



Journal of Educational Sciences

Journal homepage: <https://jes.ejournal.unri.ac.id/index.php/JES>



P-ISSN
2581-1657

E-ISSN
2581-2203

The Effects of an Integrated Writing Task on Undergraduates' Critical Thinking in English Argumentative Writing

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ARTICLE INFO

Article history:

Received: 24 Sept 2021

Revised: 03 April 2022

Accepted: 05 April 2022

Published online: 24 April 2022

Keywords:

Critical Thinking

Paul & Elder's critical thinking model

English Argumentative Writing

ABSTRACT

The critical thinking in English writing skills is among the heated discussions in the field of second language writing. Grounded in Paul & Elder's critical thinking model and aided by Critical Thinking Disposition Inventory-Chinese Version (CTDI-CV), the present study explored non-English majors' critical thinking ability through examining the development of critical thinking in English argumentative writing. The results shows no significant difference in scores of critical thinking between the experimental group and the control group. The English argumentative writing skills between the experimental group and the control group differed significantly. No relationship between the critical thinking and English argumentative writing scores was indicated in the current study.

1. Introduction

Writing courses exert the most significant influence on students' critical thinking skills (Tsui, 1999). Argumentative writing is the major genre for College English writing aiming to convey message and exchanging ideas in the fashion of thesis statement, data analysis, reasoning and concluding, which transfers thinking skills into writing. Critical thinking are engaged in the process of precise language expression, theme-generalizing, choice of topics and logical framing of an essay, a process more of the training of critical thinking skills than that of language usage (Gao & Wen, 2017; Jin, 2018).

Critical thinking in English writing is widely discussed. Research topics include learners' critical thinking development in second language writing on paragraph level (Chason et al, 2016), discourse level (Chen, 2019), in different classroom environments (Ebadi & Rahimi, 2018), and under various teaching methods (Zhang, 2018). Some research focused on the development of second-year college students' critical thinking in writing under the scenario of problem-based learning

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Doi: <https://doi.org/10.31258/jes.6.2.p.200-209>

(Kumar & Refaei, 2017) and the quality of critical thinking in students' argumentation (Stapleton & Wu, 2015). It appears that students' English writing skills positively correlate with the improvement of critical thinking (Li, 2011; Chanson et al., 2016). The direct and indirect effects of critical thinking on L2 writing are considered as the most important independent variable in second language writing (Gao & Wen, 2017).

Due to the significance of critical thinking in writing, methods to improve teaching of it were paid attention to. Examples are developing teaching strategies of college English writing (Jin, 2018; Chen, 2019). The theme of undergraduates' writing task should focus on topics from daily life that are familiar to students. Teachers' questions concerning critical thinking in the classroom and after-class also improve students' critical thinking ability and writing skills. It shows that Peer-Led Team Learning and Science Writing and Workshop Template are effective methods to improve students' writing skills (Stephenson et al., 2019). Some studies indicated that online teaching resources promotes students' critical thinking (Zhang, 2018) and achieves more efficient learning (Ebadi & Rahimi, 2018).

Some studies argued that well-designed writing task alone may not guarantee the improvement in critical thinking development (Li, 2011; Zeng, 2012). The integration of the progressive writing tasks and critical thinking teaching showed positive effects on students' critical thinking in English argumentative writing. The integrated teaching approaches to English writing and critical thinking (Yu, 2014; Wang, 2019; Dong, 2017) underpinned by critical thinking theory (Paul & Elder, 2006). These approaches based teaching objectives, teaching materials, teaching methods and teaching process on intellectual standards and elements of thought of critical thinking theory. The critical-oriented English argumentative writing teaching appears to bring positive effects to learners' English language skills (Dong, 2017). The adoption of the integrated teaching approach could improve students' argumentative writing skills in clarity, relevance, logic and depth (Wang, 2019).

The English writing skills of undergraduates have been studied extensively (eg. Yu, 2014; Dong, 2017; Wang, 2019). However, the effects of critical thinking-oriented integrated English argumentative tasks remain underexplored. To bridge the gap, the present study incorporates analysis of specific writing tasks using critical thinking model and employs critical thinking-oriented worksheets built on critical thinking model (Paul & Elder, 2002; 2006). In this process, critical thinking-oriented classroom guidance was incorporated as part of the efforts to develop a holistic understanding of college students' critical thinking in English argumentative writing. More importantly, this attempt might shed light on writing instruction in tertiary classroom teaching.

Three research questions are as follows: (1) What are the effects of the integrated English argumentative task on students' critical thinking? (2) What are the effects of the integrated English argumentative task on students' English argumentative

writing skills? (3) What is the correlation between students' critical thinking and English argumentative writing skills?

2. Methodology

The participants of this research include 96 sophomores studying at a key language university in Beijing. All of the participants had College English courses in the first year of college and their English proficiency ($p=0.74>0.05$), English argumentative writing proficiency ($p=0.93>0.05$) and critical thinking ($p=0.46>0.05$) were at the same level.

Instruments employed in this research include the questionnaire (Critical Thinking Disposition Inventory-Chinese Version, CTDI-CV) and Python 3.9. The effects of the teaching intervention on students' writing skills were examined through writing assessment, and critical thinking through online questionnaire. The CTDI-CV was revised and modified based on the California Critical Thinking Disposition Inventory (CCTDI) in order to adapt to Chinese context including Chinese culture and way of thinking (Peng et al, 2004: 646), which made it widely used in studies on critical thinking in China (Wen, 2012: 22).

CTDI-CV adopts the five-point Likert scale to grade with "1" representing "strongly disagree", "5" representing "strongly agree". Participants are required to accomplish it within 20 minutes. It contains 70 items with the total score of 350 points, including seven dimensions of critical thinking properties that contain 10 items each (Peng et al., 2004: 645). The seven dimensions are truth-seeking, inquisitiveness, analyticity, systematicity, self-confidence, open-mindedness and cognitive maturity. The overall reliability of the online questionnaire is 0.90 with 24 items deleted. The reliability of each of the seven dimensions are truth-seeking (0.54), inquisitiveness (0.74), analyticity (0.67), open-mindedness (0.66), self-confidence (0.82), systematicity (0.67), cognitive maturity (0.56). To improve the accuracy of the survey results, the online questionnaire was distributed to students in scrambled order.

The integrated argumentative task consists of six argumentative writing tasks, namely, pre-test (Essay 1), Task 2 (Essay 3), Task 3 (Essay 4), Task 4 (Essay 5), and post-test (Essay 6). English argumentative writings were collected one week after the assignments. Each task included three sections. Section 1 was the critical-oriented classroom teaching to analyze the writing tasks in accordance with the elements of thought in Paul & Elder Model of Critical Thinking. Section 2 was the critical-oriented classroom discussion during which students analyzed the writing task through discussion with their peers to discover the critical thinking elements. Section 3 was to accomplish the writing task in concert with the critical-oriented writing procedures. The procedures include four steps: critical-oriented brainstorming, first draft, critical-oriented peer review and final draft.

The evaluation of English argumentative writing consists of clarity, relevance, logicity and depth since they are the heatedly discussed dimensions in argumentative writing research (Wen, 2008; Yu, 2014: 24; Wang, 2018:53). The foregoing four dimensions are corresponding with relevance, explicitness, coherence and sufficiency (Wen & Liu, 2006: 52), which is regarded as the analytical framework of the current study. Relevance refers to the correspondence between students writing and the writing requirements. Clarity means whether the central idea and sub-points are clear and specific. Depth refers to whether the arguments are underpinned by examples, facts or experiences. Coherence equals the logicity, that is, the logical connection between the central idea and its sub-points (Wen & Liu, 2006: 51-52). The scoring of the five dimensions of the argumentative writing ranks from 5 points (the highest) to 1 point (the lowest) with a total score of 20 points. Writings were rated by two experienced teachers. To ensure the inter-rater reliability, the two raters graded 15 writings respectively before the calculation of it. The inter-rater reliability is 0.90 ($r > 0.85$).

Qualitative methods was employed in the present study to collect and analyze data. The questionnaire was distributed and collected via WeChat. A pilot study was conducted to 90 sophomores before the commencement of the experiment to ensure the reliability of the questionnaire. In the measurement of critical thinking in pre-test, no significant difference between the experimental group and the control group ($p = 0.71$, $p > 0.05$) was indicated. The writing pre-test (Task 1) showed no significant difference between the experimental group and the control group ($p = 0.67$, $p > 0.05$).

Quantitative data in the current study were mainly analyzed by Python 3.9. In order to compare the differences between the experimental group and the control group, the total scores and sub-scores of the questionnaire and the writings between the experimental group and the control group were analyzed by independent sample t-test. The relationship between critical thinking and English argumentative proficiency was examined by means of Pearson correlation analysis.

3. Results and Discussion

3.1 Effects of Integrated Tasks on Critical Thinking

For the purpose of examining whether there is any difference between the experimental group and the control group with regards to critical thinking, the independent sample t-test was employed to analyze the data collected in pre-test and post-test. The results are as shown in Table 1.

Table 1. Independent Sample T-Test Analysis of the CTDI-CV Survey between the Experimental Group and the Control Group

Scores (Post-test)	Groups (mean±sd)		t	p
	the experimental group	the control group		
	166.45±16.38	165.21±18.66	0.34	0.73

As indicated in Table 1, no significant difference between the experimental group and the control group is demonstrated ($p=0.73>0.05$). Mean score of the experimental group is higher than that of the control group, but not up to statistical difference.

Aiming at exploring the differences of scores of critical thinking test in the seven dimensions respectively, independent sample t-test analysis was conducted to every dimension in the CTDI-CV scores of pre-test and post-test. The results are illustrated in Table 2.

Table 2. Independent Sample T-Test Analysis of Seven Dimensions of CTDI-CV Scores

Scores (Post-test)	Groups (mean ± sd)		t	p
	the experimental group	the control group		
Truth-seeking	21.42±4.15	21.95±4.47	0.59	0.56
Inquisitiveness	26.95±3.36	26.92±3.87	0.30	0.98
Analyticity	27.84±2.75	26.79±3.09	1.72	0.09
Open-mindedness	12.40±1.67	11.54±1.62	2.49	0.01
Self-confidence	32.15±4.79	32.92±5.04	0.76	0.45
Systematicity	31.86±4.78	31.49±4.60	0.37	0.71
Cognitive maturity	13.85±2.50	13.59±2.94	0.47	0.64

As shown in Table 2, there is no significant difference between the experimental group and the control group in truth-seeking, inquisitiveness, analyticity, self-confidence, systematicity and cognitive maturity of critical thinking disposition. In the dimension of “open-mindedness”, however, the experimental group registers significant improvement. It indicates that the critical thinking-oriented classroom guidance facilitates the development of open-mindedness in critical thinking disposition.

3.2 Effects of Integrated Tasks on English Argumentative Writing

The examination of effects of the writing tasks adopts independent sample t-test, aiming at analyzing the last writing task in comparison of the differences between the experimental group and the control group.

Table 3. Independent Sample T-Test Analysis of the Argumentative Writing

Scores (Post-test)	Groups (mean±sd)		t	p
	the experimental group	the control group		
	16.47±2.69	12.19±3.15	7.08	0.00

As indicated in Table 4, significant difference in argumentative writing skills between the experimental group and the control group is demonstrated in post-test ($p=0.00<0.05$). The mean score of the experimental group is 16.47, while that of the control group is 12.19. It can be inferred that the overall English argumentative writing skills of the experimental group excelled that of the control group.

For the purpose of comparing the scores of English argumentative writings in the four dimensions of relevance, clarity, depth and logic in the post-test, independent sample t-test was conducted to every single dimension of the argumentative writings. The results are shown in Table 4.

Table 4. Independent Sample T-Test Analysis of Four Dimensions of English Argumentative Writing

Scores (Post-test)	Groups (mean \pm sd)		t	p
	the experimental group	the control group		
Relevance	4.54 \pm 0.59	3.83 \pm 0.78	4.97	0.00
Clarity	4.17 \pm 0.87	3.04 \pm 1.10	5.59	0.00
Depth	3.86 \pm 0.67	2.69 \pm 0.90	7.17	0.00
Logic	3.91 \pm 0.89	2.63 \pm 0.95	6.69	0.00

As can be seen in Table 4, there were significant differences in all the four dimensions between the experimental group and the control group ($p<0.05$). It indicates that the scores of the experimental group were higher than that of the control group in all the four dimensions. Therefore, the integrated tasks have enhanced the relevance, clarity, depth and logic of the English argumentative writing. The specific improvement will be elaborated in the following discussion section.

Relevance is the dimension in which students performed most impressively among the four dimensions. The predominant problems concerning relevance were no appropriate summary of the given materials, and the lack of thesis statement after the summary of the materials. Although the clarity of argumentative writing had been enhanced, the points of the central idea was not prioritized sufficiently. That is to say, the sub-arguments were not appropriately and comfortably included in the main point as a reader expects. Students' performance on the dimension of depth was not as excellent as relevance and clarity. The primary problem in students' argumentative writing was that the majority of sub-arguments lacked supporting materials such as facts, statistics and evidence. Like depth, logic was another dimension that required more improvement in students' argumentative writing. The gap between the pre-test and the post-test mainly lies in the logicity in the connection between sub-arguments.

Table 5. Paired Sample T-Test of the Pre-test and Post-test of the Four Dimensions of Argumentative Writing

Name		TE1 pre-test vs TE1 post-test	TE2 pre-test vs TE2 post-test	M pre-test vs M post-test	FM1 pre-test vs FM1 post-test
Relevance	t	-3.16	-0.57	-6.17	-5.61
	p	0.01	0.58	0.00	0.00
Clarity	t	-0.91	0.59	-6.53	-5.33
	p	0.38	0.56	0.00	0.00
Depth	t	-1.43	0.92	-8.12	-7.26
	p	0.17	0.93	0.00*	0.00
Logic	t	-1.46	0.30	-8.47	-4.97
	p	0.16	0.77	0.00	0.00

(TE1=Trade and Economics Class 1, TE2=Trade and Economic Class 2, M=Management Class, FM=Financial Management Class 1)

For the purpose of further comparing the differences in the four dimensions of argumentative writing of the control group and the experimental group before and after the experiment, paired sample t-test was carried out. As can be seen in Table 4.5, all the four dimensions of argumentative writing, namely, relevance, clarity, depth and logic, experienced significant improvement in class M and class FM ($p=0.00<0.05$). Additionally, the dimension of relevance differed significantly between pre-test and post-test achieves statistically significant difference ($p=0.01<0.05$) of class TE1.

All the four dimensions are improved in the writing of the experimental group, whereas only the dimension of relevance has been improved in the control group. The other three dimensions of clarity ($p=0.38>0.05$), depth ($p=0.17>0.05$) and logic ($p=0.16>0.05$) remain stable in scores of their argumentative writing. Therefore, it can be inferred that apart from critical thinking-oriented teaching intervention, students' English argumentative writing skills can also be advanced through intensive training.

Such results indicates that on the one hand, the critical thinking-oriented teaching intervention enhanced the argumentative writing skills of the experimental group. The control group did not evidence significant improvement in their writing skills since no teaching intervention was administered to them. On the other hand, unlike critical thinking disposition, argumentative writing skills might be much easier to be improved within a relatively short span of time with intensive training and practices.

3.3 Relationship between Critical Thinking Disposition and Argumentative Writing Scores

To explore the relationship between critical thinking disposition and English argumentative writing skills, a further examination of the correlation between the participants' critical thinking and L2 writing scores was required. A Pearson correlation analysis was carried out to examine this relationship. As indicated in Table 6, there was no relationship between the participants' critical thinking

dispositions and English argumentative writing scores in both pre-test ($r=0.18$, $p=0.81$) and post-test ($r=0.67$, $p=0.53$).

Table 6. The Relationship between Critical Thinking Dispositions and Argumentative Writing Skills

		Pre-test writing score	Pre-test CT score	p
Pre-test writing score	Pearson	1	0.18	0.81
Pre-test CT score		0.18	1	
		Post-test writing score	Post-test CT score	
Post-test writing score	Pearson	1	0.67	0.53
Post-test CT score		0.67	1	

A point worth discussion is the progress of students' argumentative writing skills. In the present study, argumentative writing scores of the experimental group was significantly improved. This is in consistent with Dong (2017). However, the scores of writings in the control group in this study remained stable, while it was found remarkable progress in Dong (2017). It might be led by the fact that different evaluation standards of writing were adopted in the two studies. Dong (2017) employed "IELTS Writing Task 2 Band Descriptors", whereas the evaluation framework proposed by Wen & Liu (2006) was used in the current study. The latter emphasizes the thinking process in argumentation including examining the topic, conceptualizing the argumentation, arranging the sub-arguments and logic connection between sub-arguments. It appears that explicit teaching approaches are effective in improving students' critical thinking and argumentative writing skills (Stephenson et al., 2019).

4. Conclusion

The current study has examined the impact of critical thinking-oriented teaching approach on English argumentative writing skills of undergraduates in mainland China grounded in Paul & Elder's critical thinking model and aided by CTDI-CV. No significant difference in students' critical thinking disposition between the experimental group and the control group was found, whereas the difference of argumentative writing skills was noteworthy. English argumentative writing skills of the experimental group were improved remarkably. No correlation between the critical thinking disposition and English argumentative writing skills was revealed. The integrated argumentative writing task is a potentially good means to improve English writing teaching, the critical thinking-oriented writing process may facilitate students to develop profound understanding of composition.

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How to cite this article:

Huiying, D., & Zhencong, L. (2022). The Effects of an Integrated Writing Task on Undergraduates' Critical Thinking in English Argumentative Writing. *Journal of Educational Sciences*, 6(2), 200-209.
