulties. Many participants described frustration and self-doubt when encountering challenging passages or unfamiliar vocabulary. "I would often give up if I couldn't understand something right away," shared one participant. "I felt like I wasn't making any progress."

Additionally, participants in the control group noted a lack of self-efficacy and belief in their ability to improve their reading comprehension skills. Without systematic instruction in CT, participants struggled to develop adaptive coping strategies and viewed challenges as indicators of their incompetence rather than growth opportunities. They described a sense of resignation or helplessness when confronted with difficult readings, leading to disengagement or avoidance of challenging texts. "I felt like I was just not cut out for reading," reflected one participant. "It seemed like no matter what I did, I couldn't understand it."

Furthermore, participants in the control group expressed a desire for more structured support and guidance in building resilience and overcoming comprehension obstacles.

Without explicit instruction in CT strategies, participants felt ill-equipped to navigate complex texts and lacked the social support network provided by collaborative learning experiences. They described a need for strategy and resources to help them persevere through challenges and develop a more resilient mindset toward reading comprehension tasks. "I wish there were someone to guide me through the tough parts," expressed one participant. "I think having a clear strategy would have helped me feel more confident."

The diagram manifests the themes that emerged from the semi-structured interviews conducted with participants from both the experimental and control groups regarding the impact of CT strategies in reading comprehension instruction on their resilience.



Diagrams 2. *Themes regarding the effect of practicing critical thinking strategies in reading comprehension instruction on EFL learners' resilience*

### **The effect of practicing critical thinking strategies in reading comprehension instruction on EFL learners' language attainment in academic growth**

A t-test was needed to determine the effect of practicing CT strategies in reading comprehension instruction on EFL learners' language attainment and academic growth.



However, before conducting the t-test, a Kolmogorov-Smirnov Test was conducted to ensure the data normality, which showed that on both pre-and posttest, data was normally distributed ( $p > .05$ ). Additionally, a t-test showed that on the pretest, the difference between the two groups was not significant ( $p > .05$ ).

Table 1  
*Group Statistics on the Posttest*

	Group	N	Mean	Std. Deviation	Std. Error Mean
Posttest Scores	Experimental	20	12.800	2.546	.569
	Control	20	2.900	1.372	.306

Table 1 shows that the experimental group ( $N = 20$ ,  $M = 12.800$ ,  $SD = 2.546$ ) outperformed the control group ( $N = 20$ ,  $M = 2.900$ ,  $SD = 1.372$ ) on the posttest.

Table 2  
*Independent Samples Test on the Posttest*

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Posttest Scores	Equal variances assumed	5.064	.030	15.305	38	.000	9.900	.646	8.590	11.209
	Equal variances not assumed			15.305	29.182	.000	9.900	.646	8.577	11.222

Table 2 demonstrates a significant difference between the two groups on the posttest ( $t = 15.305$ ,  $df = 29.182$ ,  $p = .001$ ) with a large effect size (.471).

### Discussion

The present study investigated the impact of CT strategies in reading comprehension instruction on EFL learners' mindfulness, resilience, and language attainment in academic growth. The findings reveal compelling insights into the potential benefits of integrating CT

into language learning pedagogy and underscore the importance of cultivating cognitive and socio-affective dimensions in language education.

Integrating CALL into the instructional framework had a multifaceted impact on learners' mindfulness, resilience, and language attainment in academic growth. Through CALL platforms, learners engaged with interactive multimedia materials and authentic language resources, fostering a sense of mindfulness by immersing themselves in purposeful language learning activities. The interactive nature of CALL tasks encouraged learners to engage with the content actively, promoting metacognitive awareness and reflection on their language learning processes. Moreover, CALL facilitated collaborative learning experiences and peer interactions, providing a supportive environment for learners to develop resilience in navigating language challenges and overcoming comprehension obstacles. Additionally, CALL platforms offered personalized learning experiences tailored to individual learners' needs and preferences, promoting autonomy and self-regulated learning strategies. These adaptive features of CALL contributed to enhanced language attainment in academic growth by providing learners with opportunities to practice CT skills in authentic language contexts and receive immediate feedback on their performance. Overall, integrating CALL into language instruction proved instrumental in fostering mindfulness, resilience, and language attainment among EFL learners, highlighting its potential as a pedagogical tool for enhancing language learning outcomes in diverse educational settings.

The integration of CT strategies in reading comprehension instruction positively influenced EFL learners' mindfulness and resilience. Participants in the experimental group demonstrated heightened awareness and engagement with reading materials and increased metacognitive awareness and reflection during the reading process. These findings align with previous research highlighting the role of CT in fostering deep comprehension and self-regulated learning strategies (Brookfield, 1987; Halpern, 2013). By actively applying CT skills, learners developed a more mindful and deliberate approach to reading comprehension tasks, enhancing their real-time ability to monitor and adjust their cognitive processes.

Moreover, the systematic instruction in CT strategies contributed to participants' resilience in navigating comprehension obstacles and overcoming challenges encountered during reading tasks. Participants exhibited greater confidence, perseverance, and adaptive coping strategies when faced with difficult passages, viewing challenges as opportunities for learning and growth rather than insurmountable barriers. These findings underscore the importance of fostering resilience in language learners, as it equips them with the necessary skills and mindset to navigate the complexities of language acquisition and academic pursuits (Martin, 2013; Cassidy, 2016).

The statistical analysis revealed a significant improvement in EFL learners' language attainment and academic growth following the integration of CT strategies into reading comprehension instruction. Participants in the experimental group outperformed their

counterparts in the control group on the posttest, demonstrating higher proficiency levels in language skills essential for academic success.

The observed improvements in language attainment can be attributed to several factors. Firstly, the explicit instruction in CT strategies provided learners with systematic approaches to comprehending and analyzing complex texts, enhancing their reading proficiency. Secondly, emphasizing metacognitive awareness and reflection encouraged learners to monitor and regulate their language learning processes, leading to more effective self-directed learning strategies. Finally, the collaborative learning experiences and social support networks fostered within the experimental group facilitated peer interactions and knowledge sharing, enriching the learning environment and promoting collaborative problem-solving skills.

The novelty of this study lies in its comprehensive exploration of the interplay between CT strategies, mindfulness, resilience, and language attainment in academic growth within EFL education. While previous research has examined the individual effects of CT instruction or socio-affective factors on language learning outcomes, this study integrates these dimensions into a holistic framework to provide a nuanced understanding of their interconnectedness. This study contributes novel insights into the dynamic processes underlying language learning and cognitive development by investigating the impact of CT strategies in reading comprehension instruction on learners' mindfulness, resilience, and language attainment. Additionally, the study employs a concurrent mixed-methods design, incorporating quantitative and qualitative data to understand the phenomena under investigation comprehensively. This methodological approach enhances the depth and richness of the findings, offering valuable implications for language education pedagogy and practice.

The findings of this study contribute to the existing literature by shedding light on the potential interplay between CT skills development within CALL environments and its impact on learners' mindfulness, resilience, and language attainment (Chapelle, 2001; Levy & Stockwell, 2006). As highlighted in the literature review, CALL has been recognized for its effectiveness in enhancing language proficiency and engagement by integrating diverse technological tools tailored to learners' needs (Godwin-Jones, 2014; Warschauer & Meskill, 2013). However, the specific role of CT strategies in shaping learners' cognitive and socio-affective dimensions within CALL settings has been underexplored. By incorporating CT instruction into CALL-mediated language learning, this study extends the theoretical framework by providing empirical evidence of the synergistic effects of CT and CALL on learners' language learning outcomes.

Furthermore, the study contributes to the literature on mindfulness and resilience by investigating how these constructs interact with CT strategies in CALL-mediated instruction (Baer et al., 2004; Bamber & Schneider, 2016). While mindfulness and resilience have been

associated with positive psychological well-being and academic success, their relationship with CT within language learning environments has been relatively unexplored. The findings of this study suggest that practicing CT strategies within CALL environments may enhance learners' mindfulness and resilience by promoting metacognitive awareness, critical self-reflection, and adaptive coping mechanisms.

Moreover, the study adds to the literature on language attainment by examining the impact of CT strategies within CALL environments on learners' language proficiency and academic growth (Alamer et al., 2023; Stockwell, 2012). Language attainment is crucial in language learning endeavors, particularly for EFL learners seeking to navigate global communication and academic landscapes. The findings of this study demonstrate that integrating CT instruction into CALL-mediated language learning can significantly improve learners' language proficiency and academic performance.

This study contributes to a deeper understanding of the potential synergies between CT, mindfulness, resilience, and language attainment within CALL-mediated language instruction (Chapelle, 2001; Godwin-Jones, 2014; Stockwell, 2012). The findings provide valuable insights for educators and curriculum designers seeking to enhance language learning experiences and outcomes in diverse educational settings by elucidating the complex interplay between these constructs. Additionally, the study underscores the importance of integrating CT instruction into CALL environments to promote learners' cognitive, socio-affective, and linguistic development, ultimately fostering their academic success and global competence.

The findings of the study offer implications for various stakeholders in EFL education. For language teachers, the implications of this study are profound. Integrating CT strategies into CALL environments can enhance language instruction by promoting deeper engagement, critical analysis, and metacognitive awareness among learners (Warschauer & Meskill, 2013). Language teachers can leverage CALL platforms to incorporate interactive tasks and authentic communicative activities that facilitate the development of communicative competence in the target language (Godwin-Jones, 2014). By integrating CT instruction into CALL-mediated language learning, teachers can create immersive and interactive learning experiences that mirror real-world language use contexts, thereby enhancing learners' language proficiency and academic performance (Stockwell, 2012). Additionally, teachers can use the findings of this study to design CT-focused language activities and assessments that promote learners' cognitive and socio-affective development within CALL environments.

For syllabus designers, the study highlights the importance of incorporating CT instruction into language curricula to foster learners' CT skills and language proficiency (Chapelle, 2001). Syllabus designers can use the findings of this study to develop CT-focused learning objectives, outcomes, and assessments that align with the goals of CALL-mediated

language instruction (Levy & Stockwell, 2006). By integrating CT instruction into language syllabi, designers can ensure learners have the CT skills necessary to navigate complex linguistic and communicative tasks in today's globalized world (Godwin-Jones, 2014). Furthermore, syllabus designers can collaborate with language teachers and materials developers to create CT-focused instructional materials and resources that facilitate meaningful learning experiences within CALL environments.

Materials developers play a crucial role in supporting CT instruction within CALL environments by designing interactive multimedia software, online platforms, and mobile applications that facilitate the development of CT skills (Warschauer & Meskill, 2013). Materials developers can use the findings of this study to create CT-focused language learning materials that provide learners with opportunities to engage with authentic language materials, receive immediate feedback, and access personalized learning resources (Stockwell, 2012). By incorporating CT-focused tasks and activities into language learning materials, developers can enhance learners' motivation, engagement, and language proficiency within CALL environments (Levy & Stockwell, 2006). Additionally, materials developers can collaborate with language teachers and syllabus designers to ensure that CT-focused materials align with the goals and objectives of CALL-mediated language instruction.

For policymakers, the study underscores the importance of integrating CT instruction into language education policies and initiatives to promote learners' cognitive and socio-affective development (Chapelle, 2001). Policymakers can use the findings of this study to advocate for integrating CT-focused language instruction into national and institutional language education frameworks (Godwin-Jones, 2014). By prioritizing CT instruction within language education policies, policymakers can ensure learners have the CT skills necessary to thrive in today's rapidly changing linguistic and communicative landscapes (Levy & Stockwell, 2006). Additionally, policymakers can allocate resources and funding to support professional development initiatives for language teachers, materials developers, and syllabus designers focused on integrating CT instruction into CALL-mediated language learning environments.

## **Conclusion**

In conclusion, this study investigated the effects of practicing CT strategies in reading comprehension instruction within Computer-Assisted Language Learning (CALL) environments on EFL learners' mindfulness, resilience, and language attainment in academic growth. The findings indicate that integrating CT instruction into CALL-mediated language learning significantly impacts learners' cognitive and socio-affective development. Specifically, learners in the experimental group demonstrated improvements in mindfulness, resilience, and language attainment compared to those in the control group. These findings underscore the importance of integrating CT instruction into language education to promote

deeper engagement, critical analysis, and metacognitive awareness among learners. Furthermore, the study highlights the potential of CALL platforms to facilitate meaningful learning experiences that enhance learners' language proficiency and academic performance. Progressing toward the future, future research should continue exploring CT instruction's role within CALL environments and its impact on learners' cognitive and socio-affective dimensions. Additionally, efforts should be made to develop CT-focused instructional materials and resources that align with the goals and objectives of CALL-mediated language instruction. Language educators and policymakers can better support learners in developing the CT skills necessary to navigate today's globalized world by addressing these areas.

### **Acknowledgment**

The authors extend their appreciation to the Deanship of Scientific Research at King Khalid University for funding this work through large group Research Project under grant number RGP2/403/45

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