

## The effect of critical thinking-infused paragraph writing instruction on university first-year students' intellectual traits

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### Abstract

The purpose of this study was to investigate the effect of critical thinking-infused paragraph writing instruction on enhancing university first-year L2 students' intellectual traits. The study involved two randomly selected first-year Social Science stream classes. The researchers employed the embedded design in the study because they mainly used quantitative data augmented by qualitative data. The researchers analyzed the questionnaire data and the interview data using the one-way between groups ANCOVA and thematic analysis method respectively. The finding of the questionnaire data analysis indicated that participants in the treatment group were better in their intellectual traits scores. The result of the interview data analysis also revealed that participants in the treatment group had a better interest in using elements of thought and intellectual traits after the intervention. Hence, integrating critical thinking instruction into APW lessons needs to be considered among all stakeholders to enhance university first-year EFL students' intellectual traits.

**Keywords:** Argumentative paragraph; critical thinking; instruction; intellectual traits; university first-year students.

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## 1. Introduction

According to Paul and Elder (2014), the intellectual trait is one of the three critical thinking (hereafter CT) dimensions – elements of thought, intellectual standards, and intellectual traits. These scholars define intellectual traits as the traits of mind and character necessary for the right action and thinking. Other scholars, for instance, Facione, Facione, and Giancarlo (1996) call this dimension of CT 'critical thinking dispositions' – hereafter CT dispositions. Facione defines CT dispositions as the consistent internal motivation to engage in problems and make decisions by using thinking. Thus, 'intellectual traits' and 'CT dispositions' are likely to be used interchangeably.

Many scholars (Facione et al., 1996; Paul, 1992; Facione, Facione, & Giancarlo, 1994) showed their agreement that CT embraces not only skills but also dispositions. In line with this view, Ennis (1985) recognizes that the ability to think critically is distinct from the disposition to do so. Though they are like two sides of a coin, Facione (2000) also argues that CT skills and CT dispositions are separate entities. Thus, the following are the most common intellectual traits or CT dispositions mentioned by different scholars believed to be incorporated in a definition that is to be articulated to explicate the concept of 'critical thinking. These are open-mindedness (Bailin et al., 1999b; Ennis, 1985; Facione 1990; Halpern, 1998); fair-mindedness (Bailin et al., 1999b; Facione, 1990); the propensity to seek reason (Bailin et al., 1999b; Ennis, 1985; Paul, 1992); inquisitiveness (Bailin et al., 1999b; Facione, 1990); the desire to be well-informed (Ennis, 1985; Facione, 1990); flexibility (Facione, 1990; Halpern, 1998); and respect for (and willingness to entertain) others' viewpoints (Bailin et al., 1999b; Facione, 1990; Paul & Elder, 2014).

Researchers assert that developing CT is interrelated with students' learning. For instance, Crocker and Bowden (2011), promoting students' CT motivates students to learn. They also claim that it attracts the students' innate desires for self-improvement. Concerning practical aspects of CT instruction methodologies, Stoller and Fitzsimmons-Doolan (2016) contend that teachers get opportunities to encourage students to think critically using the target language by providing content-based activities.

Though Facione, Giancarlo, Facione, and Gainen (1995) advocate that CT skills and CT dispositions mutually reinforce each other, the relationship is not one-to-one since having the skills of CT does not guarantee the dispositions to CT and vice versa (Facione, 2000). This relationship implies two principles: what CT is to be taught and how CT is to be taught.

The first principle is that CT instruction should include both the development of CT skills and the nurturing of CT dispositions so that students are not only able but also willing to use CT skills in appropriate circumstances (Profetto-McGrath, 2003). The second principle advocates that although CT skills and CT dispositions instruction should not be separated, Facione (2000) claims that skills and dispositions are two separate things, and different approaches should be employed to teach each aspect.

Regarding infusing CT skills and dispositions in writing, the current researchers believe that Richard Paul and Linda Elder's CT model is found relatively suitable as it involves three CT dimensions: elements of thought, intellectual traits (CT dispositions), and intellectual (CT) standards. The intervention provided in the current study was based on Richard Paul and Linda Elder's CT thinking model that considers CT as a three-dimension phenomenon – elements of thought, intellectual (CT) standards, and intellectual traits (CT dispositions). However, this article focused on the questionnaire provided to the participants before and after the intervention as well as the interview question that probes the 'interest of using the elements of thoughts and intellectual standards to investigate the effect of CT-infused paragraph writing instruction on enhancing first-year students' intellectual traits.

### 1.1 Review of related literature

### 1.1.1 *Related Research Findings on Critical Thinking and L2 Argumentative Writing*

As far as the researchers' readings are concerned, Internationally, Adege (2016) and Solomon (2019) were the local researchers who conducted studies to examine the connection between CT and argumentative writing in the L2 context. These studies are discussed briefly in the following paragraphs. The two researchers' studies will be presented briefly below.

Adege (2016) conducted a quasi-experimental study to examine the effects of explicit instruction in CT on student achievement in writing academic papers, general CT ability, and CT dispositions. He conducted the study on two intact sections of non-major undergraduates who were taking an EFL academic writing skills course to satisfy their general education requirement at Addis Ababa University. A two-group pretest/posttest quasi-experimental design was employed in the study. The findings of this study revealed that students' abilities to think critically, performance in writing academic papers, and dispositions toward critical thinking were improved due to the intervention provided to the students in the experimental group.

Solomon (2019) investigated the effects of problem-based English writing instruction on students' CT dispositions and argumentative writing skills. He used two intact sections of first-year Law students at the University of Gondar. His study's findings showed that there was a significant difference between the two groups in CT dispositions and argumentative writing skills as the experimental group outperformed the control group. From the discussion in this section, it can be inferred that CT and writing influence each other.

These two above-mentioned local researchers dealt with participants' dispositions (intellectual traits) towards CT and argumentative writing at the essay level. However, these researchers intended to examine the effect of the proposed intervention at the argumentative paragraph level – which is the building block of an argumentative essay. In the next sub-section, Richard Paul and Linda Elder's Model of CT will be briefly discussed.

### 1.1.2 *Richard Paul and Linda Elder's Critical Thinking Model*

Richard Paul and Linda Elder define CT as “the art of analyzing and evaluating thinking to improve it” (Paul & Elder, 2008, p. 2). The scholars believe that critical thinkers regularly employ intellectual (CT) standards to the elements of thought and this, in turn, fosters their intellectual traits (CT dispositions). Based on this belief, the scholars have provided a three-dimension CT model that includes elements of thought, intellectual standards, and intellectual traits as the scholars claim that the three dimensions make one's CT complete. In line with this view, Giancarlo and Facione (2001) argue that the concept of CT that focuses solely on cognitive skills is incomplete, so it should embrace the acknowledgment of a characterological component, often referred to as a disposition, to reflect a more comprehensive view of CT. Facione (1990) and Facione et al. (1994) also argue that CT should involve the affective or disposition aspect of an individual to be complete. The disposition component of CT deals with describing a person's inclination to use CT when s/he came across problems to be solved, ideas to be evaluated, or making decisions about what is to be done.

#### 1.1.2.1 Elements of Thought

Paul and Elder believe that critical thinkers can improve the quality of their thinking by “skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them” (2014, p.19). Hence, these scholars have provided the “elements of thought” or “universal structures of thought” that consist of eight elements: *purpose, question at issue, information, interpretation and inference, concepts, assumptions, implications and consequences, and point of view*. Hence, Paul and

Elder (2014) clearly illustrate in one sentence how these eight elements are interrelated in a thinking process (italic is used by the current researchers to show the 'elements of thought' in the sentence):

*Whenever you reason [think], you do so in some circumstances, making some inferences (that have some implications and consequences) based on some reasons or [pieces of] information (and assumptions) using some concepts, in trying to settle some question (or solve some problem) for some purpose within a point of view (p. 89).*

The above illustration indicates how the elements of thought work together in the process of thinking to affect the result of thinking as the interdependence among the elements of thought directs special attention to the inner logic of thinking in nature. In this regard, Paul and Elder provide the analogy of elements of thought and parts of the body as follows. "Like the parts of the body, the parts of thought function in an interdependent fashion" (2014, p. 96).

#### 1.1.2.2 Intellectual Standards

Any skill requires standards or criteria to assess the quality of that skill when someone employs it. In this vein, Bailin, Case, Coombs, and Daniels (1999a) claim that relevant standards for the teaching of CT are vital to assess whether or not a thinker can meet the relevant criteria for strong reasoning. Although other scholars in the field of CT (Facione, 1990; Stapleton, 2001) could not indicate such an assessment scheme in their models, Richard Paul and Linda Elder have provided in their CT Model the "intellectual standards" that indicate the quality of one's thinking. They have suggested nine intellectual (CT) standards as both evaluation criteria and goals for students to achieve. These are *clarity, accuracy, precision, relevance, depth, breadth, logicalness, significance, and fairness*.

#### 1.1.2.3 Intellectual Traits

The issue of someone's interest in using the CT knowledge s/he has was termed 'Critical Thinking Dispositions' among researchers like Facione, et al. (1995) and Halpern (2012) while Richard Paul and Linda Elder termed the concept 'Intellectual Traits' in various versions of their work. However, both terms were used interchangeably in this article. as can be observed throughout the work.

Researchers, such as Facione (1990), Facione et al. (1995), and Halpern (1998) consider CT dispositions as the inclination or interest of a thinker to use CT skills for academic issues and daily life. Other scholars in the field also insist that people may choose to not practice their thinking abilities, or may have not yet acquired the habit to use these abilities. For instance, Case (2005) claims that no amount of [CT] skill would overcome the limits of habits of mind, such as closed-minded and prejudicial thinking. The panelists of the Delphi project also claimed that a positive attitude or disposition toward critical thinking is necessary. According to the Delphi report (Facione, 1990), an ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused on inquiry, and persistent in seeking results which are as precise as the subject and circumstances of an inquiry allow.

Facione et al. (1994) insist that the California Critical Thinking Dispositions Inventory (CCTDI) is a standardized questionnaire developed by Facione in 1992. They developed the inventory to assess the CT dispositions of individuals in various fields including students. However, the current researchers have thought that students can understand easily if the questionnaire was prepared based on the concepts of intellectual traits used by Richard Paul and Linda Elder as the intervention material was prepared using the concepts these scholars used in their work. The researchers also intended to prepare the

questionnaire using simple English for non-native participants in contrast to the CCTDI questionnaire which was initially prepared for native speakers of English. Further, the researchers assumed that the 'CT Dispositions' sub-scales suggested by Facione (1990) and the 'Intellectual Traits' proposed by Richard Paul and Linda Elder are overlapping concepts expressed in different terms. According to Facione et al. (1994) identified seven CT disposition sub-scales (*truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness, and cognitive maturity*). However, Richard Paul and Linda Elder identified eight intellectual trait components – *intellectual humility, intellectual perseverance, intellectual autonomy, intellectual confidence in reason, intellectual integrity, intellectual empathy, intellectual courage, and intellectual fairness* (Paul & Elder, 2014).

According to the current researchers' understanding, the concepts in Facione's seven CT dispositions sub-scales and Richard Paul and Linda Elder's (2008) eight elements of 'Intellectual Traits' overlap as follows. Truth-seeking goes with intellectual fairness, open-mindedness goes with intellectual empathy, analyticity goes with intellectual integrity, systematicity goes with intellectual perseverance, inquisitiveness goes with intellectual courage, CT self-confidence goes with intellectual confidence in reason and CT maturity goes with both intellectual humility and intellectual autonomy. Hence, the researchers examined both categories and summarized them in the following table.

**Table 1**

*Overlapping Concepts of Richard Paul and Linda Elder's 'Intellectual Traits' and Facione's CT dispositions*

No.	Richard Paul and Linda Elder's 'Intellectual Traits' Categories with their meaning	Facione and C. Facione and Peter A. Facione's 'CT dispositions' Sub-scales with their meaning
1	<i>Intellectual Autonomy</i> : Becoming an independent thinker by adhering to appropriate intellectual standards.	<i>Cognitive (CT) Maturity</i> : the tendency to make reflective judgments; recognizing the level of acceptance that some problems are ill-structured, with more than one viable answer.
2	<i>Intellectual Humility</i> : Being aware of the biases or weaknesses in one's and/or someone else's viewpoint. <i>Intellectual Courage</i> : being committed to facing and fairly addressing ideas, beliefs, or viewpoints that someone does not want to consider.	<i>Inquisitiveness</i> : a desire to be well-informed and to learn even if there is no apparent need to acquire this new knowledge.
3	<i>Intellectual Empathy</i> : Being in the shoes of others to genuinely understand them.	<i>Open-mindedness</i> : Having tolerance of contradicting views with sensitivity to the possibility of one's own bias.
4	<i>Intellectual Integrity</i> : sticking oneself to the same standards one expects others to meet.	<i>Analyticity</i> : acknowledging the importance of applying reason and using evidence to resolve challenging situations.
5	<i>Intellectual Perseverance</i> : Not giving up in the face of complications embedded in intellectual tasks.	<i>Systematicity</i> : being organized, orderly, focused, and diligent in inquiry (CT).
6	<i>Intellectual Confidence in Reason</i> : Being moved in the way the reasons lead one instead of being drawn by one's selfish interest.	<i>Critical Thinking Self-Confidence</i> : Trusting in one's ability to make judgments
7	<i>Intellectual Fair-mindedness</i> : Being aware of treating all viewpoints equally, without reference to one's feelings or selfish interests.	<i>Truth-seeking</i> : searching for honest and objective pieces of information, even if they do not support one's interests or opinions.

Scholars in the field of CT, such as Bailin et al. (1999b); Dewey (1933); Ennis (1985); Facione (1990); Facione et al. (1995); and Halpern (1999) also emphasized the importance of being disposed to use CT skills. Facione et al. (1995); Fisher (2011); Giancarlo, Blohm, and Urdan (2004); Ip et al. (2000); and Paul and Elder (2014) also argue that involving CT demands skills and dispositions. Accordingly, Paul and Elder (2014) introduced intellectual traits (CT dispositions) as one of the three dimensions of their CT model.

Further, they extended the notion of intellectual traits by employing the idea of weak-sense and strong-sense critical thinkers in their studies saying:

*Critical thinking involves basic intellectual skills, but these skills can be used to serve two incompatible ends: self-centeredness [weak sense] and fair-mindedness [strong sense]. As we develop the basic intellectual skills that critical thinking entails, we can begin to use those skills in a selfish or fair-minded way (p. 21).*

The above quotation implies that to achieve their selfish interest or to make their opponents' thinking look bad, weak-sense critical thinkers use their intellectual (CT) skills in an unethical manner. Conversely, strong-sense critical thinkers use their intellectual (CT) skills in an ethically responsible manner and avoid using the skills to gain an advantage over others. Hence, Paul and Elder (2014) advocate the importance of being a fair-minded critical thinker, and they highlight the ethical aspect of intellectual traits (CT dispositions) which should not be neglected in the teaching of CT. They also insist that the notion of a 'weak-sense' critical thinker does not imply a lack of intellectual skills; instead, it emphasizes the attempt to employ the skills in a self-centered manner.

Paul and Elder (2014) figure out eight intellectual traits which are essential to lead someone to the level of a strong-sense critical thinker. These are intellectual humility (being conscious of the limits of one's knowledge), intellectual perseverance (being disposed to work through intellectual complexities despite frustrations), intellectual autonomy (disposition towards being an independent thinker), intellectual confidence in reason (recognizing that strong reasoning is vital), intellectual integrity (holding oneself to the same standards that one expects others to meet), intellectual empathy (entertaining opposing views), intellectual courage (being willing to challenge other's, as well as one's beliefs) and fairmindedness (being conscious of the need to treat all viewpoints).

### **1.2 Purpose of the study**

Some researchers argue that CT cannot be taught rather it is acquired through social practice though many researchers disagree. The purpose of this study was to examine the effect of CT-infused paragraph writing instruction on university first-year students' intellectual traits. To this end, the researchers attempted to address the following research questions in this study.

**RQ1:** Is there statistically a significant difference in the post-intervention intellectual traits questionnaire mean scores between the treatment group and the non-treatment group after controlling for the pre-intervention mean score?

**RQ2:** Which intellectual traits of the mind were improved in the treatment group after the intervention?

**RQ3:** How do participants in the treatment group reflect on their interest in using elements of thinking and intellectual (CT) standards in writing argumentative paragraphs after they were provided the CT-infused paragraph writing instruction?

## **2. Materials and Methods**

### **2.1 Participants**

This study employed the embedded design (Creswell, 2012; Creswell & Clark, 2011; Teddli & Tashakori, 2009) as the design supports a researcher to integrate the quantitative data with the qualitative data to better understand the issue under study. According to Creswell (2012), the embedded design gives room for any researcher to gather qualitative data to augment the intervention study. Hence, to examine the effect of CT-infused paragraph writing instruction on students' intellectual traits, the researchers distributed the same questionnaire to participants in both groups before and after the

intervention to analyze the difference quantitatively and involved three randomly selected participants to understand the reflections of the treatment group and a non-treatment group.

Wollega University first-year students taking the EFL common course “Communicative English Language Skills II (FLEn 1012)” in the academic year 2020/21 were the target population of the study. However, it was unlikely to involve all Wollega first-year students because the study employed intervention to examine the effect of the intervention on students in the treatment group. Hence, the researchers randomly selected Social Science Stream from the two streams in the Fresh Students College (Natural and Social Science streams). Then, they randomly selected two Social Science Stream sections with 32 students (treatment group) and 31 students (non-treatment group) for it was still difficult to involve all Social Science Stream students in a study that employed intervention.

As the intervention was employed on the intact class, the researchers were not forced to request the participants in the treatment group to fill out a consent letter. Instead, they openly and informally discussed with the participants the advantage of intervention to compose argumentative paragraphs. Following the discussion, the participants in the treatment group were inspired and engaged in the intervention.

## **2.2 Data collection tools**

A five-point-scale questionnaire was administered to both groups before and after the intervention to examine the groups' differences in their intellectual traits due to the intervention. A semi-structured face-to-face interview was also employed with the randomly selected participants from the treatment group. The details of the instruments will be presented next.

### *2.2.1 Questionnaire*

The researchers assumed that the three CT dimensions that Richard Paul and Linda Elder have employed in their work are more precise, and practical and appear to be easier to be learned and used in the L2 context to improve one's intellectual traits or CT dispositions. As a result, they developed a scale questionnaire from the work of Paul and Elder (2014) as their work appears more pertinent to L2 learning.

The questionnaire that focuses on intellectual traits (CT dispositions) was administered before and after the intervention. The researchers developed a CT dispositions questionnaire based on the eight “Intellectual Traits” identified by Paul and Elder (2014) to examine the willingness of students to consider elements of thought and reflect CT quality while they write argumentative paragraphs as well as in their daily lives. Hence, a five-point-scale (Strongly disagree, Disagree, Undecided, Agree, and Strongly Agree) questionnaire has been prepared based on the eight intellectual traits using declarative statements. The questionnaire consisted a total of 32 items (Intellectual Humility = 5 items, Intellectual Courage = 6 items, Intellectual Empathy = 3 items, Intellectual Integrity = 4 items, Intellectual Perseverance = 5 items, Intellectual Confidence in Reason = 3 items, Intellectual Autonomy = 3 items and Intellectual Fair-mindedness = 3 items).

On a six-point scale, Giancarlo and Facione (2001) claim that from the total score of 420, a score of 210 points or less implies students' negative or weak disposition toward CT, a score of between 210 and 280 points indicates ambivalent and a score of above 280 points implies positive or strong disposition towards CT. The current researchers adapted Giancarlo and Facione's (2001) interpretation of the CCTDI questionnaire scores in his questionnaire though he reduced the scale from six points to five points and used the mean score instead of total scores. In this regard, he categorized the scale into three – (1.00 – 2.50 = weak disposition toward CT; 2.6 – 3.5 = ambivalent (Ambivalent: having or showing neither a

strong nor a weak attitude towards critical thinking ) disposition toward CT, and above 3.5 = strong disposition toward CT). This shows the sum of each sub-theme which is divided by the number of items in each sub-theme. For example, the “Humility” sub-theme has five items; the average sum score was 13.78, and when the average sum score is divided into 5 the result is 2.76. This indicates that the mean score is on the “Ambivalent” scale (2.6 – 3.5). For better understanding, the adapted scale is provided next.

**Table 2**

*Scale for analyzing sub-categories of intellectual traits*

Intellectual Traits sub-scales	No. of items	Strong disposition	Ambivalent	Weak disposition
Intellectual Courage	6	21.6 – 30 (3.6 – 5)	15.6 – 21.5 (2.6 – 3.5)	Below 15 (<2.5)
Intellectual Humility	5	17.6 – 25 (3.6 – 5)	12.6 – 17.5 (2.6 – 3.5)	Below 12.6 (<2.5)
Intellectual Perseverance	5			
Intellectual Integrity	4	14.4 – 20 (3.6 – 5)	10.4 – 14.3 (2.6 – 3.5)	Below 10 (<2.5)
Intellectual Empathy	3	10.8 – 15 (3.6 – 5)	7.8 – 10.7 (2.6 – 3.5)	Below 7.7 (<2.5)
Intellectual Confidence in reason	3			
Intellectual Autonomy	3			
Intellectual Fairness	3			

### 2.2.2 Interview

A semi-structured interview was employed to gather detailed data from the three randomly selected participants from the treatment group. Six open-ended interview guide questions were prepared mainly to probe their opinion about how participants in the treatment group reflected their interest in using elements of thinking and intellectual (CT) standards in writing argumentative paragraphs after they were provided the CT-infused paragraph writing instruction. As mentioned earlier three participants were randomly selected from the treatment group since the interview questions focused on the intervention provided, and participants from the non-treatment group were not included in the interview because they were not provided with any intervention.

After the interview data were gathered, the researchers listened to the audio-recorded data twice and started the transcription during the third listening, and they employed a semi-verbatim transcription technique that allows omitting pauses between words and fillers, such as ‘umm...’, and ‘err...’. When the transcription was completed, they gave it to one of their colleagues to listen to the recordings and check the transcribed document against the recordings. In addition, they requested their colleague to translate the responses given in Afan Oromo (The mother tongue of the Oromo people, and one of the local languages that are spoken in many parts of Ethiopia) and Amharic (A mother tongue of the Amhara people, and one of the local languages that are spoken in many parts of Ethiopia) into English, and checked the transcription and did the translation. The researchers reviewed the translation and used it in the data analysis.

### 2.3 Procedure and Analysis

The quantitative and qualitative data were gathered concurrently – the data were gathered in one phase. Quantitative data using the questionnaire were collected at the very beginning and the end of the intervention. Qualitative data were gathered through interviews soon after the intervention to get adequate and relevant data from the fresh memory of each interviewee about the role of the intervention in enhancing their intellectual traits while writing argumentative paragraphs.



The quantitative data gathered through the questionnaire before and after the intervention were entered into SPSS version 20, and their descriptive statistics and inferential statistics were analyzed. Before the analysis of descriptive and inferential statistics, item reliability analysis was conducted, and Cronbach's Alpha coefficient was 0.718, and this reliability level is acceptable. From the descriptive statistics, mean scores (M) and standard deviation (SD) were employed. The mean was used to show the arithmetic average of each group and to roughly see the difference between the treatment group and the non-treatment group in their scores. The standard deviation was calculated to show the average distance of all the scores in the distribution from the mean for each group respectively.

Concerning the inferential statistics, the researchers employed analysis of covariance (ANCOVA) – specifically, one-way between groups ANCOVA – to examine the attitude of the participants toward CT before the intervention and to statistically adjust the effect of the pre-intervention questionnaire score on the post-intervention score. In other words, using ANCOVA helps to confirm that the difference revealed between the groups after the intervention was really due to the intervention. Further, ANCOVA is convenient when a researcher is unable to randomly assign her/his participants to different groups and uses existing groups like classes of students (Pallat, 2010).

The qualitative data from the interview were also analyzed using the thematic analysis method as the interviewees' responses were analyzed against the predetermined theme, i.e., the interest of participants in the treatment group after the intervention was provided.

### 3. Results

#### 3.1. Questionnaire Scores Analysis Results

This section deals with discussing on results of the analysis made using Intellectual traits (CT dispositions) data obtained through a Likert scale questionnaire to answer research questions 1 and 2. The results of the analysis will be discussed one after the other in the following sections.

##### 3.1.1. Effect of the Intervention on Participants' Intellectual Traits Scores

The analysis conducted in this section aimed at examining whether the intellectual traits (CT dispositions) of participants in both groups differ significantly due to the exposure of the treatment group to CT-infused paragraph writing instruction while statistically controlling the pre-intervention scale questionnaire score.

A five-point Likert scale questionnaire was prepared to address the first research question as CT cannot be complete without its disposition aspect. Descriptive statistics were computed (mean and standard deviation were depicted) to see whether or not there was a difference between the non-treatment and treatment groups in their intellectual traits (CT dispositions) scores before and after the intervention was offered to the treatment group.

**Table 3**

*Descriptive statistics for intellectual traits (CT dispositions) mean scores*

Test	Group	N	Statistic	
			Mean	SD
Pretest	Treatment	32	11.32	1.54
	Non-treatment	31	11.41	0.74
Posttest	Treatment	32	18.21	0.97
	Non-treatment	31	11.79	0.84

The mean scores in Table 3 revealed that before the intervention, participants in the non-treatment group scored slightly better than participants in the treatment group (treatment: M = 11.32, SD = 1.54; non-treatment: M = 11.41, SD = 0.74). The results after the intervention, however, revealed that participants in the treatment group scored better (treatment: M = 18.21, SD = 0.97; non-treatment: M = 11.79, SD = 0.84).

The SD outputs indicated that the scores of 68% of participants in the treatment group and non-treatment group deviate from the pre-intervention and post-intervention mean scores one SD of the means (pretest:  $\pm 1.54$  &  $\pm 0.74$ ; posttest:  $\pm 0.97$  &  $\pm 0.84$ ). This showed that the post-test score in both groups was closer to the mean than the pretest scores.

The Shapiro-Wilk test was calculated for assessing the distribution of the intellectual traits data before and after the intervention for both groups. The results portrayed in the output were as follows. Treatment group: pretest W32 = 0.975, p = 0.686; posttest W32 = 0.939, p = 0.072, and non-treatment group: pretest W31 = 0.976, p = 0.695; posttest W31 = 0.980, p = 0.821. The results indicated that the data were normally distributed as all the p-values were greater than 0.05.

The homogeneity of regression slopes for group and pre-intervention questionnaire average scores were also calculated as portrayed in Table 4 below to check whether the data were normally distributed as well as whether the ANCOVA assumption was met.

**Table 4**

*Homogeneity of regression slopes for group and pre-intervention questionnaire pretest average scores*

**Tests of Between-Subjects Effects**

Dependent Variable: Dependent Variable: PoSumAv

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
<b>Corrected Model</b>	91.218 <sup>a</sup>	2	45.609	53.108	.000	.639
<b>Intercept</b>	120.220	1	120.220	139.986	.269	.700
<b>Group*PreSumAv</b>	<b>91.218</b>	<b>2</b>	<b>45.609</b>	<b>53.108</b>	<b>.376</b>	<b>.039</b>
<b>Error</b>	51.528	60	.859			
<b>Total</b>	10828.781	63				
<b>Corrected Total</b>	142.746	62				

a. R Squared = .639 (Adjusted R Squared = .627)

The analysis results in Table 4 above depicted that there was no interaction between the group and pre-intervention questionnaire average scores as the p-value is greater than 0.05 (0.376). This indicated that the ANCOVA assumption was met, and it allowed to conduct of ANCOVA.

To this effect, the researchers entered Intellectual Traits data gathered through a questionnaire from both groups into SPSS and calculated the one-way ANCOVA. In this regard, the Intellectual Traits average score before the intervention was considered “covariate” and the Intellectual Traits average score after the intervention was regarded as a “dependent variable”, and the group (a group that was offered CT-infused paragraph writing instruction and a group that was not offered the instruction) was regarded as the independent variable.

The researchers used the one-way ANCOVA as they intended to statistically control the effect of the Intellectual Traits average score before the intervention before intervention (covariate) to examine if there was statistically a significant difference between the non-treatment group and the treatment group in their Intellectual Traits average score after the intervention was provided to the treatment

group. Before running the one-way ANCOVA, assumptions like the linearity of the relationship between the dependent variable and covariate, homogeneity of regression slopes for the dependent variable and the covariate, and so forth were checked, and they confirmed that the assumptions were met. Hence, the one-way ANCOVA was computed.

Using the before and after intervention questionnaire data, a one-way between-groups ANCOVA was calculated to examine the difference between the treatment group and the non-treatment group in their questionnaire score after intervention (CT-infused paragraph writing instruction) was offered to the treatment group while the effect of the covariate was statistically controlled. The one-way ANCOVA result in Table 5 depicted that there was statistically a significant difference between the two groups on the dependent variable (after intervention questionnaire score) after the covariate (before intervention questionnaire score) was statistically adjusted,  $F(1, 60) = 123.649$ ,  $p = 0.000$ . Further, the partial Eta squared value (0.805) indicated that 80.5% of the variance in the dependent variable (the questionnaire score after the intervention) was explained by the independent variable (group). In other words, this value shows that the group had statistically a significant effect on the participants' after-intervention questionnaire score (the dependent variable).

**Table 5**

*One-way ANCOVA results for before and after intervention questionnaire scores*

**Tests of Between-Subjects Effects**

Dependent Variable: PoSumAv

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
<b>Model</b>	10778.505 <sup>a</sup>	3	3592.835	4287.745	.000	.995
<b>PreSumAv</b>	.217	1	.217	.259	.612	.004
<b>Group</b>	<b>207.218</b>	<b>2</b>	<b>103.609</b>	<b>123.649</b>	<b>.000</b>	<b>.805</b>
<b>Error</b>	50.276	60	.838			
<b>Total</b>	10828.781	63				

R Squared = .995 (Adjusted R Squared = .995)

*3.1.2.Improvement of Intellectual Traits of the Mind in the Treatment Group*

Descriptive statistics (mean and standard deviation) were used to examine which intellectual traits of the mind were enhanced in the treatment group among the eight sub-themes of intellectual traits (Humility, Courage, Empathy, Integrity, Perseverance, Confidence in reason, Autonomy, and Fairness). This analysis was conducted to address the second research question, i.e., “Which intellectual traits of the mind were improved in the treatment group after the intervention?” In this regard, both groups’ intellectual traits of the mind in all sub-categories (Humility, Courage, Empathy, Integrity, Perseverance, Confidence in reason, Autonomy, and Fairness) were at the “Ambivalence” level before the intervention as depicted in Table 6. After the intervention, all the sub-categories were improved to the “Strong disposition’ level in the treatment group while they remained at the “Ambivalent” level in the non-treatment group.

**Table 6**

*Descriptive statistics for the sub-theme’s intellectual traits (CT dispositions)*

Intellectual Traits	Group	Pre-intervention		Post-intervention	
		Mean	SD	Mean	SD
Humility	Treatment	13.78	2.55	19.38	2.27
	Non-treatment	13.81	2.24	14.52	2.25
Courage	Treatment	16.22	3.00	22.31	2.10
	Non-treatment	16.22	2.31	17.16	1.93
Empathy	Treatment	7.84	1.89	14.34	1.47
	Non-treatment	8.16	1.13	8.87	1.69
Integrity	Treatment	11.44	2.86	16.06	2.17
	Non-treatment	11.81	1.14	11.97	1.76
Perseverance	Treatment	14.34	2.78	19.97	2.38
	Non-treatment	14.32	1.60	14.32	2.10
Confidence in reason	Treatment	8.53	2.78	14.84	1.08
	Non-treatment	8.81	1.30	8.84	1.57
Autonomy	Treatment	10.13	2.20	14.81	1.20
	Non-treatment	9.87	1.26	9.48	1.26
Fairness	Treatment	8.28	1.71	14.00	1.24
	Non-treatment	8.29	1.19	9.19	1.45

The analysis of interview data was also conducted to explore the attitude or disposition of participants in the treatment group towards using the CT knowledge they had and/or gained. To address the third research question, the researchers interviewed three randomly selected participants from the treatment group. The interview allowed the researchers to listen live to the sample participants to better understand the interest they had to use, in writing their argumentative paragraphs.

In the face-to-face interview, all the interviewees reflected that their interest in using CT in their argumentative paragraph writing increased after they were provided with CT-infused paragraph writing instruction. For instance, ES6 reacted to the question in his mother tongue and the translated English version is presented as follows:

*Before the training, I didn't know whether what I was writing had clarity, accuracy, etc. But after the training, I am in a position to analyze whether what I write has clarity, accuracy, depth, etc., or not. Hence, after the training, my interest in using the elements of thought and intellectual standards when I want to write a paragraph becomes higher as compared to my interest before the training.*

ES6's reflection in the quote above showed that before the training, ES6 did not have both the knowledge about elements of thought and intellectual (CT) standards and the interest to use them when he was writing on a given topic. After he had attended the training, he started thinking carefully about the pieces of writing he has been producing, and he developed an interest in thinking about elements of thought and intellectual (CT) standards. In the last statement of his reflection, he revealed that his interest in using the elements of thought and intellectual standards increased as he compared the interest he had before the training.

Similarly, ES23 also reflected what ES6 expressed in her response. She said that before the training she did not know the elements of thought and intellectual standards as well as the interest in using them when she was writing an argumentative paragraph. As the training helped her understand those dimensions of CT (elements of thought, CT/Intellectual standards, and CT dispositions/Intellectual traits), she was informed on how to write a paragraph on a controversial topic using the CT dimensions. Further, she uncovered that the training supported her to have a better interest to think deeply about a given controversial topic before writing on it. ES23 opined about her interest in thinking critically as follows:

*Before the training, I have no interest in using the elements of thought and the intellectual standards because I have no information and I do not know [about elements of thought and intellectual standards]; how can I use them? But after the training, I have got some information and experience in using the*

*elements of thought and intellectual (CT) standards. That encouraged me to think carefully about the issue I was writing about.*

The above quote unveiled that before the training, ES23's interest to use CT in her paragraph was low because she did not know the CT dimensions she learned and practiced during the training. After the training, she became aware of the elements of thought and intellectual standards that are vital for improving one's intellectual traits. This implies that ES23's willingness to use elements of thought and intellectual standards was increased after the training.

ES17 also suggested that his interest in using the CT knowledge he had and/or gained improved after the training. For instance, in the quote translated from his mother tongue into English, ES17 said that his initiation was increased after the training. He reacted, "... *The initiation I have to use elements of thought and CT standards also increased after the training*". This quote disclosed that ES17's interest in using CT in writing an argumentative paragraph improved after the training.

#### **4. Discussion**

The results from the post-intervention questionnaire in this study revealed that participants in the treatment group scored better after the intervention when compared to the non-treatment group's score. This finding is consistent with Adege (2016). Adege found out that students' dispositions toward critical thinking improved due to the intervention offered in his study. In line with this view, Amrous, and Nejmaoui (2016) claim that CT skills and dispositions are complementary to each other. This implies that having CT knowledge (the knowledge of the elements of thought and intellectual/CT standards) and having the interest to use the CT knowledge makes one's CT complete.

The interview analysis result also revealed that the CT-infused paragraph writing instruction was provided to participants in the treatment group during the treatment. This finding is in agreement with the suggestion made by Amrous and Nejmaoui (2016) – they insisted that CT operates well when it involves cognitive performances as well as dispositions. This implies that providing CT instruction and the opportunity to practice using the elements of thought and intellectual standards during the instruction enhances participants' interest in using the CT knowledge they had had before and/or gained during the instruction.

#### **5. Conclusion**

This study aimed to examine whether or not there was a significant difference between participants in the treatment group and non-treatment group in their intellectual traits scores. To achieve the aim, the before and after intervention tests questionnaire was administered to obtain the quantitative data. Additionally, randomly selected treatment group participants were interviewed about their interest in using elements of thought and intellectual standards during writing argumentative paragraphs, and the data were analyzed qualitatively to strengthen the result of the quantitative data. Results of both the quantitative and qualitative data showed that the difference between the treatment group and the non-treatment group in their intellectual traits was significant as the one-way ANCOVA outputs after the intervention depict that the p-values were less than 0.05 ( $F(1, 60) = 123.649, p = 0.000$ , partial Eta squared = 0.805) ( $F(1, 60) = 123.649, p = 0.000$ , partial Eta squared = 0.805)

The findings from the quantitative and qualitative data analyses indicate that the intervention provided (the CT-infused paragraph writing instruction) has the potential to improve their interest they had to employ the elements of thought and intellectual standards while they compose relatively better argumentative paragraphs. Hence, it is possible to conclude that the intervention (CT-infused paragraph writing instruction) had a positive effect on treatment group participants' intellectual traits.

Based on the conclusion, the researchers recommended that EFL instructors, curriculum (syllabus) designers, and material developers need to integrate CT instruction with argumentative paragraph writing to promote first-year students' CT quality in their writing. The researchers also recommended that future studies are to be conducted on English major EFL students who take different writing courses to address the topic or the issue more comprehensively. They also suggested that focusing on EFL major students will guide the researchers to focus on essay writing as EFL majors learn advanced-level writing.

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