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Process Writing and Enhancement of Critical Thinking Ability: Is Writing a Vehicle or an Ingredient of Critical Thinking?

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Abstract

The study aimed to investigate the relationship between process writing (PW) and critical thinking (CT) ability of Iranian EFL learners. Furthermore, the role of PW in the enhancement of CT was investigated. In so doing, 65 upper-intermediate language learners were selected from Rasht Islamic Azad University based on convenience sampling. The results of the pretests indicated that participants were homogeneous regarding language proficiency as determined by Babel test, CT by Watson-Glaser critical thinking appraisal (W-GCTA), and writing ability by a writing test. By implementing a quasi-experimental design, the participants were randomly assigned to experimental and control groups. The experimental group received a step-by-step process of teaching CT and utilized CT skills in developing an essay. The control group, in contrast, merely practiced PW. After applying the non-parametric Spearman rank-order correlation, the results revealed that there was a significant correlation between PW and CT (rs =.632, p<.05). The results of the non-parametric Mann-Whitney U test substantiated that there was a significant difference in CT ability of control and experimental groups (U=.000, p<.05), revealing that PW is a vehicle of CT, not an ingredient.

Keywords: Critical Thinking, Critical Writing, Process Writing, Thinking Skills, Writing Skills

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1. Introduction

Writing is considered as the linguistic organization of thinking (Lantolf, 2000). According to Vygotsky (1987), writing is a written speech that externalizes human thinking by utilizing language. Therefore, the development of thinking and the enhancement of writing go hand in hand. Paul and Elder (2007) contend that writing emphasizes decision making. Problem-solving, the expression of arguments, and elaboration of opinions may involve a process of critical thinking (CT), which helps the writer to compare and contrast choices and provide support and elucidate ideas. In this way, involving in writing can mean using relevant thinking and cognitive skills, and thus it influences the development of related mental processes. Similarly, Larkin (2009) asserts that writing is a process of metacognition that can promote active thinking.

In this regard, a number of studies utilized essay writing to develop and assess CT (e.g., Bean, 2011; Hyland, 2003; Moon, 2008; Paul & Elder, 2014; Weigle, 2002). However, the role of writing in the enhancement of CT remained unexplored. To Wade (1995), writing is an ingredient of CT, and improving such abilities requires an improvement in the students' writing skills. Condon and Kelly-Riley (2004), on the other hand, emphasize the explicit instruction of CT skills via writing and consider writing as a vehicle through which the CT skills can be transferred to students. The spate of research determining the role of writing in CT, however, is remarkably low. This research paper attempted to study whether there was any relationship between CT and process writing (PW). It also investigated the role of PW in improving CT ability among Iranian EFL learners.

2. Review of Related Literature

CT is a cognitive skill that affects every aspect of human life. Paul and Elder (2007) explicate CT as a structured cognitive process that requires active and skillful engagement in thinking. Later, Paul (2012) describes CT as "disciplined self-directed thinking," and considers it as the "perfections of thinking appropriate to a particular mode or domain of thinking," which reveals itself as "sophistic or weak sense and fair-minded or strong sense" (p. 33). Sophistic, as Paul (2012) argues, pertains to the "interests of a particular individual or group" while excluding others; whereas, fair-minded relates to the "interests of different people or groups" (p. 33). Paul and Elder (2014) maintain that to improve the CT ability, learners need to engage in a set of intellectual processes, including the point of view, purpose, concept, information, question, inference, assumption, and implication. These components of thinking require learners to shift from memorizing the pieces of information to the thinking process.

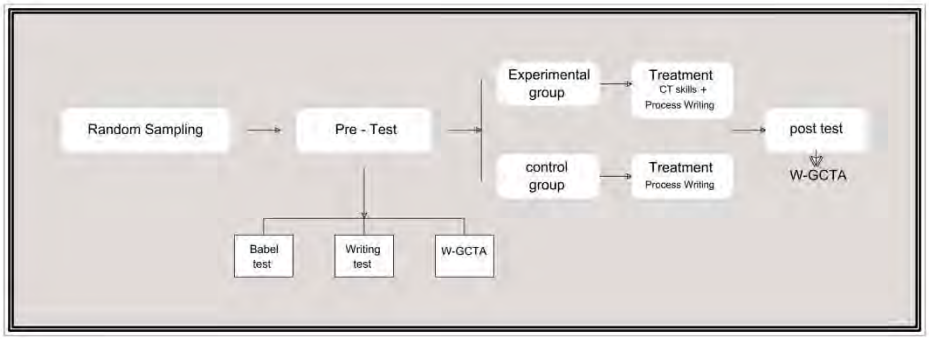
Although the definition of CT is appealing and encouraging in terms of the features it includes, the abilities in these definitions do not easily lend themselves to use. In this regard, Lipman and Sharp (1980) refer to the importance of writing and postulate that writing needs thinking. A writer plans, makes some inferences based on assumptions, tests alternatives, and involves in mental activities. Along the same vein, Paul and Elder (2003) consider writing as a form of intellectual work through which the students choose an essential subject, decide on the underlying meaning, suggest some examples, and make analogy or metaphor to help readers connect the writing with the real life.

Compatible with the contention that writing requires thinking, Rashtchi (2007) explored whether cooperative writing could enhance the CT ability of Iranian EFL learners. While the experimental group wrote cooperatively, the control group practiced individual writing. After comparing the final scripts,

she concluded that cooperative writing could lead to the enhancement of CT. Naber and Wyatt (2014) conducted a study on 70-fourth-semester nursing students. Following a pretest-post-test design, the participants took the California CT Skills Test (CCTST) and California CT Disposition Inventory Test (CCTDI). Then they were randomly assigned to experimental and control groups. Unlike the control group, the experimental group completed six reflective writing assignments on their class readings, clinical rotations, or group activities. The results revealed that the experimental group outperformed the control group in four CCTST subscales. The researchers also figured out that the experimental group had a significant increase in the truth-seeking subscale of the CCTDI.

Condon and Kelly-Riley (2004) assert that having students write does not mean that they think critically. Stated differently, if students are not explicitly invited to think critically or are not provided with a definition of the construct of thinking, they will not incorporate CT skills. Therefore, they consider context and method of measurement as determining factors in the use of CT. Yancey (2015) also regards writing as a medium for CT and states that CT skills need explicit instruction in which the student is active in the process. Similarly, Swartz (2003) asserts that CT requires explicit instruction. However, relying on his findings from a large unrestricted sample, Jensen (1994) argues that any of the two mental abilities are related to each other at some level.

The theoretical controversy on CT and writing led the researchers of this study to investigate the relationship between CT and PW as well as the role of PW in the enhancement of CT. The reason for focusing on PW was that it engages learners in cognitive and metacognitive strategy use, and can enhance learners' awareness toward the use of skills that are necessary for thinking and generating ideas. The following flowchart illustrates the procedure of the study:



Flowchart of the Procedure Conducted in the Present Study

Therefore, the researchers formulated the following research questions:

1. Is there any relationship between the PW and CT abilities of Iranian EFL learners?
2. Is there any difference in the CT ability of those who practice CT via PW and those who merely put PW into practice?

3. Method

The present quasi-experimental study has a non-equivalent pretest-post-test control group design and thus involves pretest, treatment, and post-test phases.

3.1. Participants

The participants were 65 undergraduate students majoring in TEFL and English Translation, who were attending an essay writing course in the English Department at Rasht Islamic Azad University, Iran. They had passed the advanced writing course and were familiar with the product aspect of writing before taking the course. The researchers used Babel English Language Placement Test to homogenize them. Those students whose scores were between 52 and 80 (one standard deviation above and below the mean) were

selected as the participants. Subsequently, they wrote a five-paragraph essay on a writing prompt. Akef's (2007) rating scale was employed to assess their writing ability. The participants also took Watson-Glaser critical thinking appraisal (W-GCTA) to enable the researchers to ensure that they were homogenous regarding the CT ability.

3.2. Instrumentation and Materials

The instruments and materials utilized in the present study were Babel English Language Placement Test, a set of essay writing prompts, tasks on CT skills, and the W-GCTA. What follows is a brief explanation regarding the data gathering tools.

Babel English Language Placement Test was used to examine the learners' level of English. The test is in multiple-choice format and consists of 25 items measuring the recognition of correct responses to reading prompts, grammatical forms, and lexical choices in contexts. The time allocated to taking the test was 60 minutes.

Three university lecturers ensured that the test is comprehensive and appropriate for the participants' linguistic and background knowledge, and the instructions were clear. The reliability of the test estimated through KR-21 was 0.91.

The essay writing prompts, according to Kroll and Reid (1994), are the stimuli in the form of writing topics to which the students respond. The researchers took the writing prompts from Cambridge IELTS Test (1-10). The selected prompts were in framed format. Since there is a risk that a prompt may fail to demonstrate the students' actual level of writing skill accurately, the researchers analyzed the potential usability of the prompts. Each prompt was analyzed based on the six categories introduced by Hamp-Lyons (1991). The categories comprised the writing situation (contextual variables), the subject

matter (content variables), the wording of both the prompt and the instructions (linguistic variable), the tasks (task variables), the rhetorical specification (rhetorical variables), and the scoring criteria (evaluation variables). By careful monitoring of these variables, the researchers selected some prompts and asked five students with similar characteristics of the participants to write a five-paragraph essay. A committee of three university lecturers examined the writings of the students, revised and revised the prompts. Then again, another group of students wrote an essay on the revised prompt. If the final writing was acceptable, the committee members approved the prompt otherwise, they rejected it. A sample of a prompt and the revised version is presented in Appendix A.

A set of tasks on CT based on Paul and Elder (2014) and Thompson (1996, 1999) was employed. The researchers matched the tasks with the writing prompts and asked the learners to practice the elements of CT before starting to write and developing the topic into a five-paragraph essay. The tasks were piloted on some students and accordingly modified to assure the practicality.

The next instrument was the W-GCTA (Watson & Glaser, 2010) used as both the pretest and post-test. The instrument is designed to examine the respondent's ability to think analytically and logically and consists of 80 questions in five different sections. Making correct inferences, recognizing assumptions, making deductions, coming to conclusions, interpreting, and evaluating arguments comprise the different sections of the questionnaire. The items are similar to problems, statements, arguments, and interpretations that individuals may encounter in everyday situations, such as reading a newspaper or book and listening to the news.

3.3. Procedure

3.3.1. Pre-test

After ensuring that the participants were homogeneous regarding the general language proficiency, the teacher asked them to write an essay on a writing prompt to examine whether they did not differ on the product (grammar and mechanics) and process aspects of writing. The researchers analyzed the product aspect of writing based on the format of a paragraph, topic and supporting sentences, coherence, unity, and transitions. For the process, they applied Akef's (2007) scoring scale. The participants also took W-GCTA to enable the researchers to verify that there was no statistically significant difference between the CT of the groups at the onset of the study.

3.4. Treatment

After administering the pretests, the researchers designed a sixteen-session course plan (eight sessions for teaching the components of CT and four for teaching the writing skills) for the experimental group. During the remaining sessions, the participants practiced writing using the CT components. In the first session, the teacher dealt with the first component of CT (purpose). Initially, the students did the following exercise (Paul &Elder, 2014, p. 99):

One of my purposes is …

I can achieve this purpose by …

... something that I think about a lot is …

... Its relation to my main purpose is ….. .

A shared problem in determining the purpose (e.g., clarity) was designated and elaborated. The problem was illustrated by giving an example-taken from Paul and Elder (2014)-of a person who was going to give a lecture but because s/he was not prepared, his/her thought process diverged from the main

direction. Then they were trained on how to clarify purpose (by giving an example, elaborating the purpose in their own words, illustration, analogy). Successively, a writing prompt was presented, and learners were required to clarify the fundamental purposes and specify how they can achieve the purpose. In the same vein, the researchers introduced other components of CT, such as conceptualization of words, processing information, inferencing, seeking for underlying assumptions, and drawing conclusions. The participants practiced these components by employing some exercises taken from Paul and Elder (2014) and Thompson (1996, 1999). The exercises helped the researchers figure out the difficulties, explain each thinking component explicitly, and provide a writing prompt to practice it.

From session nine, the researchers started working on the writing skill via the process approach based on White and Arndt (1991). The first session of the writing class centered around the diverse techniques of creating ideas. Then the participants generated ideas by employing some writing prompts. They received feedback from the teacher about the way they could nurture their ideas.

Three other stages of writing, correspondingly, were introduced to the class. Each session, learners delivered their homework scripts, and the researchers analyzed the components of thinking that were employed by the learners in their scripts and provided oral or written feedback. In the edition stage, the learners made necessary changes and took notes of their mistakes. The final drafts, then, were collected as samples for further analysis.

One of the researchers taught the classes, which lasted one semester. The data were gathered based on the learners' performance in each session, as well as their final performance.

For the control group, the researchers also designed a sixteen-session course plan (four sessions for teaching the processes of writing) which was

similar to the classroom procedure implemented in the experimental group. In the remaining sessions, the participants practiced the writing process on the writing prompts selected for the study from Cambridge IELTS Test (1-10). The classes started with teaching the rules of writing and were followed by brainstorming the students on the topic of the day. Then the teacher asked the students to discuss the topics in small groups, take notes, and prepare an outline. As the next step, they started preparing their first drafts individually. The teacher provided feedback on the drafts of the writings. The teacher collected the drafts and left comments on them regarding the structure and mechanics of writing. In the subsequent session, the students received their drafts and started preparing the final version. The teacher corrected them carefully and provided explanations where necessary. The teacher listed the common errors and explained them with examples in the class.

3.5. Post-Test

After a one-semester treatment, the participants in both experimental and control groups took the W-GCTA.

4. Results

4.1. Answering the First Research Question

The first research question of the study was asked: "Is there any statistically significant relationship between PW and CT scores?" The researchers had to meet the assumption of normality of data distribution to be able to perform an appropriate test for the correlation between the two variables. Table 1 shows the result of the normality test for the two sets of scores. As the result of the Shapiro-Wilk test shows (Table 1), the data were not normally distributed for

the two sets of pretest scores ($p^{<}.05$). Therefore, the non-parametric Spearman rank-order correlation was used to find the relationship.

Table 1. ***Test of Normality for the PW and Critical Thinking Scores***

	Shapiro-Wilk		
	Statistic	df	Sig.
CT_Scores	.900	65	.000
PW	.886	65	.000

Table 2 shows the descriptive statistics for the CT (M=74.52, SD=3.16), and PW (M=68.52, SD=2.09),

Table 2. ***The Descriptive Statistics for the PW and Critical Thinking Scores***

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
CT_Scores	65	70.00	79.00	74.5231	3.16775	10.035
PW	65	64.00	71.00	68.5231	2.09991	4.410
Valid N (listwise)	65					

The Spearman rank-order correlation was performed to determine the relationship between the PW and CT scores. As Table 3 shows, there was a positive, statistically significant relationship between these two variables, rs=.632, p<.05. Thus, the null-hypothesis that there is no statistically significant relationship between PW and CT scores was rejected.

Table 3. ***The Spearman Rank-Order Correlation Test for the PW and CT Scores***

			CT_Scores	PW
Spearman's rho	CT_Scores	Correlation Coefficient	1.000	.632**
		Sig. (2-tailed)	.	.000
		N	65	65
	PW	Correlation Coefficient	.632**	1.000
		Sig. (2-tailed)	.000	.
		N	65	65

Answering the Second Research Question

The second research question of the study asked: "Is there any statistically significant difference in the CT ability of those who practice CT via writing and those who merely put writing processes into practice?" As the researchers had pre- and post-tests, the ANCOVA test was used to adjust the post-test scores for any differences in the pretest. Before running ANCOVA, certain assumptions had to be examined. The first assumption was linearity.

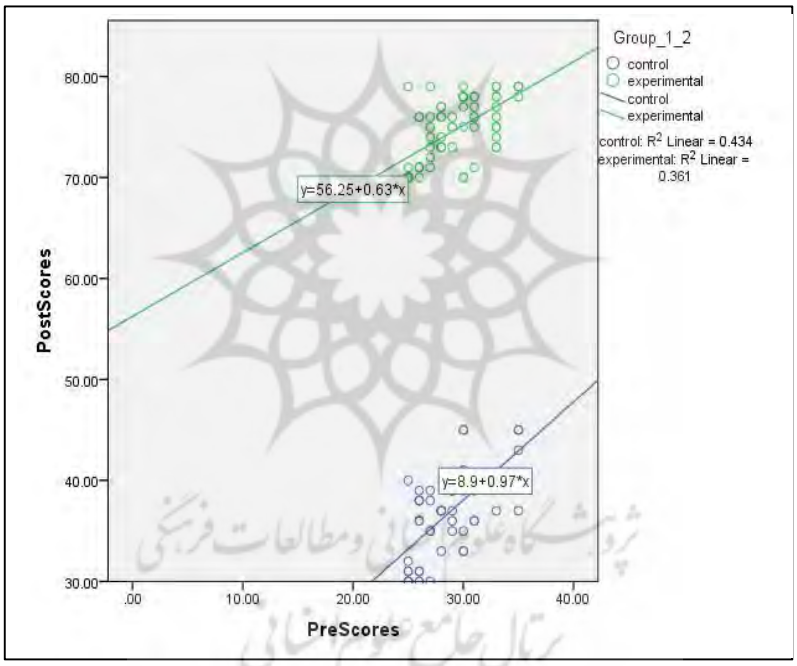


Figure1. *The Scatterplot for Checking the Assumption of Linearity*

As Figure 1 shows, there is a linear relationship between the pre- and post-test scores for each level of the independent variable, as assessed by visual inspection of a scatterplot for the CT scores of those who practiced the CT via writing and those who merely put writing processes into practice.

The next assumption was related to the homogeneity of the regression slopes presented in Table 4. As Table 4 reveals, the assumption of the

homogeneity of regression slopes was not met as the interaction term was statistically significant, $F(1, 121)=3.70$, $p=.037$. Therefore, the ANCOVA test could not be run for this research question; instead, the gain score comparison was used.

Table 4. *Testing the Homogeneity of the Regression Slopes for the CT Scores*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	45252.032[a]	3	15084.011	1793.711	.000
Intercept	1352.042	1	1352.042	160.778	.000
Group_1_2	714.007	1	714.007	84.906	.000
PreScores	685.031	1	685.031	81.460	.000
Group_1_2 * PreScores	31.121	1	31.121	3.701	.037
Error	1017.536	121	8.409		
Total	443664.000	125			
Corrected Total	46269.568	124			

The normality assumption was examined through Shapiro-Wilk's test to enable researchers to choose the appropriate statistical test for the gain score comparison. The result of the Shapiro-Wilk's test shows that the scores for the experimental group do not enjoy normal distribution ($p<.05$). Therefore, the non-parametric Mann-Whitney U test was conducted to compare the mean difference between the two groups.

Table 5. *Test of Normality for the CT Gain Scores of the Groups*

	Shapiro-Wilk		
	Statistic	df	Sig.
Gain_Cont	.955	60	.027
Gain_Exp	.952	60	.019

Table 6 shows the mean ranks. The description of the ranks showed a higher mean rank for the experimental group (93) as compared to the control group (30.50).

Table 6. *The Ranks Table for the CT Gain Scores of the Groups*

	Group_1_2	N	Mean Rank	Sum of Ranks
Gain_Scores	control	60	30.50	1830.00
	experimental	65	93.00	6045.00
	Total	125		

The result of the Mann-Whitney U test (Table 7) showed a significant difference in CT scores of the control and experimental groups (U=.000, p < .05), indicating that the related null hypothesis (there is no statistically significant difference in CT ability of those who practiced the CT via writing and those who merely put writing processes into practice) was rejected and the experimental group outperformed the control group.

Table 7. *Mann-Whitney U Test for Comparing the CT Gain Scores of the Groups*

	Gain_Scores
Mann-Whitney U	.000
Wilcoxon W	1830.000
Z	-9.670
Asymp. Sig. (2-tailed)	.000

5. Discussion

The main goals of this study were primarily to verify the relationship between EFL learners' CT ability and PW, and to investigate the role of PW in CT ability. Concerning the first goal, the results substantiated the positive correlation between CT and PW, revealing that these two variables are significantly related to each other. The findings are compatible with Hacker et al. (2009), who claim that writing can be seen as applied metacognition, stating that editing, drafting, idea generation, word production, translation, diagnosing, and revision are used as control strategies of our thoughts.

Metacognition refers to the monitoring and control of our thinking. This view is echoed by Paul and Elder (2007), who suggest that during writing, writers need to adjust and monitor their thinking to seek useful information and check its relevance and significance for achieving their goals in writing. The process of writing, therefore, encourages students to think and rethink their ideas, and gradually acquire more efficient ways of adjusting and controlling their minds. Writing demands learners to be mentally involved in the act of writing and focus on their mental processes (Rashtchi & Aghajanzadeh, 2008).

Also, the results indicated that although PW and CT are closely associated, the process writing by itself cannot lead to higher CT ability. Instead, PW is a vehicle to practice CT skills, including deductive, inductive, evaluative, and analytical skills. The findings find support from Beyer (1991), who argued, "CT is not an automatic by-product of studying certain subjects" (p. 274). In a similar vein, Van Gelder (2005) asserts that subject course instruction, even with the implicit emphasis on CT, may not adequately prepare students for CT. Hence, as he suggests, CT should be practiced deliberately and taught explicitly as an indispensable part of the curriculum.

Similarly, Abrami et al. (2008), after a meta-analysis over a hundred empirical studies, concluded that explicit instruction of CT has a significant effect on CT development. The findings also find additional support from Bensley and Spero (2014), who revealed that direct teaching of CT skills significantly improved students' CT performance and metacognition. Halpern (2007) and Swartz (2004) also asserted that to incorporate CT in the rich context of specific courses effectively, students need explicit teaching. The explicit instruction of CT is vital to EFL learners. According to Egege and Kutieleh (2004), the explicit instruction of CT is necessary mainly to the non-western cultural background, since they lack experience and practice in CT.

On the contrary, the findings of the present study are in contrast with Bouanani (2015). After employing five assignments for thirty students, Bouanani showed that reflective writing is a pedagogical strategy that enhances the CT skills of undergraduate students. By referring to Flavell (2002), Bouanani argued that cognitive skills are employed to complete a task, while metacognitive skills contribute to the reflection on the process of cognition. They also help individuals to monitor and regulate their mental processes later on.

6. Conclusions

The present study explored the association between the elements of thinking and PW. Then the study investigated the role of PW in the enhancement of CT ability. The findings revealed that there was a strong association between CT and PW. However, the findings implied that PW, by itself, cannot make someone as a critical thinker, although it may affect the thought patterns, this is not the CT ability. Therefore, one may not expect CT to appear randomly and with no explicit instruction and guided exercises. The results of the present study have some pedagogical implications for language teachers, researchers, and syllabus designers. The findings inspire teachers to consider writing as a tool to promote and assess the thought rather than considering it as a passive skill. It also suggests that teachers should instruct CT skills through PW rather than merely relying on the PW for the promotion of thinking skills. The findings may also inspire language researchers to utilize PW as an instrument for teaching and assessing CT. Also, it helps the syllabus designers to consider the CT skills in the table of specifications and define some exercises for each skill to promote both the CT ability and the writing ability of language learners.

This study, like other studies, is not without limitations. One of the major limitations of the study was the small size of the participants. Therefore, the present study does not make any claim on the generalizability of the findings. Moreover, further research can be conducted to test the appropriateness of different genres of writing for eliciting CT skills among Iranian and other EFL learners.

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Abbreviations

PW process writing

CT critical thinking

Appendix A

Writing prompt Before Revision

Nowadays, the way many people interact with each other has changed because of technology. In what ways has technology affected the types of relationships people make? Has this become a positive or negative development? Give reasons for your answer and include any relevant examples from your knowledge or experiences.

Writing prompt After Revision

Nowadays, the way many people ***communicate*** with each other has changed because of the ***internet***. In what ways has the ***internet*** affected the types of ***communication*** people have? Has this become a positive or negative development? Give reasons for your answer and include any relevant examples from your knowledge or experiences.