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Assessment of Non-English-major Undergraduates' Critical Thinking Skills in Western Jiangxi Province, China

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Abstract: *This study investigates the level of critical thinking skills (CTS) among non-English-major undergraduates from three universities in Western Jiangxi Province, China. Recognizing the increasing cognitive demands of translation-related tasks and existing educational disparities, this research assesses students' CTS levels and explores demographic variations by university affiliation, gender, field of study, academic year and English proficiency level. The study is part of a broader research project examining the interrelationship between critical thinking skills, motivation, and translation competence.*

A quantitative survey design was adopted using a validated CTS scale based on the Delphi Report framework. Data were collected from 532 non-English-major undergraduates enrolled at Pingxiang University, Xinyu University, and Yichun University. Both descriptive statistics and inferential statistical analyses (independent-samples t-tests, one-way ANOVA, and two-way ANOVA) were conducted to analyze the data and to examine main and interaction effects across demographic variables.

Findings indicated that respondents' overall critical thinking skills were moderately high (M = 3.38, SD = 0.53). Female students significantly outperformed male students in the level of CTS. In terms of field of study, students in arts and physical education (APE) demonstrated significantly higher CTS levels than those in STEM fields. Furthermore, students with English proficiency level above CET-4 scored markedly higher than their peers below CET-4. A significant interaction effect was also observed between gender and field of study, i.e. female students in APE majors demonstrated significantly higher levels of critical thinking skills than their counterparts in STEM disciplines, suggesting nuanced group-specific cognitive profiles.

Curriculum developers and educators should embed explicit critical thinking instruction into translation modules, with a focus on gender-sensitive and discipline-specific interventions. Enhancing CTS through targeted pedagogical reforms will foster more cognitively prepared learners across diverse academic backgrounds.

Keywords: *Critical thinking skills, level difference, non-English-major undergraduates, gender, field of study, English proficiency level, Western Jiangxi Province*

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1. Introduction

Critical thinking is widely recognised as a foundational skill across various academic disciplines, cultures, and educational systems worldwide, including within China. It has long been considered crucial not only for academic success but also for enabling individuals to engage meaningfully in social, civic, and professional life (Facione, 2015). According to Rychen and Salganik (2003), critical thinking ranks among the essential competencies for lifelong learning and effective societal participation. Similarly, the Organisation for Economic Co-operation and Development (OECD) has stressed the importance of critical and creative thinking in managing the demands of increasingly complex and dynamic global environments (Vincent-Lancrin et al., 2019).

In the Chinese educational context, the significance of critical thinking has been strongly affirmed. As highlighted by the Core Competency Research Group (2016), it is a central element in the country's national curriculum reform initiatives. Furthermore, national leaders, including President Xi Jinping (2021), have frequently underscored the importance of cultivating innovative and critical thinkers to support China's progress in science, education, and technological innovation.

Over the past few decades, there has been a noticeable rise in scholarly attention to critical thinking skills (CTS) within higher education, especially concerning their role in fostering student achievement and lifelong learning capacity (Martins et al., 2025; Listiana et al., 2025; Phusavat & Ongkunaruk, 2025). Research across various higher education contexts has demonstrated that critical thinking skills (CTS) can vary significantly according to demographic variables such as gender (Ghanizadeh, 2017), academic year (Bezanilla et al., 2019), field of study (Quitadamo et al., 2008), and English language proficiency (Ku & Ho, 2010). University affiliation has also been shown to influence CTS development, often reflecting differences in institutional resources, pedagogical orientation, and academic culture (Giancarlo & Facione, 2001).

However, despite increasing scholarly attention to CTS, few studies have systematically examined whether these skills vary across multiple demographic factors in the same research design, especially in less-developed regions such as Western Jiangxi Province, where universities are striving to enhance students' cognitive, communicative, and problem-solving abilities. Nevertheless, employers have expressed concerns that many graduates still lack adequate CTS for the demands of the workplace, particularly in sectors requiring independent judgment, analytical reasoning, and evidence-based decision-making (Tiwari et al., 2006;Wu, 2023). Such deficiencies can manifest in limited problem diagnosis skills, difficulty evaluating the credibility of information sources, and a tendency to adopt rote learning rather than analytical approaches. This mismatch between academic training and professional requirements underscores the urgency of investigating how demographic factors influence CTS, to inform targeted interventions that address these gaps and prepare graduates for both domestic and global challenges.

This article presents partial findings from a broader research project titled *"The Mediating Effect of Motivation Between Critical Thinking Skills and Translation Competence Among Non-English-Major Undergraduates in Western Jiangxi Province, China"*. The overarching study investigates the complex interrelationships among critical thinking skills, motivation, and translation competence. While the broader aims and theoretical models will be detailed in forthcoming publications, the present paper focuses exclusively on the cognitive dimension—namely, the assessment of critical thinking skills. By examining both the overall level of CTS and group-level differences across demographic variables, this study aims to contribute empirical insights to the fields of translation education, educational psychology, and curriculum design.

Accordingly, this study is guided by the following objectives: (1) to examine the level of critical thinking skills among non-English-major undergraduate students in Western Jiangxi Province, and (2) to determine whether CTS levels vary significantly across five demographic variables: gender, academic year, university affiliation, field of study, and English proficiency level. These objectives are designed to address the current lack of empirical data and provide a foundation for future pedagogical interventions.

2. Literature review

Despite the universal recognition of its importance, scholars remain divided on how critical thinking should be conceptualised and defined.

2.1 Multidisciplinary foundations of critical thinking

The study of critical thinking is informed by various disciplinary traditions, each offering distinct conceptual lenses. From a philosophical perspective, critical thinking is rooted in rational inquiry and sceptical reflection. Building on the Socratic method, modern philosophers like Siegel (1985) stress the normative dimension of critical thinking: its role in cultivating a "critical spirit" and guiding individuals toward truth and logical consistency. Pettersson et al. (2020) further argue that idealised philosophical views of reasoning should be pragmatically aligned with how learners apply reasoning in authentic educational contexts.

In psychology, critical thinking is closely related to Dewey's (1991) concept of reflective thinking and Glaser's (1942) notion of critical evaluation of statements. Later theorists such as Ennis (1962), McPeck (1981), and Paul (1989) expanded these definitions to incorporate meta-cognitive processes like conceptual analysis, synthesis, and judgement. Sternberg (1986) viewed critical thinking as a strategy-driven process essential for effective problem-solving, while Pauzi (2024) highlighted its intersection with epistemology and curriculum design, framing it as both a skill and a disposition necessary for intellectual and moral development.

In the educational domain, Bloom's Taxonomy of Educational Objectives (TOEO) laid the foundation for understanding cognitive domains relevant to critical thinking. Core components such as "analysis," "synthesis," and "evaluation" are central to educational assessment and pedagogy (Anderson & Krathwohl, 2001). Contemporary scholars continue to debate how these components should be operationalised across domains.

2.2 Structural models of critical thinking

Scholars have proposed several structural models of critical thinking to define its core components and make them amenable to empirical investigation. Among the most frequently referenced are three foundational frameworks.

The Single-Dimension Model (Glaser, 1942) conceptualizes critical thinking as a linear reasoning process that centers on assessing evidence and resolving problems through logical analysis. In contrast, the Two-Dimension Model (Facione, 1990) offers a dual-layered perspective by separating critical thinking into cognitive skills and dispositional tendencies. The cognitive dimension includes six key skills: interpretation, analysis, inference, evaluation, explanation, and self-regulation, while the dispositional aspect highlights traits such as truth-seeking, open-mindedness, and systematic thinking. Building upon these earlier frameworks, the Three-Dimension Model developed by Paul (1991) provides a more integrated view. It weaves together intellectual standards, elements of thought, and intellectual virtues—emphasizing a holistic approach to critical thinking that is both reflective and rigorous.

Although these models differ in structure and emphasis, they share a common belief: that critical thinking is not only teachable and observable but should be purposefully embedded in the pedagogy and assessment strategies of higher education.

2.3 Conceptual framework adopted in the present study

The present study adopts the Delphi Model of critical thinking proposed by Facione (1990), focusing specifically on the cognitive skills dimension. This orientation is consistent with the empirical goals of the research, which seeks to measure students' actual skills rather than their attitudinal dispositions. The six skills—interpretation, analysis, evaluation, inference, explanation, and self-regulation—represent a sequence of cognitive operations relevant to complex judgement and decision-making.

However, based on both theoretical reasoning and empirical alignment with the current research context, the "explanation" dimension is excluded. The Delphi Report itself acknowledges that not all skills are contextually applicable to every discipline (Facione, 1990). Drawing on both theoretical and empirical considerations, this exclusion is supported by Song (2016), who argued that explanation, which typically requires verbal articulation of reasoning, may have limited applicability in the context of translation tasks. For non-English-major undergraduates, especially in written or cognitively internal decision-making settings, verbal explanation is often not a central feature. Consequently, this study operationalises critical thinking skills through a five-skill model that better reflects students' cognitive engagement during translation and problem-solving. Specifically, five core dimensions were assessed: interpretation, which involves comprehending and clarifying meaning; analysis, which focuses on identifying patterns, logical relationships, and structural elements within arguments or data; evaluation,

which entails assessing the credibility of information sources and the quality of reasoning; inference, the ability to draw logical conclusions from available evidence; and self-regulation, which refers to monitoring, questioning, and refining one's own cognitive processes throughout problem-solving tasks.

3.Methodology

This study employed a quantitative research methodology with a cross-sectional survey design, to assess the levels of critical thinking skills (CTS) among non-English-major undergraduate students in Western Jiangxi Province, China. The selection of this design is justified by the study's objective to measure and compare CTS across different demographic groups in a structured and statistically valid manner. A quantitative approach enables the collection of standardised responses from a large sample, thereby facilitating generalisability and inferential analyses.

3.1 Population and participants

The target population for this study consisted of non-English-major undergraduate students enrolled at three public universities in Western Jiangxi Province, namely Pingxiang University (PXU), Xinyu University (XYU), and Yichun University (YCU). These institutions were selected due to their regional representativeness and the substantial size of their undergraduate student cohorts.

According to the universities' official statistics, PXU admits approximately 3,009 non-English-major undergraduates annually, XYU around 3,740, and YCU approximately 4,930. The total non-English-major undergraduate population across these three institutions is estimated at 46,716 students. This broad base ensured that the study captured a diverse and representative student sample reflective of the wider higher education environment in Western Jiangxi.

The inclusion of students from all four academic years (first to fourth year) provided a longitudinal perspective on cognitive development across university stages. In addition, demographic variation in gender, field of study, university affiliation, and English language proficiency further enriched the data, allowing for robust subgroup comparisons.

3.2 Sample size and sampling method

The sample size was determined by using the Krejcie and Morgan (1970) sample size determination table, which recommends a minimum of 381 respondents for a population of over 45,000. This number ensures a 95% confidence level with a 5% margin of error—criteria widely accepted in educational research for achieving statistical reliability and generalisability (Sudina, 2021).

To account for potential attrition or non-response, a larger sample of 532 was targeted, maintaining statistical power while reducing the risk of bias. The chosen sample size also supports the use of advanced statistical procedures such as multiple comparisons and factorial analysis of variance (ANOVA), which require adequate participant numbers for each subgroup.

A stratified sampling method was adopted to ensure proportional representation across key university strata. The population was divided into strata based on university affiliation.

Participants were then randomly selected within each university in proportion to the size of that subgroup in the total population (Wu & Thompson, 2020). This method reduces sampling bias and enhances the precision of group comparisons.

3.3 Instrumentation

The instrument which was used to measure critical thinking skills was a scale adopted from Wang Yuying's (2022) doctoral dissertation titled "Research on the Influencing Factors and Optimization Strategies of College Students' Critical Thinking Development in Virtual Learning Environment." The original scale was developed in Chinese and has been validated in the context of Chinese higher education, making it linguistically and culturally appropriate for the current study population.

The instrument adopted and used in this study was grounded in the Delphi framework proposed by Facione (1990), which conceptualises critical thinking as comprising multiple interrelated cognitive skills.

The scale consists of 34 five-point Likert items, each ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Prior to formal data collection, two experts reviewed the questionnaire to ensure its content and face validity. In addition, a pilot study was conducted with 30 students to ensure item clarity and contextual relevance. Internal consistency reliability, assessed using Cronbach's alpha, was found to be 0.93 and the validity, assessed by KMO and Barlette test, turned out to be 0.78, indicating satisfactory psychometric properties.

3.4 Data collection and analysis procedures

Data were collected through Wenjuanxing (www.wenjuan.com), which link was distributed through WeChat/QQ groups with participation details after prior consent from university authorities and participants. Participants were informed of the voluntary nature of the study and anonymity was ensured.

All responses from the questionnaire were systematically coded and entered SPSS Version 26.0 for quantitative analysis. A series of statistical analysis procedures were conducted to address the research questions. Firstly, descriptive statistics, including means, standard deviations, and frequency distributions, were computed to summarise participants' demographic characteristics and their overall performance on the critical thinking skills (CTS) scale. To explore relationships among categorical demographic variables, chi-square tests of independence were employed.

To assess differences in CTS levels across demographic groups, a combination of inferential tests was implemented. Independent samples t-tests were used for comparisons involving binary variables, particularly gender. For variables with more than two groups, such as field of study, English proficiency, academic year, and university affiliation, one-way analysis of variance (ANOVA) was conducted. In cases where interaction effects were hypothesised, two-way ANOVA procedures were applied, with specific focus on the interaction between gender and field of study.

All statistical analyses were conducted at a significance level of $p < .05$. Where significant differences were identified, effect sizes were calculated and reported using appropriate

indicators such as Cohen's d and partial eta-squared (η^2), providing a clearer understanding of the magnitude of group differences and interaction effects.

4. Results and discussion

This section presents and interprets the key findings of the study, highlighting overall critical thinking skill levels and significant group differences across demographic variables.

4.1 Results

This section mainly presents descriptive analyses of participants' characteristics, their overall level of critical thinking skills, and the variation in the level of critical thinking skills among the different demographic groups.

(1) Descriptive Statistics (related to RQ1)

Firstly, descriptive analysis was conducted to examine the demographic distribution of participants and the overall level of critical thinking skills (CTS). The total number of valid respondents was 532. As shown in Table 1, the sample included 304 female students (57.14%) and 228 male students (42.86%). Regarding academic year, 58.08% were Year 1 students, followed by 15.60% from Year 2, and 26.32% from Year 3 or Year 4. Students were distributed across three universities: Pingxiang University (37.22%), Yichun University (32.33%), and Xinyu University (30.45%).

In terms of field of study, 48.32% were from Liberal Arts and Social Sciences (LASS), 36.65% from Science, Technology, Engineering, and Medicine (STEM), and 15.04% from Arts and Physical Education (APE). A majority of students (64.85%) had not yet passed CET 4, while 20.30% were at the CET 4 level and 14.85% had passed above CET 4.

Table 1 Categorical Variables of the Respondents

Variable	Categories	Frequency	Percent (%)
gender	female	304	57.14
	male	228	42.86
Academic Year	Year 1	309	58.08%
	Year 2	83	15.60%
	Year 3&4	140	26.32%
University Affiliation	PXU	198	37.22
	YCU	172	32.33
	XYU	162	30.45
Field of Study	LASS	257	48.32
	STEM	195	36.65
	APE	80	15.04
English Proficiency	below CET 4	345	64.85
	CET 4	108	20.30

Level	Above CET 4	79	14.85
Total		532	100.000

Source: Developed for this research.

Secondly, descriptive statistical analysis was conducted for the continuous variable. After normality test of all items related to critical thinking skills scale, the descriptive statistics for the critical thinking skills scale yielded a mean score of 3.38 with a standard deviation of 0.53, suggesting a moderately high level of critical thinking skills among the sample.

(2) Group difference analysis (related to RQ2)

Inferential statistical tests were conducted to assess whether significant differences existed in CTS across five demographic variables: gender, academic year, university affiliation, field of study, and English proficiency level. Homogeneity of variances was tested prior to all group comparisons, which will not be presented in this article.

(a) Gender differences in CTS

An independent sample t-test revealed a statistically significant difference between male and female students in CTS scores. As is shown in Table 2, female students (M = 3.49, SD = 0.50) outperformed male students (M = 3.24, SD = 0.54), with t(530) = -5.42, p < .001, indicating a moderate effect size (Cohen's d = 0.48). This suggests that gender is a relevant factor in the development of critical thinking skills, with female students demonstrating stronger overall performance.

Table 2 T-test for gender

Variable	Group	Sample Size	Mean	S. D	T and p-value	Welch's test	Mean difference	Cohen's d
CTS	Male	228	3.24	0.54	T=-5.42	T=-5.36	0.25	0.48
	Female	304	3.49	0.50	$p<$ 0.001	$p<$ 0.001		

(b) Field of study difference in CTS

A one-way ANOVA showed a significant difference in CTS scores across fields of study, F (2, 529) = 2.03, p < .05. As is shown in Table 3, post hoc multiple comparisons (Bonferroni method was used in all the post hoc multiple comparisons of this study) indicated that students from the APE group (M = 3.47) scored significantly higher than students in the STEM group (M = 3.31), p = .03. No significant differences were observed between LASS and the other two groups. The partial eta squared was 0.01, indicating a small effect size (Cohen's f = 0.11). This result highlights that students in creative or performance-based fields may engage in more complex cognitive tasks contributing to their higher CTS.

Table 3 Post hoc multiple comparisons for field of study

Variable	(I)Group	(J)Group	(I)Mean	(J)Mean	Diff(I-J)	P	Between-group Deviation	Total Deviation	Partial η^2	Cohen's f
CTS	LASS	STEM	3.40	3.31	0.09	0.07	1.72	151.36	0.01	0.11
	LASS	APE	3.40	3.47	-0.07	0.34				
	STEM	APE	3.31	3.47	-0.16	0.03				

(c) English proficiency level difference in CTS

Significant differences were also found across groups based on English proficiency, $F(2, 529) = 2.03$, $p < .05$. Post hoc tests, as is shown in Table 4, revealed that students who had passed above CET 4 ($M = 3.49$) scored significantly higher than those below CET 4 ($M = 3.34$), $p = .01$. Differences between CET 4 and other groups were not statistically significant. These findings suggest that English language ability may be associated with stronger critical thinking development, possibly due to increased exposure to diverse linguistic and cognitive structures.

Table 4 Post hoc multiple comparisons for English proficiency level

Variable	(I)Group	(J)Group	(I)Mean	(J)Mean	Diff(I-J)	P	Between-group Deviation	Total Deviation	Partial η^2	Cohen's f
CTS	below CET 4	CET 4	3.34	3.41	-0.07	0.29	2.03	151.36	0.01	0.12
	below CET 4	above CET 4	3.34	3.49	-0.15	0.01				
	CET 4	above CET 4	3.41	3.49	-0.08	0.29				

(d) Two-way interaction

To further explore the combined effects of demographic variables on critical thinking skills (CTS), this study conducted a series of two-way ANOVA examining all possible interaction terms among gender, academic year, university affiliation, field of study, and English proficiency level. The goal was to identify whether interactions between any two demographic variables significantly influenced students' CTS performance.

Among the tested combinations, only the interaction between gender and field of study reached statistical significance, indicating that the relationship between field of study and CTS differs depending on gender. Other interaction effects (e.g., Gender × Academic Year, University Affiliation × English Proficiency Level) were found to be non-significant and are thus not reported in this article for parsimony and clarity.

The significant Gender × Field of Study interaction revealed nuanced differences as shown in Table 5. Among male students, those in STEM fields scored marginally higher in CTS than their LASS counterparts, with a mean difference of 0.15 ($p = .07$). Among female students, APE

students scored significantly higher than those in STEM, with a mean difference of 0.27 (p = .01), while LASS students slightly outperformed STEM students, with a mean difference of 0.14 (p = .07). These findings suggest that the cognitive development of critical thinking skills may be shaped not only by discipline but also by gendered learning contexts and academic orientations.

Table 5 Post hoc comparison for gender × field of study

Gender	(I) Field of Study	(J) Field of Study	Mean Difference (I-J)	Std. Error	P	97.5% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Male	LASS	STEM	-0.15	0.08	0.07	-0.32	0.03
		APE	-0.10	0.11	0.37	-0.35	0.15
	STEM	LASS	0.15	0.08	0.07	-0.03	0.32
		APE	0.05	0.10	0.66	-0.18	0.27
	APE	LASS	0.10	0.11	0.37	-0.15	0.35
		STEM	-0.05	0.10	0.66	-0.27	0.18
Female	LASS	STEM	0.14	0.07	0.07	-0.03	0.30
		APE	-0.13	0.08	0.11	-0.32	0.06
	STEM	LASS	-0.14	0.07	0.07	-0.30	0.03
		APE	-0.27	0.10	0.01	-0.49	-0.05
	APE	LASS	0.13	0.08	0.11	-0.06	0.32
		STEM	0.27	0.10	**0.01**	0.05	0.49

4.2 Discussions

This section interprets the study's major findings in relation to the stated research objectives and contextualizes them within the broader body of critical thinking literature.

4.2.1 Level of Critical Thinking Skills

Descriptive analysis revealed that non-English-major undergraduates in Western Jiangxi Province demonstrate a moderately high level of critical thinking skills (CTS), with an overall mean score of 3.38 (SD = 0.53). This suggests that students possess basic competencies in reasoning, analysis, and inference, yet there is evident room for improvement.

This moderate performance level mirrors trends reported in several empirical investigations. For instance, Ma, Liu, and Tang (2023) identified similar shortcomings among Chinese medical undergraduates, while Bi and Che (2024) noted that students in teacher training programmes often lack strong critical thinking dispositions. Li (2024) also reported negative or underdeveloped critical thinking tendencies among non-English majors, attributing these outcomes to the overreliance on passive, lecture-driven pedagogies. Wang and Yuan (2017) further argued that limited exposure to problem-based learning (PBL) and weak curriculum integration of higher-order skills constrain students' critical faculties.

These results can be contextualized within the pedagogical characteristics of non-key universities in Western Jiangxi, where traditional exam-oriented instruction dominates, and few opportunities exist for authentic reasoning or reflective engagement. The emphasis on rote learning in English language courses likely contributes to the limited cultivation of meta-cognitive strategies necessary for critical thinking.

Nevertheless, there are promising pedagogical innovations underway. Wen's (2015) Production-Oriented Approach (POA) and the increasing adoption of flipped classrooms (Li, 2024) have shown efficacy in integrating output-driven, reflective learning. Moreover, Bezanilla et al. (2019) emphasized the value of practices like argumentation, synthesis, and case-based analysis in improving students' critical thinking regardless of instructional setting. Such methodologies offer a road-map for educators in similar contexts seeking to improve cognitive outcomes among non-English majors.

4.2.2 Group Differences in Critical Thinking Skills

The study also examined demographic variation in CTS, revealing significant differences across gender, academic discipline, and English proficiency.

(a) Analysis showed that female students significantly outperformed male students in overall CTS scores. This finding is consistent with prior studies reporting superior female performance in reflective and analytical tasks (Shubina & Kulakli, 2019). Al-Mahrooqi and Denman (2020) similarly documented higher CTS scores among female students in both science and humanities streams. These outcomes may be attributed to gender differences in classroom engagement, learning preferences, and task orientation, particularly in environments that reward reflective discourse and sustained reasoning.

However, the literature presents some contradictory evidence. For instance, Marni, Aliman, and Harsiati (2020) found no gender-based difference in CTS among Indonesian undergraduates, while Rizal et al. (2021) highlighted male dominance in digital analytical tasks. These mixed findings suggest that cognitive disparities may be influenced by educational setting, assessment type, or domain-specific content rather than gender alone.

(b) This study found significant variation in CTS across academic disciplines. Specifically, students in Science, Technology, Engineering, and Mathematics (STEM) disciplines scored significantly lower than their counterparts in arts and physical education (APE) fields. This trend aligns with the findings of Li, Han, and Zhong (2019), who observed stronger CTS among students in humanities-related majors. Similarly, Si (2024) noted inconsistency in discipline-based CTS outcomes but acknowledged the influence of curricular structure and learning tasks.

In contrast, some scholars (e.g., Zhou, 2019; Franco & Almeida, 2015) have reported better CTS performance among science students, especially in postgraduates. However, in the Jiangxi context, the dominance of formulaic and exam-focused pedagogies in STEM education may limit student exposure to open-ended reasoning and reflective exercises—both vital to critical thinking.

(c) Results indicated a clear link between English proficiency and CTS: students with proficiency above CET-4 scored significantly higher in critical thinking than their peers with lower scores. These findings support the view that language proficiency and cognitive development are mutually reinforcing, particularly in tasks requiring interpretation, evaluation,

and self-regulation.

Students above CET-4 also displayed stronger bilingual and instrumental competencies, likely due to broader exposure to English input and more advanced engagement with academic texts. This echoes existing research highlighting that language proficiency serves as both a cognitive tool and a gatekeeper for access to critical thinking-rich tasks (Bi & Che, 2024)

(d) A significant interaction effect was found between gender and academic discipline, indicating that the influence of field of study on CTS differs across genders. Among male students, those in STEM disciplines performed better in CTS than those in LASS, although the effect size was small. This may reflect the analytical emphasis of STEM curricula (Dong et al., 2023), but the lack of broader meta-cognitive instruction likely limits deeper critical engagement.

For female students, those in APE disciplines scored significantly higher than those in STEM field with a moderate effect size, while LASS students slightly outperformed STEM students, with a small effect size. This finding challenges stereotypes that prioritize STEM for cognitive development and underscore the importance of diverse instructional strategies across fields.

This may be due to the discursive and interpretive nature of humanities education, which supports the development of reasoning and reflective thinking (Ghanizadeh, 2017; Al-Mahrooqi & Denman, 2020). Furthermore, these findings underscore the necessity of field- and gender-responsive pedagogies. Instructional designs should accommodate varied learning styles, particularly in underrepresented disciplines, and embed strategies that promote cognitive engagement for all learners.

5. Conclusion and Recommendations

This section summarizes the main findings and discusses their educational implications, followed by practical recommendations to enhance critical thinking skills among non-English-major undergraduates and for future research.

5.1 Conclusion

This study investigated the level of critical thinking skills (CTS) among non-English-major undergraduates in Western Jiangxi Province, China, and explored how CTS levels varied across gender, field of study, and English proficiency. Employing a quantitative, cross-sectional survey design, the study involved 532 undergraduate students from three regional universities: Pingxiang University, Xinyu University, and Yichun University. Data were collected using a validated instrument adapted from Wang Yuying's (2022) scale, which was grounded in the American Philosophical Association's Delphi framework for CTS. The respondents represented diverse academic years, fields of study, and English proficiency levels, allowing for robust comparative analysis.

The findings revealed that participants, on average, demonstrated a moderately high level of critical thinking skills. This suggests a basic awareness of core cognitive abilities—such as inference, evaluation, and analysis—but also highlights that their overall competence remains inadequate when compared with the complex cognitive demands required for effective translation performance and higher-order academic tasks. The results underscore the need for

more targeted instructional strategies to enhance students' critical engagement and cognitive processing in language learning contexts.

Significant differences emerged across gender, academic discipline, and English proficiency. Female students significantly outperformed their male peers in overall CTS, supporting existing literature that links meta-cognitive engagement more strongly with female learners. Likewise, students majoring in arts and physical education (APE) disciplines exhibited significantly higher CTS scores than those from STEM backgrounds, possibly due to the more interpretive and discursive nature of arts-based curricula. Furthermore, students with English proficiency above CET-4 achieved better CTS outcomes, reaffirming the interdependence between language skills and critical cognitive abilities. A notable interaction effect was also found between gender and field of study, with female APE students showing the highest CTS levels, and male STEM students scoring marginally higher than their liberal arts counterparts. These results reflect a nuanced and interdependent relationship between demographic attributes and cognitive development in higher education.

5.2 Recommendations

Considering the findings, several recommendations are proposed to help develop critical thinking skills among non-English-major undergraduates, particularly in under-resourced regions like Western Jiangxi Province. First, university curricula should be re-calibrated to incorporate explicit instruction in higher-order thinking. This includes embedding structured tasks such as argument evaluation, critical reading, reflective writing, and case analysis into both language and general education courses. These activities are aligned with the cognitive dimensions of the Delphi framework and can significantly enhance students' reasoning, inference, and evaluative capacities.

Furthermore, the observed gender-based differences in critical thinking performance call for more gender-responsive pedagogical strategies. Male students—particularly those in liberal arts disciplines—may benefit from scaffolding techniques that promote metacognitive awareness and cognitive persistence. Such interventions may include structured debate formats, guided questioning techniques, and peer review exercises that are specifically designed to stimulate cognitive engagement.

Disciplinary disparities in critical thinking performance also suggest the need for field-specific teaching models. In STEM programs, where critical thinking scores were lower, pedagogical practices should move beyond rote content delivery toward inquiry-based learning, interdisciplinary project work, and reflective lab reporting. These approaches have been shown to bridge the gap between technical problem-solving and broader critical reasoning.

In addition, since English proficiency was found to be positively associated with critical thinking skills, translation and English courses should be restructured to emphasize integrated cognitive-linguistic development. Tasks such as source text evaluation, justification of lexical choices, and error correction not only improve language proficiency but also cultivate deeper analytical habits.

At the institutional level, universities should consider establishing support mechanisms such as critical thinking labs, writing centres, and reflective learning workshops. These resources can provide ongoing formative support and promote a campus-wide culture of inquiry. It is also important to invest in ongoing professional development for instructors, equipping them with

both the conceptual knowledge and practical tools needed to facilitate cognitive skill development across disciplines.

Lastly, future research and teaching practices should adopt a longitudinal perspective in evaluating students' cognitive growth. Beyond one-off assessments, sustained monitoring of critical thinking performance—possibly through portfolios or repeated assessments—can yield richer insights into how cognitive competencies evolve in response to pedagogical intervention. By adopting these multidimensional and contextually relevant strategies, institutions can better equip students with the critical faculties needed for academic success, translation competence, and broader intellectual adaptability in the 21st-century learning environment.

6. References

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