



The Relationship Between Critical Thinking Disposition and Argumentative Writing Performance of EFL Learners in China

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Abstract. Critical thinking disposition is the habitual intrinsic motivation of people and the drive for learning critical thinking knowledge and skills. The present study explores the relationship between students' CTD and EFL argumentative writing. To this end, 140 students who majored in the English major in a tertiary university of science and technology were selected and given the test of CTD and EFL argumentative writing test. The writing test was then reviewed by the automated essay scoring system iWrite. The results show that the English majors possess a strong positive CTD and there is no relation between students' CTD and EFL argumentative writing performance.

Keywords: CTD · EFL learners · Argumentative writing

1 Introduction

The development of digital and networked technologies [1] and the emergence of “21st century skills” [2] has triggered great interest in teaching thinking in classrooms. Linguistic circle generally believed that critical thinking is closely related to writing, especially argumentative writing, a process highly overlapping with the use of 21st century skills. Various theoretical and empirical studies have been done to prove that critical thinking (hereafter CT) exerts a positive influence on writing.

Particularly, studies on the relationship between CT and writing performance of EFL learners have gained fruitful results. A typical example was made by Chinese scholar Pei Zhangwei and his colleagues in 2017, and their research inspected the association of CT and argumentative writing among EFL learners in China, showing that critical thinking skills (hereafter CTS) were not significantly correlated with students' writing performance and that students with strong CTS did outperform students with weak CTS [3]. Hassan S. and Sara N. explored the relationship between creativity in thinking and writing performance of Iranian EFL learners on comparison/contrast. And they have reached reverse results which showed that there was a significant positive relationship between creativity in thinking and both total and components of writing performance in comparison and contrast [3]. While empirical studies on CTS and writing performance abound, studies on the correlation between critical thinking disposition are relatively rare. Therefore, this study aims to bridge the gap by measuring the association between critical thinking disposition (hereafter CTD) and argumentative writing performance.

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2 Theoretical Framework

The concept of CT can be traced back to 2000 years ago. Yet, it is a term with multiple definitions. In 1990, experts in the American Philosophical Association (APA) published the Delphi Report, in which CT was defined as “a purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation and inference, as well as explanation of the evidential, conceptual, methodological and contextual consideration upon which that judgment is based. In addition, Chinese scholar Wen Qiufang defined the CT as “the ability to make a purposeful and rational judgment of things or opinions based on standards”.

It is generally acknowledged that CT broadly comprises two components, CTS and CTD. According to Peter Facinone and N. C. Facione (1994), CTS are concerned with cognitive skills such as analysis, interpretation, explanation, evaluation, self-regulation and inference, while CTD relates to the affective domain, including the following seven aspects: truth-seeking, analyticity, open-mindedness, systematicity, maturity, inquisitiveness and self-confidence [4]. And Peter Facione and N. C. Facione created the California Critical Thinking Disposition Inventory (CCTDI), the first study in the world to test students’ CTD. Subsequently, many scholars (Profetto-McGrath 2003; Wengenstein et al. 2010) have conducted empirical studies using this scale among students of different majors in different regions. Most of the studies on CTD in China have been conducted on the basis of translating and revising the CCTDI for college students, among which the most influential ones are Luo Qingxu and Yang Xinhui (2001) and Peng Meici and Wang Guocheng (2004). However, due to the small sample size and high homogeneity, the results do not apply to the whole group of Chinese college students. Professor Wen Qiufang (2012) revised the CCTDI twice from 2008 to 2009 and conducted a large-scale trial test with a large sample covering students in nearly 100 majors from 51 universities in China. Large-scale pilot tests were conducted to make it fit the Chinese cultural context. After repeated revisions, Wen’s revised version has become a highly accepted scale in China by virtue of its high reliability. Therefore, in this study, Wen’s edition will be adopted as the measuring tool.

3 Methodology

3.1 Research Questions

This study is to explore the correlation between students’ CTD and their argumentative writing performance. The research questions are as follows: What is the status quo of CTD among English majors whose English levels are not at the top level in China? What is the relationship between their CTD and argumentative writing performance?

3.2 Participants

146 sophomores majored in English in an institute of science and technology in Guangzhou participated in the study, their ages ranging from 19–21. All the students would take part in CET-4, a national college English test in China in the semester when

the study was carried out. Students' English performance in their college entrance examination were among 85–120 points (the total points is 150), and the university they are studying in ranks at the tertiary level of the undergraduate education in China.

3.3 Instruments

3.3.1 Wen's Edition of Critical Thinking Disposition Questionnaire

The questionnaire used in this study is the critical thinking disposition questionnaire published by Professor Wen Qiufang in 2009. Based on Peter Facione and N.C. Facione's original CCTDI, Wen's edition consists of 54 Likert-type items with 5–8 items attributed to each dimension. The eight dimensions are analyticity, inquisitiveness, systematicity, self-confidence, truth-seeking, cognitive maturity, open-mindedness and justice-orientedness. In a prior study, it was found that only 50 items met the statistical requirement, so at last 4 items were deleted. To test the reliability of the questionnaire, Wen organized a large-scale study involving 18,825 students from 51 universities in 2009. And the overall coefficient of the questionnaire stands at 0.87 and the Cronbach alpha coefficients of academic dimension and social dimension are 0.84 and 0.80 respectively [5]. The results showed that the internal consistency reliability of the questionnaire could be guaranteed.

In this study, all the 50 items were spread randomly. There is a six-point Likert scale ranging from strongly disagree to strongly agree. Standardized scores were then calculated for each dimension. For each dimension, a person's score in the instrument may range from a minimum of 10 points to a maximum of 60 points. According to Wen et al., a score of 40 points or higher indicates a positive disposition, a score in the range of 30 to 40 points a wavering disposition, and a score of 30 points or less a negative disposition. An overall score can be computed by summing up all the scores of the 8 dimensions, ranging from 80 points to 480 points. A total score of 320 points or higher means a positive overall disposition, whereas a score of 240 or lower indicates a negative disposition. The score which stands between 240 points and 320 points presents ambiguity toward critical thinking [5]. Furthermore, Wen divided the 8 dimensions into two groups, which are academic dimension and social dimension. The academic dimension consists of analyticity, inquisitiveness, systematicity, and self-confidence, while the social dimension consists of the other four dimensions.

3.3.2 EFL Writing Performance Based on iWrite Automated Essay Scoring System

iWrite is an automated essay scoring system launched in 2015 based on domestic and foreign machine automated scoring systems. Designed in cooperation with experts in the fields of second language writing, foreign language assessment and corpus linguistics, it has established an evaluation system that involved language, content, structure, and technical specifications. The system is mainly functioned on the basis of the construction of the iWrite corpus, which has now built a monitoring corpus of hundreds of millions of words and a core corpus of over 8 million words.

iWrite has now been adopted in the English Test for International Communication (ETIC) and according to Li Yanling and Tian Xiachun (2018), who had conducted a

research to compare the iWrite system's automated scoring and human scoring of essays of 645 participants of ETIC in 2018, iWrite2.0 has a high reliability of scoring and can be used in exams and daily writing instruction [6].

The topic and writing directions for the writing test used in this study are as follows: students are allowed 30 min to write an essay entitled "Should Adult Children Live with Their Parents?". And they should write at least 150 words but no more than 200 words. The writing topic was selected for its familiarity and openness. A familiar topic typically generates better CT, according to Stapleton (2001) [7]. Meanwhile, the topic is controversial and thus open to discussion.

3.4 Data Collection and Analysis

Data were collected during the spring semester of 2021. Before the test, the participants were informed of the research purpose and assured of the confidentiality of their data. The CTD test was administered to the participants during regular lecture periods via Wenjuanxing, an online platform. Students took up to 15 min to complete the test. A total of 146 students participated in the test and all the answers were considered valid. The EFL writing test was taken individually by participants after class. The teacher assigned the writing task on iWrite and the students were allowed 15 days to finish the writing task, during which they could revise their essays. Scores of the final version were taken in the study. Among the above 146 valid questionnaires, 140 students' scores were collected. As a result, the valid number of CTD questionnaire and EFL writing test scores is 140, and its percentage is 96%.

After collecting the questionnaires and the scores of students' essays, the writer typed the data into SPSS 25.0 to do data analysis. The descriptive analysis, independent samples t-test, and correlation were utilized to measure CTD and the compositions.

4 Results and Discussion

4.1 CTD Among English Majors

4.1.1 The Status Quo of Students' CTD

As shown in Table 1, the CTD of the participants in this study had a mean score of 408.65, indicating a positive disposition. Compared with the score of the national college students' obtained by Wen et al. (2012), the score is 53.77 points higher, showing that the participants' CTD are stronger than that of the average level of national college students. Moreover, the standard deviation was 27.55, indicating that the CTD of students in this study is relatively concentrated with slight difference.

To further clarify the distribution of CTD, the author grouped them and calculated the percentage of students in each score section, as shown in Table 2. Most students showed general support and positive support; therefore, the overall level was comparatively high. It is possibly because most participants are from Guangdong Province, where people are more open-minded and schools enjoy better teaching resources, thus students have received education that is not so concentrated on drilling and duck-feeding.

Table 1. Description of the total score

Subject	Mean	Std. Deviation
Students in this study	408.66	27.55
National college students	354.85	38.81

Table 2. Grouping situation of students' CTD

Group		Score section	Percentage of English majors in this study	National college students' percentage
Negative disposition		Lowest through 240	2.9%	0.23%
Wavering disposition		240–320	5.7%	17.99%
Positive disposition	Reluctant support	320–342	11.4%	18.15%
	General support	342–365	37.9%	24.56%
	Positive support	365–400	38.4%	26.91%
	Firmly support	400–480	3.6%	12.17%

Table 3. Description of mean scores of all the eight dimensions

Group	Mean	Std deviation	Dimension	Mean	Std. deviation
Academic dimension	4.95	0.36	Analyticity	5.17	0.52
			Inquisitiveness	5.12	0.44
			Systematicity	4.69	0.55
			Self-confidence	4.82	0.48
Social dimension	5.27	0.42	Truth-seeking	5.27	0.60
			Cognitive maturity	4.92	0.33
			Open-mindedness	5.61	0.70
			Justice-orientedness	5.26	0.59

4.1.2 The Analysis on Students' CTD in Academic Dimension and Social Dimension

SPSS 25.0 was used to further analyze the scores of CTD, and the single-subject scores at academic dimension and social dimension were also obtained, as shown in Table 3.

Table 4. Paired sample t-test

	Paired differences							
	Mean	Std. Deviation	Std. error mean	95% confidence interval of the difference		t	df	Sig (two-tailed)
				lower	Upper			
mean score of the academic dimension–mean score of the social dimension	–0.227	0.369	0.31	–0.165	–0.165	–7.261	139	0

The mean score of the social dimension is 0.32 higher than that of the academic dimension, and the paired sample t-test yielded Sig. = 0 (see Table 4), which reaches the level of significant difference, indicating that contemporary students not only focus on knowledge courses and intellectual improvement, but also actively join in practice activities. In contrast, Wen (2012) found that the score of college students’ social dimension was lower than that of their academic dimension, and that college students had deficiencies in cognitive maturity and interpersonal communication. This change is inseparable from the increasing emphasis on cultivating students’ practical skills.

According to Wen’s study in 2012, the mean score 3 or below shows a negative disposition, 3–4 a wavering disposition and 4 or more a positive disposition. As shown in Table 3, the mean scores of the eight dimensions are more than 4, indicating that students show a positive disposition in all dimensions. Among these 8 dimensions, open-mindedness has the highest mean score, indicating that students can accept different views with an open and inclusive attitude. And what English majors lack most of is systematicity (the mean score is 4.69, the lowest in the eight dimensions), which means that they are relatively weak in solving problems with reasoning and evidence.

4.2 Correlation Between Students’ CTD and EFL Argumentative Writing Performance

Descriptive data showed the participants’ EFL writing scores ranged from 65.33 to 96.67; mean EFL writing score was 80.6, higher than the passing cut-off score. The result of Pearson correlation test showed that there was no correlation between students’ CTD and their argumentative writing performance on iWrite system ($r = -0.037$, $p = 0.668 > 0.05$), as shown in Table 5. That is to say, students’ CTD exerted no influence on students’ EFL argumentative writing performance.

The study is slightly in contrast with the study made by Liu Bing in 2017, whose study showed that there was a feeble positive correlation between science students’ CTD and their writing performances [8]. There are possibly two reasons. For one thing, the study failed to control participants’ EFL proficiency. Recently, some reviews and empirical studies have defied the proposition that Asian students are deficient in CT because of

Table 5. The Pearson correlation test between CTD and EFL argumentative writing performance

		Writing scores	Scores of CTD
Writing scores	Pearson correlation	1	-0.037
	Sig. (two-tailed)		0.668
Scores of CTD	Pearson correlation	-0.037	1
	Sig. (two-tailed)	0.668	

their cultural traditions; they have also justified that inadequate English proficiency is also a factor hindering EFL learners from thinking critically. For example, Gao (2015) testified that English proficiency is a critical factor determining CT of English majors. He divided forty English majors into two groups according to their English proficiency levels, and students received writing and oral tests both in English and Chinese. The results showed that although students were inadequate in English writing and speaking, when both were done in Chinese they could easily display CT [9]. For another, writing may not be simply equated with CT. Condon and Kelly-Riley (2004) in Washington State University studied students in the Writing Assessment Program. Surprisingly, the result showed an inverse relationship between their CT and writing ability [10]. Having students do writing tasks does not automatically mean that they are thinking critically in the writing process. Moreover, critical thinking skills are not always taught on writing classes, as some empirical studies showed that many teachers teach more of structural, grammatical, and mechanical aspects of essay writing than critical thinking skills (e.g., Liu, 2018; Rumniski & Hanks, 1995). In fact, when doing EFL writing tasks, many students are likely to modeling on fixed templates covering formulaic phrases rather than putting their ideas into writing by practising critical thinking.

5 Conclusion

This study assessed the association between CTD and EFL argumentative writing of undergraduate English majors in tertiary universities of science and technology in China. The findings showed that English majors do possess strong CTD, and their CTD is not correlated with EFL argumentative writing performance.

The results of this study have the following main implications: firstly, it is advisable for students to focus on practical and social skills while improving their professional knowledge and skills. Secondly, for EFL writing teachers, it is preferable to integrate language-proficiency-oriented as well as CT-oriented activities into their instruction. As writing requires students to transform thoughts from abstract thinking into concrete language, it is not enough to rely wholly on critical thinking. Honing a sound language foundation and improving students' critical thinking are two paralleled ways in improving students' EFL writing performance.

This study is constrained by some limitations. It only examined English majors from one tertiary university of science and technology in southern China and failed to control for participants' EFL proficiency. And samples the test involved is relatively too small

a group that the results may have discrepancy compared with larger samples. Moreover, scores given by iWrite were relatively high and students' real writing ability may not be fully reflected, and the effectiveness is still questioned. Lastly, the study failed to track the same group of students to see their long-term changes in CTD and writing proficiency. To increase the reliability and generalizability of the results obtained, future researchers could choose a more representative sample of EFL learners, control for confounding variables which may influence the complex process of EFL writing, and carry out longitudinal studies to accurately see how English majors' CTD develops over college years and how creativity in thinking affect EFL learners' writing ability.

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