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INVESTIGATING THE ASSOCIATION BETWEEN CRITICAL THINKING AND (INTER) CULTURAL INTELLIGENCE AMONG ALGERIAN EFL UNDERGRADUATES

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Abstract: Critical thinking and cultural intelligence have become essential skills in English as a Foreign Language (EFL) instruction that enable learners to function effectively in both academic and intercultural settings. Despite their theoretical overlap, limited research has been directed to the association between the constructs, mainly in EFL classrooms. This study aims to examine the level of critical thinking and cultural intelligence among Algerian EFL students. The work purports to measure the degree of interrelationship between these constructs. A quantitative correlational design was adopted, and data were collected from thirty undergraduate students at the department of English, university of Constantine 1 through the administration of three standardized instruments: a Critical Thinking Scale (CTS), a performance-based Critical Thinking Test (CTT), and the Cultural Intelligence Scale (CQS). The findings of descriptive statistics revealed from moderate to high critical thinking and cultural intelligence capabilities. Pearson correlation results indicated significant positive relationship between critical thinking dispositions and cultural intelligence ($r = .48$, $p < .05$), and between cultural intelligence and critical thinking performance ($r = .63$, $p < .001$). Further findings showed that communication and metacognitive reflection were the strongest predictors of cultural intelligence, while behavioural cultural intelligence significantly predicted critical thinking performance. These findings highlight the significant role as well as the reciprocal effect of critical thinking and cultural intelligence in EFL instruction. The study, therefore, underscores the need for integrating instructional approaches that simultaneously foster critical thinking and intercultural intelligence in EFL curricula.

Keywords*:* correlation; Critical thinking; cultural intelligence; EFL instruction; metacognitive reflection

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1. Introduction

1.1.Background of the Study

Over the past decade, critical thinking (CT) and cultural intelligence (CQ) have played a pivotal role in EFL instruction, particularly in intercultural education. While CT endows learners with the capacity to critically and reflectively analyse, evaluate, and interpret acquired knowledge, CQ stimulates their ability to understand, adapt, and operate effectively in diverse cultural contexts. Both skills are essential in EFL as they enable learners to manage complex situations, engage in intercultural communication, and become global citizens.

In Algeria, EFL education aims to promote both intercultural com:petence and higher-order thinking skills alongside language proficiency. Despite these efforts, many students still demonstrate limited intercultural abilities and insufficient engagement in critical thinking. This may be attributed to the traditional emphasis on grammar-based instruction and rote learning. Given Algeria's multicultural context and increasing global engagement, fostering CT and CQ has become an educational priority.

Recent research has emphasized the importance of critical thinking in enhancing learners' analytical and problem-solving skills (Facione, 2015; Halpern, 2014). Similarly, cultural intelligence has been widely recognized as a key factor in effective intercultural communication (Ang & Van Dyne, 2008). Empirical studies have also explored the relationship between these constructs. For example, Rafie et al. (2016) reported a positive association between cultural intelligence and language learning outcomes, while Karadağ (2022) and Bećirović (2023) highlighted the role of critical thinking in fostering intercultural competence.

However, despite these contributions, limited research has investigated this relationship within the Algerian EFL context. Most previous studies have been conducted in different socio-cultural and educational settings, which may limit their applicability to Algerian universities. Therefore, the present study aims to examine the association between critical thinking and cultural intelligence among Algerian EFL university students.

1.2. Problem Statement

In spite of the fact that critical thinking skills and cultural intelligence are viewed as key competencies in higher education, limited empirical research has been directed to address these competencies in foreign language instruction. Similarly, the link between CT and CQ at both global and national levels has been overlooked. Most of the existing literature tends to examine these variables independently emphasizing either cognitive development or intercultural progress, which overlooks their potential interrelation. This gap limits a comprehensive understanding of how these constructs interplay in shaping individuals' performance in global contexts. To bridge this gap, the current work seeks to investigate the interrelationship between critical thinking and cultural intelligence among Algerian EFL learners. The work aims at providing deeper insight into how these capabilities conjointly contribute to effective language achievement.

1.3. Research Objectives

The study aims at:

- Measuring the correlation between critical thinking and cultural intelligence among Algerian EFL learners.
- Scrutinizing how these two capabilities influence EFL learning, particularly in relation to intercultural communication and cognitive engagement.

1.4. Research Questions

To achieve the aforementioned objectives, the following questions are raised:

- What is the level of critical thinking (dispositions and performance) among Algerian EFL university students?
- What is the level of cultural intelligence across its four dimensions (metacognitive, cognitive, motivational, and behavioural)?
- Is there a statistically significant correlation between critical thinking (dispositions and performance) and cultural intelligence?

1.5. Research Hypothesis

There is a significant positive correlation between critical thinking and cultural intelligence among Algerian EFL university students.

1.6. Significance of the Study

The study is deemed significant as it purports to tackle EFL instruction from both perspectives: the cognitive perspective and the intercultural perspective. To the best of our knowledge, this is the first attempt that highlights the interrelationship between CT and CQ in the Algerian context, with the objective of nurturing more reflective and culturally competent language learners. By exploring the interconnection between these competencies, this work consolidates knowledge on intercultural language instruction, which, hence, paves the way for future investigations in the field.

2. Literature Review

2.1. Definition of Critical Thinking

Critical thinking is the purposeful, self-regulatory, and intellectually disciplined process that pedainvolves forming sound judgments and guiding belief and action (Facione, 1990a). CT incorporates the deployment of cognitive strategies, such as interpretation, analysis, evaluation, inference, explanation, and synthesis, actively and skilfully to analyse and evaluate thinking with a view to improving it (Elder & Paul, 2010). Learning new concepts, solving problems, drawing inferences, and making decisions are goal-oriented tasks that underlie the ultimate purpose of critical thinking (Sternberg, Roediger, & Halpern, 2007; Dumitru & Halpern, 2023).

Critical thinking involves two dimensions: cognitive abilities and affective factors (Facione, 1990a; Giancarlo & Facione, 2001). Regarding the cognitive dimension, six cognitive capabilities assist individuals to comprehend meaning, examine ideas critically, draw conclusion and make decision through the use of sound reasoning. These abilities are interpretation, analysis, evaluation, inference, explanation, and self-regulation (Norris & Ennis, 1989; Andreucci-Annunziata et al., 2023). In tandem, critical thinking dispositions refer to the attitudinal traits that promote the deliberate and reflective deployment of these cognitive abilities. They encompass open-mindedness, inquisitiveness, fairness, flexibility, and intellectual honesty (Giancarlo & Facione, 2001; Kennedy et al., 1992). Cognitive abilities have proved to correlate positively with dispositions when examining the relationship between the ability to adapt one's reasoning and the driving force to engage in reflective judgment (Karakuş, 2024). Likewise, a strong disposition toward critical thinking has been associated with learners' academic engagement, research participation, and reflective practices that consolidate their capacity for autonomous reasoning (Tian et al., 2024). The integration of cognitive abilities and dispositional traits ensures that critical thinking functions as an intellectual habit of mind that extends across academic, personal, and social contexts.

In higher education context, Hammoudi and Zerouati (2025) stress the need to engage in complex cognitive processing while negotiating meaning and discourse, which are considered as the core attributes of critical thinking, such as analytical reasoning, interpretation of information, and reflective judgment, thereby, placing critical thinking as an integral component rather than an isolated skill of language-driven cognition.

2.2. Critical Thinking Instruction

Critical thinking has emerged as an eminent educational objective, for it endows learners with the capacity to make sound reasoning, find solutions to given problems, and make thoughtful decisions in both academic and real-world contexts (Facione, 1990a; Halpern, 2014). Framed within the higher levels of Bloom's Taxonomy—analysis, evaluation, and creation—critical thinking involves higher-order thinking that facilitates knowledge construction beyond mere memorization (Bloom, 1956; Anderson & Krathwohl, 2001; Nurmatova & Altun, 2023). In simple words, at these levels, learners are expected to scrutinize concepts, synthesize meaning and evaluate perceived information rather than recalling mechanically. Critical thinking develops as an amalgam of cognitive and metacognitive processes that integrate knowledge, reflection, and self-regulation (Pereles, Ortega-Ruipérez, & Lázaro, 2024). According to King & Kitchener (2004), CT develops from pre-reflective to reflective reasoning stages as learners mature intellectually. Empirical evidence confirms that this cognitive ability must be instructed explicitly rather than implicitly through guided instruction and real-world tasks. (Taghinezhad & Riasati, 2023; Rouijel, Bouziane, & Zohri, 2023; Abrami et al., 2015). Dialogue, scaffolding, and real-life problem solving are effective practices, as argued by Ennis's (1989) and Lipman's (2003). In higher education and particularly within foreign language instruction, critical thinking pedagogy fosters learners' linguistic and cognitive skills, especially when embedded in content-based instruction that actively involves them in analytical and evaluative reasoning tasks. (Aziz & Rawian, 2022; Zhang & Tang, 2024). Boumediene (2020) adds strategies such as debate and literary analysis to promote both reflective thinking and communicative competence. In Algeria, the implementation of critical thinking is often limited by examination-driven objectives and teachers' insufficient pedagogical preparedness. (Baghoussi, 2021). These challenges, hence, call for curriculum reform and teacher professional development to make critical thinking a central educational goal. Hammoudi and Zerouati findings (2025) indicate that pedagogical instruction that requires learners to process, evaluate, and produce academic discourse enhances higher-order thinking skills. These findings imply that CT pedagogy would be considered most effective if embedded within communicative and cognitively challenging learning tasks, where learners are required to analyse content, justify viewpoints, and reason on language use.

2.3. Assessment of Critical Thinking

Critical thinking can be assessed using a variety of methods that elicit both cognitive abilities and affective dimensions. Standardized tests, such as California Critical Thinking Skills Test (CCTST) (Facione, 1990b) and Cornell Critical Thinking Test (CCTT) (Ennis, Millman & Tomko, 2005), or performance-based measures (e.g. essays, projects and debates) are widely adopted measures. The latter type provides a more authentic measure of the learners' reasoning, analytical and reflective capabilities (Braun, Shavelson, Zlatkin-Troitschanskaia & Borowiec, 2020). However, the validity of these measures remains of paramount importance. Facione (1990a) highlights four basic criteria for assessing critical thinking: content validity, construct validity, reliability, and fairness. Content validity indicates that the tasks measures real critical thinking abilities rather than rote memorization. Construct validity requires that correct responses should be obtained from sound reasoning rather than by chance or unrelated knowledge. Reliability is the consistency of the results

among evaluators and contexts. Fairness necessitates that the instruments should be free from linguistic, cultural or socioeconomic bias.

2.4. Definition of Intercultural Intelligence

Intercultural intelligence, also referred to as *cultural intelligence (CQ)*, refers to the individual's capability to perform effectively in culturally diverse settings (Cultural Intelligence Center, 2021; Van Dyne, Ang, Tan & Rockstuhl, 2024).). Multiple intelligences theories (e.g. Semenov & Randrianasolo, 2024) go beyond traditional notions of intercultural competence to highlight the multicomponential nature of the concept through a set of interrelated components, including metacognitive, cognitive, motivational and behavioural components, that underlie the individual's capacity to adapt and function effectively in diverse cultural settings (Cultural Intelligence Center, 2021). In contrast to emotional and social intelligence, which are viewed as culture and social dependent constructs, CQ is culture-free which enables individuals to adapt effectively in intercultural contexts (Cultural Intelligence Center, 2021; Jeyavel et al., 2023). It is noteworthy that successful intercultural communication should avoid stereotypes and rely instead on cultural generalizations that encompass group regularity as with individual diversity (Cultural Intelligence Center, 2021; Van Dyne et al., 2024). Recent theories of CQ perceive this ability as not stable stressing that it could be nurtured through education, multicultural experiences and reflective training (Ang & Van Dyne, 2008; Gedik, 2022; Radwan, 2022). In the EFL context, CQ fosters empathy, tolerance and communicative competence, which underpins the interplay between languistic proficiency and intercultural adaptation (Gedik, 2022; Radwan, 2022; Zou & Lertlit, 2022).

Cultural intelligence is distinguished from cultural competence in that it involves both theoretical and empirical notions rooted in the framework of multiple intelligences. It highlights a constellation of abilities that enable the learner to function effectively across various cultural contexts. (Early & Ang, 2003), while earlier theories of cultural competence put major focus on personality traits rather than developed skills.

As stated earlier, cultural intelligence (CQ) is a multidimensional construct that encompasses a set of abilities that enable the individual for the effective adaptation in intercultural settings. Based on tenets of Sternberg's theory (1986), Earley, and Ang (2003) model, it includes four core dimensions**:** metacognitive, cognitive, motivational, and behavioural. The metacognitive dimension involves the individual's awareness and regulation across intercultural settings, the cognitive dimension is concerned with expertise of cultural norms, values and systems. The motivational dimension refers to the individual's interest, confidence and drive to engage in intercultural communication and the behavioural dimension underlines the verbal and non-verbal behaviours during culturally diverse communications.

2.5. Assessment of Cultural Intelligence

Cultural intelligence can be measured through assessment of the individual's skills across the four CQ dimensions**:** metacognitive, cognitive, motivational, and behavioural**.** Similar to critical thinking measures, contemporary CQ scales put emphasis on a set of capabilities, such as awareness of cultural assumptions, knowledge of cultural systems, motivation to engage interculturally, and the flexibility to function appropriate behaviours. These skills are purported to be developed through education and experience (Yu & Lu, 2023; Sokolova et al., 2024; Teixeira & Klein, 2024). These measures can be illustrated through *the Cultural Intelligence Scale (CQS)* (Ang et al., 2007), *the Expanded Cultural Intelligence Scale (E-CQS)* (Van Dyne et al., 2012; Rockstuhl & Van Dyne, 2018); the *Self-Assessment of Cultural Intelligence (SACQ)* and *Cultural Intelligence Inventory (CII)* (Yu & Lu, 2023; Sokolova et al., 2024).

2.6. CQ and EFL

As line with critical thinking, cultural intelligence (CQ) has a significant influence on learning English as a foreign language (EFL). In contrast to traditional approaches to teaching English as a foreign language (TEFL) that place emphasis on enhancing the learner's linguistic proficiency, recent theories shift attention to the importance of integrating CQ to develop intercultural communication skills. Recent empirical evidence has illustrated a positive correlation between CQ and the use of effective learning strategies (Khodadady & Ghahari, 2011), higher motivation to learn English (Canbay, 2020), willingness to communicate (Zhang & Wang, 2019), and stronger intercultural communicative competence (Byram, Gribkova & Starkey, 2002). Among the four CQ dimensions, metacognitive and behavioural dimensions showed the highest influence by fostering the learner's awareness of cultural diversity and their capability to regulate verbal and nonverbal behaviour. Motivational CQ, on the other hand, promotes involvement and motivation to acquire the language. These empirical findings call upon the integration of CQ through a variety of techniques, such as cross-cultural discussions, authentic materials, reflective tasks, and collaborative learning; which, in turn, equip learners with the skill to communicate effectively in cross-cultural settings.

2.7. Theoretical Evidence on the Relationship between Critical Thinking and Cultural Intelligence

According to the notion of critical thinking (CT) and cultural intelligence (CQ), both concepts share common cognitive, metacognitive, and behavioural capacities that underline effective adaptation, reflection, and intercultural involvement. CT can operate in both cultural and non-cultural context, while CQ is purely a culture-bound construct. Facione (2010) and Halpern (2014) view CT and CQ as interrelated capabilities, both encompassing cognitive skills such as problem-solving, reflective reasoning, and the understanding of complex real-world issues. Recent studies have demonstrated that both CT and CQ involve open-mindedness, analytical evaluation of information, consideration of multiple perspectives, and sensitivity to others' experiences (Wang, 2022; Bećirović, 2023). These shared skills help learners appreciate various viewpoints and cooperate effectively across cultures (Rafie et al., 2016; Karadağ, 2022). Therefore, the relationship between CQ and CT derives from their shared reliance on reasoning, analysis, and adaptability in complex cultural situations. Facione (2010) defines CT as an amalgam of higher-order cognitive skills—analysis, interpretation, inference, evaluation, explanation, and self-regulation—that involve judgment. On the other hand, Earley and Ang (2003) perceive CQ as a constellation of metacognitive, cognitive, motivational, and behavioural components that aid in ensuring effective intercultural communication. Therefore, both constructs emphasize cognitive adaptability and reflective involvement, with critical thinkers demonstrating the capacity to interpret and evaluate intercultural information objectively (Deardorff, 2009; Stier, 2006). Similarly, the dispositions associated with CT, such as curiosity, fairness, and open-mindedness (Facione, 2015), parallel with the attitudinal dimensions of CQ, such as respect, openness, and curiosity (Deardorff, 2006), enable individuals to suspend judgments and appreciate cultural diversity (Bennett, 2013). Furthermore, empirical evidence confirms this interrelationship; for instance, Rafie et al. (2016**)** reported a significant positive association between cognitive abilities related to cultural intelligence and language learning outcomes among EFL learners, which indicates that nurtured critical reasoning fosters intercultural adaptability. Critical thinking, therefore, presents a foundational mechanism that promotes analytical and creative capabilities essential for cultural intelligence and enhances the learners' capacity to engage effectively with culturally diverse settings (Paul & Elder, 2006; Halpern, 2014).

3. Methodology

3.1. Research Design

The research design adopted in this study is quantitative correlational as the work seeks to investigate the relationship between critical thinking and cultural intelligence among university students enrolled in English as a foreign language (EFL) program. This design aims to determine the extent of the correlation between the two constructs. The analysis stresses on assessing whether there is a statistically significant correlation between CT and CQ overall scores as well as among their sub-measures.

3.2. Participants

The target population of this study consisted of EFL university students. The participants of this study were selected using a convenience sampling technique, comprising approximately fifty (50) third-year students enrolled in the English as a Foreign Language (EFL) undergraduate program at the Department of Letters and English, University of Constantine**.** Four groups of participants were chosen based on accessibility and availability during the data collection period. The participants' age ranged from 21 to 25 years. This sample was considered appropriate as third-year students had already achieved intermediate to advanced linguistic proficiency (CQ) and adequate academic experience to engage with critical thinking. For ethical considerations, the purpose and procedures of the study were explained to the participants prior to data collection. Participation was voluntary, and the students had the right to withdraw from the study at any time.

3.3. Instruments

To gather data on the degree of the association between critical thinking (CT) and cultural intelligence (CQ) among EFL students, three standardized measures were administered. The first measure- the Critical Thinking Scale- aimed to assess the students' critical thinking dispositions. The second measure -the Critical Thinking Test- examines the students' actual performance in the different critical thinking skills. The third instrument- the Cultural Intelligence Scale- measures their capability to function effectively in cross-cultural settings. The three instruments were administered using Google Forms, which ensures consistency in administration, anonymity of responses, and efficiency in data collection.

3.3.1. Critical Thinking Scale (CTS)

The Critical Thinking Scale (CTS) is a self-report survey tool designed to measure students' dispositions and perceived abilities in critical thinking. The scale is comprised of a number of statements rated on a five-point Likert scale ranging from *Strongly Disagree (1)* to *Strongly Agree (5)*. The test focuses on the cognitive and metacognitive nature of critical thinking, covering the areas that entail analysis, evaluation, inference, and judgment. The CTS was adapted from standardized instruments. With regards to the reliability of the measure, previous studies have reported acceptable levels of internal consistency, with Cronbach's alpha coefficients ranging between .78 and .86, indicating high reliability (Facione, 2015). This instrument aims to provide a subjective measure of learners' self-perceived critical thinking, complementing the objective test-based measure that is the Critical thinking Test.

3.3.2. Critical Thinking Test (CTT)

The second measure, the Critical Thinking Test (CTT), is a performance-based test aiming to assess the students' ability to apply critical thinking skills in problem solving tasks. The test comprises a set of multiple-choice (MCQ) items that address critical thinking core components: analysis, inference, evaluation, and reasoning.

The participants were instructed to interpret short statements, identify assumptions, and draw logical conclusions. Each correct answer is given one point, yielding an overall performance score. The test was administered online through Google Forms and took a total of 40 minutes to complete. This assessment scale was adapted from previous measures such as the *California Critical Thinking Skills Test (CCTST)* (Facione, 2010). For the reliability of the scale, Cronbach's alpha was opted for. The latter assesses the extent to which the test items are internally consistent. The reliability coefficient using the Statistical Package for Social Sciences (SPSS 26) yielded a result of 0.72, which indicates acceptable consistency, suggesting that the test items reliably measure the intended construct.

3.3.3. Cultural Intelligence Scale (CQS)

The Cultural Intelligence Scale (CQS), developed by Ang and Van Dyne (2007), was administered to examine the learners' capacity to effectively adapt and perform in culturally diverse contexts. This scale encompasses 20 items grouped into four subscales: Metacognitive CQ (awareness of cultural assumptions), Cognitive CQ (knowledge of cultural norms and practices), Motivational CQ (drive and interest to adapt), and Behavioural CQ (ability to adjust behaviour appropriately). Participants' responses are recorded on a five-point Likert scale, ranging from *Strongly Disagree (1)* to *Strongly Agree (5)*. Similar to the previous measures, this scale has also been argued to be a valid assessment with Cronbach's alpha coefficients ranging from **.**70 to .86 (Ang et al., 2007; Van Dyne et al., 2012), which indicates satisfactory reliability. In this study, the instrument was administered via Google Forms and took approximately 15–20 minutes to complete.

3.4. Instrument Validity and Reliability

To ensure the robustness of the findings, the validity and reliability of the three research instruments were assessed.

Validity: The constructs measured by the instruments are well-established in the literature. To ensure content validity, the instruments were consulted with two experts in the field of applied linguistics and educational psychology. Their feedback confirmed that the items were relevant, clear, and comprehensible for the target population of Algerian EFL students. Furthermore, the instruments were carefully adapted from the following established measures:

- The Critical Thinking Scale (CTS) was adapted from standardized self-report measures of critical thinking disposition, rooted in Facione's (1990a, 2015) theoretical framework.
- The Critical Thinking Test (CTT) was adapted from the *California Critical Thinking Skills Test (CCTST)* (Facione, 1990b), with scenarios and language adapted to be culturally and linguistically comprehensible for the participants.
- The Cultural Intelligence Scale (CQS) was used in its standard form as developed and validated by Ang et al. (2007), which has been widely deployed and validated across different cultural contexts.

Reliability: The internal consistency of each instrument was measured using Cronbach's alpha. The results are shown in Table 1 below.

Table 1

Reliability Coefficients for the Research Instruments

Instruments	Cronbach's α	Level of Reliability
Critical Thinking Scale (CTS)	0.84	High
Critical Thinking Test (CTT)	0.72	Acceptable
Cultural Intelligence Scale (CQS)	0.79	Acceptable

As shown in Table 1, the reliability analysis yielded Cronbach's alpha coefficients ranging from 0.72 to 0.84. According to set criteria for reliability (e.g., George & Mallery, 2003), these values fall within acceptable to high level of internal consistency for the three instruments. This suggests that the items within each scale reliably measured the same underlying construct.

3.5. Scoring procedure

The scoring procedure was used to obtain reliable and comparable quantitative data from the three measures, targeting both objective performance and subjective self-assessment. In the first measure (CTS), each item was assigned a score between one and five points with corresponding answers ranging from *Strongly Disagree* (1) to *Strongly agree* (5); the total CTS score reflects the subject's overall critical thinking performance. In addition to the total score, subscale scores for specific CT dimensions (analysis, evaluation, and inference) were also calculated to allow for correlation analysis across different aspects of critical thinking.

The second measure (CTT) provided an objective assessment of the participants' critical thinking capability. Each multiple-choice item was assigned 1 point for a correct answer. The sum of the correct responses yielded the total CTT score, which reflect the participant's actual problem solving and reasoning skills. To ensure comparability with the CTS results, the scores were later converted into percentages.

Regarding the scoring of the third scale (CQS), the subjects classified 20 statements on a five-point Likert scale from *Strongly Disagree (1)* to *Strongly Agree (5)*. The total CQ score was calculated by summing all responses, with higher total scores indicating higher overall cultural intelligence. Subscale scores were also computed for each of the four CQ dimensions—metacognitive, cognitive, motivational, and behavioural—as outlined in the original instrument by Ang and Van Dyne (2007). These scores allowed for more nuanced correlation analysis between particular aspects of CQ and the corresponding CT sub-skills.

3.6. Statistical Procedure

The data obtained from the three instruments—the Critical Thinking Scale (CTS), the Critical Thinking Test (CTT), and the Cultural Intelligence Scale (CQS)—were analysed using quantitative statistical techniques to determine the strength of the relationship among the three variables. The statistical analysis aimed to investigate the correlation between the tests total scores as well as between their sub-scores.

Before conducting inferential analysis, descriptive statistics was calculated to summarize the data. These included the mean, the median, and standard deviation for the instrument's total and sub-scores. Descriptive analysis provides an overview of participants' general levels of critical thinking and cultural intelligence capabilities.

The Pearson's Product–Moment Correlation Coefficient (r) was then deployed to assess the strength and direction of the relationship between the two variables. Specifically, correlations were calculated between:

- CTS total score (critical thinking disposition) and the CQS total score (cultural intelligence level);
- CTT score (critical thinking performance) and the CQS total score;
- and between the subscale scores of CT (analysis, evaluation, inference) and CQ (metacognitive, cognitive, motivational, behavioural).

These correlations allowed to determine whether higher levels of critical thinking (dispositional and performance-based) were associated with higher cultural intelligence among EFL learners.

4. Results

Before the presentation of the study results, it is noteworthy that the analysis was based on a final sample of thirty (30) participants. The number of the participants has decreased, as twenty (20) participants from the initial group did not answer one or more of the three measures. To ensure the validity of the correlational analysis, only the datasets of participants who completed all measures were included.

4.1. Critical Thinking Dispositions Results

The Critical Thinking Scale was administered to evaluate the self-perceived critical thinking skills of 30 EFL learners. The results revealed that the subjects had from moderate to high levels of critical thinking dispositions, with an average score of 82.45 out of 120 points. The scores showed a normal distribution, ranging from 65 to 105 points, which demonstrates consistent development of critical thinking capabilities across the participants.

Table 2

Descriptive Statistics for Critical Thinking Dispositions (CTS)

N	***M***	***SD***	**Min**	**Max**	**α**
30	82.45	9.87	65	105	.84

Note. *M* = mean; *SD* = standard deviation; α = Cronbach's alpha.

When examining specific subscales, participants demonstrated the highest performance in problem solving and decision-making, while communication and metacognitive reflection represented areas for continued development. This pattern suggests that while students can apply critical thinking to solve problems, they may benefit from additional support in articulating their reasoning processes.

Table 3

Critical Thinking Subscale Performance (N=30)

Subscale	*M*	*SD*	% Max
Analysis	21.85	2.45	72.8
Evaluation	24.90	3.12	71.1
Inference	15.20	1.89	76.0
Communication and Metacognitive Reflection	20.50	3.34	58.6

Note. *M* = mean; *SD* = standard deviation; % Max = percentage of maximum score.

4.2. Cultural Intelligence Results

The participants in the second measure, Cultural Intelligence Scale, revealed an average score of 68.75 out of 100 points. Therefore, they showed from moderate to high cultural intelligence capabilities, with scores distributed from 45 to 89 points. The results revealed that most students possess foundational intercultural skills suitable for being involved in diverse cultural contexts.

Table 4

Descriptive Statistics for Cultural Intelligence (CQS) (N=30)

M	SD	Min	Max	α
68.75	12.34	45	89	.79

Note. M = mean; SD = standard deviation; α = Cronbach's alpha.

Analysis of the four CQ dimensions revealed that motivational CQ was the strongest area, indicating high student interest and confidence in intercultural interactions. The cognitive dimension, representing knowledge of cultural norms and systems, emerged as the area requiring most development, which suggests that students would benefit from more explicit cultural knowledge instruction.

Table 5

Cultural Intelligence scale (N=30)

CQ Dimention	M	SD	% Max
Metacognitive CQ	15.45	2.23	77.3%
Cognitive CQ	16.80	3.45	56.0%
Motivational CQ	18.95	2.89	75.8%
Behavioral CQ	17.55	2.67	70.2%

Note. M = mean; SD = standard deviation; ; % Max = percentage of maximum score.

4.3. Critical Thinking Performance Results

The results of the critical thinking measure showed a mean performance score of 40.15 out of 70 points (57.4%), with scores ranging from 28 to 58 points. This indicates from developing to proficient level of critical thinking application among participants.

Table 6

Descriptive Statistics for Critical Thinking Performance (CTT)

N	*M*	*SD*	Min	Max	α
30	40.15	8.23	28	58	.76

Note. M = mean; SD = standard deviation; α = Cronbach's alpha.

4.4. Performance Level Distributions

The performance distribution reveals that while students can apply basic critical thinking skills, there is room for growth in more complex analytical tasks. The moderate correlation between dispositional and performance measures (r = 0.42) suggests that students' self-perceptions align reasonably well with their actual capabilities.

Table 7

Performance Level Classification across Measures (N=30)

Measure	Low	Moderate	High	Very High
Critical Thinking Dispositions	3 (10%)	18 (60%)	8 (27%)	1 (3%)
Cultural Intelligence	4 (13%)	16 (53%)	9 (30%)	1 (3%)
Critical Thinking Performance	5 (17%)	19 (63%)	6 (20%)	0 (0%)

Note*: Performance levels based on standardized interpretation guidelines for each measure*

4.5. Summary of Key Findings

Table 8

Comprehensive Overview of All Measures (N=30)

Measure	M	SD	Performance Level	Key Strength Area
Critical Thinking Dispositions	82.45	9.87	Moderate–High	Problem-Solving
Cultural Intelligence	68.75	12.34	Moderate	Motivational CQ
Critical Thinking Performance	40.15	8.23	Developing–Proficient	Analytical Reasoning

Note. M = mean; SD = standard deviation.

The comprehensive analysis reveals several important patterns across the three measures with our sample of 30 participants. First, students demonstrate solid foundational capabilities in both critical thinking and cultural intelligence, with mean scores consistently in the moderate to high ranges. Second, there is a convergence across all measures where motivational and applicative dimensions outperform knowledge-based components. Third, the distribution of scores suggests a normal developmental progression, whereby the greatest proportion of students falls into the moderate performance range and fewer at the extremes.

These findings provide a robust foundation for examining the interrelationships between critical thinking and cultural intelligence in the subsequent correlation analysis. The results suggest that Algerian EFL students are developing important global competencies, with particular strengths in problem solving, motivation, and intercultural engagement, while showing opportunities for growth in cultural knowledge acquisition and metacognitive articulation.

4.6. Correlational Analysis

To examine the interrelationships between critical thinking and cultural intelligence, Pearson product-moment correlation coefficients were computed among the total scores and subscale scores of all three measures for the 30 participants.

4.6.1. Correlation Between Total Scores

Table 9

Correlation Matrix for Total Scores (N=30)

Variable	1	2	3
1. CT Dispositions	1.00	.48	.42
2. CQ Total	.48	1.00	.63*
3. CT Performance	.42	.63*	1.00

Note. p < .05*

Based on the data from the sample, the correlation analysis reveals several important findings. A significant positive correlation was found between cultural intelligence and critical thinking performance ($r = 0.63$, $p < .001$), suggesting that students who possess higher intercultural capabilities tend to perform better on applied critical thinking tasks. Significant positive associations could be identified between critical thinking dispositions and cultural intelligence ($r = 0.48$, $p = .007$), and between critical thinking dispositions and performance ($r = 0.42$, $p = .021$), which indicates positive interrelationships between learners' self-perceived critical thinking abilities and both their intercultural competence and actual reasoning skills.

4.6.2. Correlation Between Critical Thinking Subscales and Cultural Intelligence

Table 10

Correlations between CT Subscales and Cultural Intelligence (N=30)

Critical Thinking Subscale	Total CQ
Information Interpretation, Analysis	0.41
Critical Evaluation and Judgment	0.49
Problem-Solving and Decision Making	0.47
Communication and Metacognitive Reflection	**0.55**
Total CT Dispositions	**0.48**

Analysis of specific critical thinking subscales revealed varying strengths of relationship with cultural intelligence. The strongest correlation emerged between communication and metacognitive reflection and cultural intelligence ($r = 0.55$), which suggests that students' ability to articulate their thinking and reflect on their reasoning processes is closely linked to their intercultural capabilities.

4.6.3. Correlation between Cultural Intelligence Dimensions and Critical Thinking

Table 11

Correlations between CQ Dimensions and Critical Thinking Measures (N=30)

CQ dimension	CT dispositions	CT performance
Metacognitive CQ	0.51	0.46
Cognitive CQ	0.38	0.42
Motivational CQ	0.49	0.44
Behavioral CQ	0.52	0.58
Total CQ	0.48	0.63*

p* < .05

Analysis of the factors of cultural intelligence highlights particular patterns. The behavioural component of CQ had the strongest relationship with performance on critical thinking (r = 0.58), suggesting that being able to function effectively at a behavioural level in intercultural contexts is strongly related to practical critical thinking ability. The metacognitive component of CQ had the strongest relationship with dispositions towards critical thinking (r = 0.51).

4.6.4. Multiple Regression Analysis

Table 12

Multiple Regression Analysis Predicting Cultural Intelligence from Critical Thinking Components (N=30)

Predictor	β	*p*
Communication and Metacognitive Reflection	0.42	< .05
Critical Evaluation and Judgment	0.31	< .05
Problem-Solving and Decision Making	0.18	ns
Information Analysis and Interpretation	0.15	ns

Note. β = standardized beta coefficient; ns = not significant. Model summary: R^2 = .52, adjusted R^2 = .45, $F(4, 25) = 6.78$, $p < .01$.

A multiple regression analysis was conducted to determine which critical thinking components serve as the strongest predictors of overall cultural intelligence. The global model was statistically significant, accounting for 52% of the variance in cultural intelligence. Of the predictor variables, communication skills and meta-cognitive reflection were identified as the best unique predictors (β = 0.42, $p < .05$), suggesting that students' skills in articulating their reasoning process are significant in determining their skills in intercultural interactions.

Table 13

Regression Model Predicting Critical Thinking Performance from CQ Dimensions (N=30)

Predictor	B	p
Behavioral CQ	0.48	< .01
Metacognitive CQ	0.35	< .05
Motivational CQ	0.22	ns
Cognitive CQ	0.15	ns

Note. R^2 = .58, Adjusted R^2 = .52, $F(4, 25)$ = 7.95, p < .001. *ns* = not significant.

A second regression analysis examined the prediction of critical thinking performance from cultural intelligence dimensions. This model explained 58% of the variance in CT performance scores, with behavioral CQ emerging as the strongest predictor (β = 0.48, p < .01).

5. Discussion

As has been mentioned earlier, the aim of this research work is to examine the level of critical thinking (CT) as with cultural intelligence (CQ) among Algerian EFL students. Likewise, the study purports to measure the degree of association between these constructs. The findings of this investigation confirm the aforementioned hypothesis and provide empirical evidence on the link between CQ and CT.

5.1. Level of Critical Thinking and Cultural Intelligence capabilities

Regarding the primary research question of the level of CT and CQ among Algerian EFL learners, the findings revealed moderate capability in terms of critical thinking and cultural intelligence. However, the participants demonstrated higher critical thinking dispositions, notably in problem solving and decision making, in contrast, lower scores were shown in skills like communication and metacognitive reflection. As with cultural intelligence results, the subjects displayed higher motivational CQ in comparison to cognitive CQ, which was comparatively weaker. These results are in line with past research (e.g. Canbay, 2020; Gedik, 2022; Zou & Lertlit, 2022) where learners demonstrate stronger behavioural skills in comparison to explicit cultural knowledge. In the Algerian context, these results may reflect the instructional focus on the internalization of linguistic structures than on systematic engagement with cultural systems and critical intercultural reflection. The students' weak performance in cognitive CQ would indicate lack of pedagogical opportunities to acquire cultural knowledge explicitly in spite of the apparent willingness from the part of the learners to engage in intercultural communication.

5.2. Relationship between Critical Thinking and Cultural Intelligence

Regarding the third research question, the results of the correlational analyses showed a strong positive correlation between cultural intelligence (CQ) and critical thinking (CT). The findings of the CT and CQ performance tests showed the strongest link, indicating that students with greater cultural competency are more likely to use stronger critical thinking abilities.

These results are in line with earlier studies on the relationship between intercultural competence and higher-order cognitive skills in EFL (Rafie et al., 2016; Karadağ, 2022; Bećirović, 2023). This also confirms Facione's (2010) and Halpern (2014) theoretical framework that characterizes critical thinking as an adaptive, reflective, and context-sensitive process—traits which are viewed as core to cultural intelligence as well. These findings recommend instructional practice to develop critical thinking capability to prepare learners to be culturally competent.

5.3. Sub-Dimensional Interrelationship between CT and CQ

A thorough analysis of the findings indicated that the strong predictors of cultural intelligence are communication and metacognitive reflection. On the other hand, behavioural CQ was observed as the strongest predictive factor of critical thinking performance. These results confirm the multidimensional nature of the relationship between our research variables (CQ and CT). These results support Ang and Van Dyne's (2008) theoretical model, which places cultural awareness and regulation as central components of CQ. The findings also go in line with Deardorff's (2009) theory that reflective communication is fundamental to achieve successful intercultural interaction.

It is worth noting that the results indicate that behavioural adaptability is the predictor of the reasoning skill. While past research has emphasized the cognitive intersection between CT and CQ (Wang, 2022; Karakuş, 2024), these findings indicate that the capability to make successful verbal and non-verbal behaviour in a culturally diverse context may promote problem solving and evaluative reasoning functioning. This also goes hand in hand with Yu & Lu (2023) belief that real-world engagement and action foster cognitive development.

5.4. Pedagogical Implications

The results provide strong evidence that critical thinking and cultural intelligence should be developed concurrently rather than treated as separate instructional outcomes. The regression results offer compelling evidence for the connection between the development of cultural intelligence and critical thinking. The finding that communication and metacognitive reflection are the strongest predictors of cultural intelligence underscores the importance of verbal reasoning and self-reflection in intercultural learning. The strong predictive relationship between behavioural CQ and critical thinking performance suggests that experience with behavioural adaptation in cultural contexts enhances students' practical application of critical thinking. Integrated educational strategies that concurrently address both conceptions are supported by this reciprocal interaction. Pedagogical approaches and instructional strategies that incorporate discussion, intercultural problem-solving tasks, and experiential learning activities would be beneficial for EFL education. These techniques would nurture the students' ability to reason and, henceforth, their ability to perform well in intercultural communicative contexts.

6. Conclusion

This study was conducted to investigate the relationship between critical thinking (CT) and cultural intelligence (CQ) among 30 Algerian EFL students. The findings confirmed a significant and positive correlation between these two constructs, with a particularly strong link between learners' cultural intelligence and their performance on applied critical thinking tasks. A nuanced analysis revealed that specific dimensions are most closely intertwined: the behavioural aspect of CQ is a key predictor of CT performance, while the metacognitive and communicative skills of CT are fundamental predictors of overall cultural intelligence.

Such results have very important implications regarding EFL education, pointing out that critical thinking (CT) and cultural intelligence (CQ) are not separate learning outcomes but, instead, mutually related. In other words, it is essential to ensure language-learning progresses toward an approach cantered on curriculum design focused on integrating critical thinking and intercultural competencies. This could be very well achieved through experiential learning, involving personal adaptation, coupled with reflective learning to enhance students' critical thinking regarding various cultures.

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