

Improving EFL Students' Argumentative Essay Writing Self-efficacy through Knowledge Building Based Instruction

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Abstract

Argumentative essay writing is essential for English as Foreign Language (EFL) students but complicated and challenging to learn. Besides the difficulties, students often do not have belief in their argumentative essay writing skills. One approach that may facilitate students' self-efficacy is knowledge-building-based (KB-based) instruction based on knowledge-building pedagogy. The KB-based instruction aims to provide a comfortable learning environment with the online collaborative working platform (Knowledge Forum) where students feel safe contributing their ideas needed for writing argumentative essays. This study aimed to see if EFL students can improve their self-efficacy of English argumentative essay writing after implementing the KB-based instruction. The participants who were university non-English major freshmen (n=66) were divided into the control group (n=34) with the conventional writing instruction and the experimental group (n=32) with the KB-based instruction. The questionnaire of English Argumentative Essay Writing Self-Efficacy (AEWS) with five dimensions was adapted from the Self-Efficacy for Writing Scale (SEWS) (Bruning et al., 2013), which was administered to the 66 participants before and after the study. The statistical results indicated that the two groups did not significantly differ in terms of the "ideation," "conventions," and "self-regulation" ($p>0.05$); however, significant differences were found in terms of "argument writing ideation" and "argumentative essay writing self-regulation" ($p<0.05$). The results suggested that the KB-based instruction could improve students' self-efficacy on argumentation due to the KB-based instruction did create an environment where students could generate ideas collaboratively and comfortably. Pedagogical implications and future applications were also discussed.

Keywords: Self-efficacy, EFL, Knowledge Building, Argumentative Essay

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1. Introduction

In the global knowledge economy era, learners must develop abilities helping them succeed in academic contexts or workplaces (Zhang, 2013). These abilities include collaboration, effective oral and written communication, critical thinking, and problem-solving (Chan, 2010; Gut, 2011; Kong, 2014; Wagner, 2018). Thus, many nations nowadays pay more attention to developing these abilities for their citizens (Wagner, 2018). Due to the limited domestic demand markets, Taiwan has more and more chances for citizens to participate in international trades and collaboration or communication that are involved with other people from other countries. In these contexts, the common communication language is usually English (Cook, 1999; Crystal, 1997; Doan, 2013; Dong, 2012). Therefore, improving students' English ability in international communication has been an important goal for contemporary English education, especially for nonnative English speakers (Canagarajah, 2014; Sharifian & Marlina, 2012; Zia, 2018). As a result, in Taiwan, training students to be equipped with the abilities mentioned above is needed in the global knowledge economy.

Among the abilities needed in academic contexts or workplaces, argumentation plays a critical role in developing critical thinking and developing a deep understanding of complex issues and ideas (Deane & Song, 2014). As Kuhn (1991) argued, argumentation is a thinking skill essential to idea formulation, problem-solving, and sound judgment in writing. Many researchers have also noted the importance of developing students' argumentative essay writing skills (Ne'meth & Kormos, 2001; Rapanta et al., 2013; Toulmin, 1958, 2003; Wolfe, 2011). Previous researchers have explored the relationship between students' English writing self-efficacy and writing performance. The results have shown that high writing self-efficacy beliefs are relevant to better writing outcomes (Bruning et al., 2013; Pajares & Johnson, 1996; Pajares, Johnson & Usher, 2007). However, the research mentioned above was mainly conducted in the K-12 education context and western countries. Very little research on English argumentative essay writing and its relationship with self-efficacy in higher education was conducted in eastern countries, especially in Taiwan. Therefore, how higher education students' argumentative essay writing and their writing self-efficacy related to their writing performance in Taiwan may be an important issue.

In order to help EFL learners to overcome the language barriers and argumentation difficulties when they write argumentative essays, some researchers have examined argumentative writing with the help of computer-assisted language learning (CALL). The adoption of CALL for English writing has been proved beneficial (Warschauer & Healey, 1998), such as online blogs (Ducate & Lomicka, 2005; Kathpalia & See, 2016), online discussion forums (Du & Wagner, 2006; Luehmann & Tineli, 2008). However, the findings of the previous studies showed that participants might increase their content knowledge with the assistance of CALL, but they do not attain higher levels of argumentation in their writings (Hall & Davision, 2007; Xie, Ke & Sharma, 2008). To date, researchers are still finding appropriate teaching approaches to help learners gain higher argumentation quality.

Because argumentation is one kind of collective idea refinement, it emphasizes supporting ideas with evidence, warrants, backing, and rebuttal of counter-arguments (Jonassen & Kim, 2010). That is to say, the central part of argumentation is idea generation. The idea-centered knowledge-building pedagogy may be a potential approach to train students' argumentation skills to address this issue. In the past two decades, knowledge-building pedagogy (i.e., educational practices based on knowledge building theory) has been widely and increasingly adopted in many educational settings. Due to the main features of knowledge building, it may

be a promising teaching approach for helping learners improve the quality of argumentation. However, most contexts of the empirical studies of knowledge building were in science, mathematics, and geography (Chan & Chan, 2011; Moss & Beatty, 2006). To date, very few studies of English have addressed the critical issue mentioned above. Therefore, as one of the initial attempts, this study tried to examine if knowledge building-based instruction (KB-based instruction) can be used as a practical teaching approach promoting university EFL (English as Foreign Language) learners' self-efficacy of argumentative essay writing.

2. Literature Review

2.1 Knowledge Building Based Instruction

In the past two decades, knowledge-building pedagogy (i.e., educational practices based on Knowledge Building theory) has been widely and increasingly implemented in many educational settings. More and more relevant empirical studies in knowledge building pedagogies have been conducted in different settings (e.g., Gan, Hong, & Zhang, 2010; Hong, 2011; Hong & Sullican, 2009; Hong & Scardamalia, 2014; Aalst & Chan, 2007; Scardamalia, 2002, 2003; Scardamalia & Bereiter, 2003, 2006; Zhang et al., 2009). Regarding the instructional design, most of the KB studies only used knowledge-building pedagogy rather than integrating knowledge-building pedagogy with domain-specific instructional strategies. In addition, it was found out that most of the reviewed studies used “Knowledge Forum” as the primary research platform.

In the last few years, various technologies and tools have also been developed that can offer opportunities for computer-supported knowledge exchange (Cress, Kimmerle, & Hesse, 2006; Kimmerle, Cress, & Hesse, 2007), as well as for computer-assisted learning and collaborative knowledge building (Bryant, 2006). Scardamalia, Bereiter, and colleagues created the networked knowledge-building environment, Knowledge Forum, to support knowledge-building communities. Knowledge Forum is a platform with technology-enhanced knowledge-building pedagogies. It provides a multimedia-based knowledge space for community members to contribute ideas and rise above their early understandings (Hong et al., 2014; Hong & Chiu, 2015; Sun, Zhang, & Scardamalia, 2010). It is designed to support high-level knowledge processes and discourse that help learners to generate and improve their ideas (Hong & Scrdamalia, 2015).

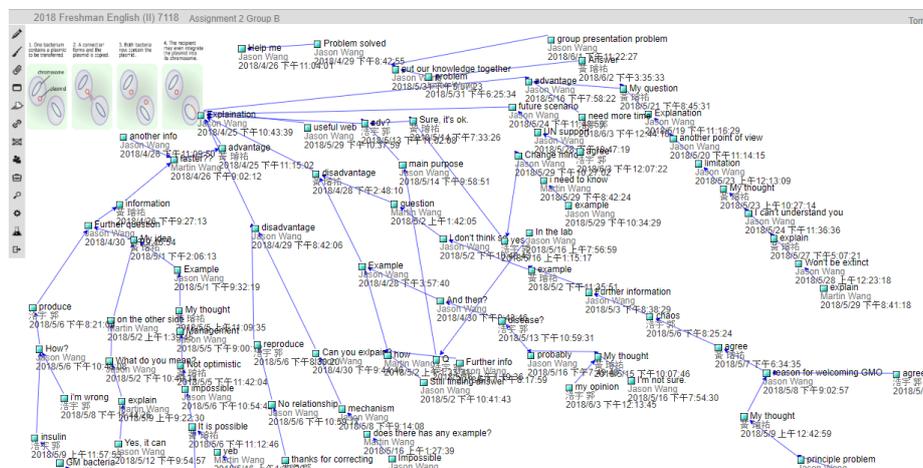


Figure 1: Screenshot of Students' Discussion on Knowledge Forum

2.2 Argumentative Essay Writing Self-efficacy

Besides assessing argumentative writing, some researchers also pay attention to the learners' self-efficacy in English writing. Bandura (1977) defined self-efficacy as one's belief that he or she can perform a specific task successfully. Bandura (1992) believed that If one has lower self-efficacy, one does not have confidence in his/her abilities; however, one with higher self-efficacy feels more confident of overcoming difficulties he/she may have. That is to say, students with higher self-efficacy are more likely to work harder and are persistent in finishing assigned tasks (Bruning & Horn, 2000; Zimmerman, 2000). Before 1990, English writing research focused more on the cognitive processes involved in students' skills. After 1990, the emphasis of English writing research has moved from cognitive processes to students' "thoughts and beliefs." The later research revealed that students' self-efficacy plays a significant role in English writing (Pajares & Johnson, 1995; Schunk, 2003). The construct of self-efficacy plays a significant role (Hashemnejad, Zoghi, & Amini, 2014). In brief, previous research has shown that high writing self-efficacy beliefs are relevant to better writing outcomes (Bruning et al., 2013; Pajares & Johnson, 1996; Pajares, Johnson & Usher, 2007).

In the past three decades, researchers of English writing have developed tools with different dimensions for measuring writing self-efficacy. These measures include the relationship between university students' writing self-efficacy and performance concentrating on writers' writing mechanics (McCarthy et al., 1985), the relationship among university students' writing self-efficacy, outcome expectancy beliefs, and writing achievement (Shell, Murphy, & Bruning, 1989), the younger students' writing self-efficacy, outcome expectancy beliefs, and writing achievement (Shell et al., 1995). The results of these early studies all suggested that writing self-efficacy positively affects students' writing performance. Recently, the latest integrated model of writing self-efficacy has been proposed and proved successfully to predict students' writing performances (Bruning et al., 2013). The model has three main dimensions: ideation, conventions, and self-regulation.

Ideation

Bruning et al. (2013) argued that the writers' beliefs about generating ideas are significant dimensions of writing self-efficacy. Idea generation is the first key element to successfully composition (Flower & Hayes, 1984).

Conventions

After generating writing ideas, the next step is to express the ideas in writing. The way of expressing ideas is through language mechanics or conventions (Fayol, Alamargot, & Berninger, 2012; Flower & Hayes, 1981). In English, the conventions would include spelling, punctuation, capitalization, and structured sentences, which may provide the frames within which writers can express their ideas successfully (Bruning et al., 2013).

Self-regulation

Having ideas to write and using appropriate mechanics to organize the ideas is essential to writing. However, some researchers argued that they are not enough (Zimmerman & Bandura, 1994; Zimmerman & Kitsantas, 2007, Bruning et al., 2013), more attention needs to be given to the writers' judgment about cognitive and linguistic features in the writing process (Hidi &

Boscolo, 2006).

From the above literature review, most English writing self-efficacy research has proved that self-efficacy positively affects students' writing performance. However, as noted, most of the contexts were in western countries, there is a lack of research about writing self-efficacy beliefs, especially in the Taiwanese EFL context. In addition, the main topic and the model developed is the general English essay writing self-efficacy. Few studies have examined the relationship between self-efficacy and argumentative writing performance and extended the three-dimension model to examine university writers' self-efficacy of argumentation writing. Thus, the present study tried to develop an instrument of English argumentative essay writing self-efficacy adapted from the previous general English essay writing self-efficacy.

2.3 Research Questions

- (1) After completing knowledge building based instruction, what are the changes of students' self-efficacy of argumentative essay writing?
- (2) Does any interaction between the knowledge building based instruction and students' self-efficacy of argumentative essay writing?

3. Methodology

3.1 Participants and Research Design

The participants came from two classes, the experimental group ($n = 32$) and the control group ($n=34$), based on two different knowledge-building-based instructions implemented in this study. They were from different departments and institutes in the same university. All of them were native speakers of Mandarin Chinese and had been learning English for nearly six years or above. The participants were enrolled in the general English course focusing on reading and writing taught by the researcher who had had the experience of adopting KB instructions at the university level for over four years. The students in the two groups met once a week for 2 hours, and the whole duration of the study was 18 weeks. In this study, both groups used an online discussion platform, Knowledge Forum, with knowledge-building pedagogy helping them generate ideas, assume agency, and foster a community regarding the writing topics in the general English course.

This study adopted a quasi-experimental method, and the participants were divided into the experimental and the control group. As shown in Figure 2, the participants ($n=66$) were divided into two groups according to the two different knowledge-building-based instructions. The two groups first took the pretest and received a mini-lesson regarding the introduction to knowledge building and the basic operations of Knowledge Forum (2 weeks). Then the two groups finished two phases of knowledge-building learning activities (KBLA1 and KBLA2) and within the middle test. Finally, they took the posttest. The details of the knowledge-building-based instruction are explained below.

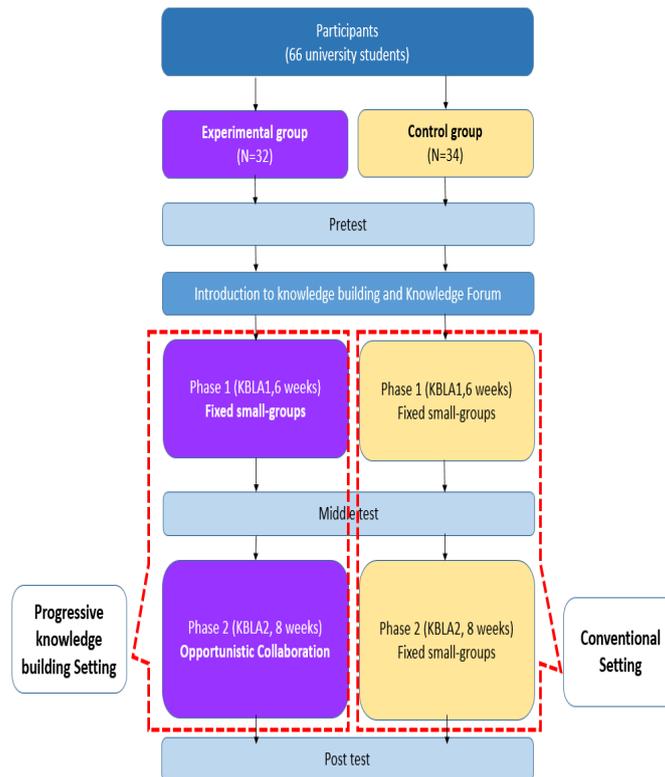


Figure 2: General Research Design of this Study

3.2 Knowledge Building Based Instruction

After the pretest, all experimental and control groups participants were divided into smaller groups in phase 1 (from Week 3 to Week 8). This study's knowledge-building-based instructions include the introduction to knowledge building and Knowledge Forum. The main difference between the two instructions was the KB learning environment. The two groups adopted the same KB learning environment (fixed small-groups), where participants mainly discussed and collaborated with the members within the group. At the beginning of phase 1, all students were introduced to knowledge building theory and the basic operations of Knowledge Forum at the beginning of the study in week 3. Once the two groups all have experienced the knowledge building process and become acquainted with Knowledge Forum operations, besides the regular textbook lecture in each week, both groups then started building their knowledge on Knowledge Forum with the topic used in the pretest: "How to solve the power shortage issue in Taiwan?". With the features of the Knowledge Forum and the knowledge-building elements taught in class, students regularly discussed the topic in and out of class. They helped each other within the small group to generate and improve ideas for reaching a consensus. They were also required to attend discussions collaboratively, and each small group was also required to do oral reports of their knowledge-building discussion progress in class (individual and group reflections) weekly. At the end of the first phase, each participant needed to finish an oral report with their group members and an English argumentative essay individually based on the ideas generated within the small group in Knowledge Forum in the first KB learning activity (KBLA1).

Before moving to the second phase, the participants took a middle test in week 8. One of the items of the middle test was argumentative essay writing. Students had to finish two English argumentative essays. The topics of the two argumentative essays were: "How to solve the

power shortage issue in Taiwan?” and “What are the pros and cons of GMOs? How can people use GMOs appropriately?” The first essay in the middle test was one of the artifacts from the first KB learning activity, which then was compared with the essay written in the pretest. The second essay in the middle test was the “pretest” of the English argumentative essay before finishing the second KB learning activity. A mini-lesson with reading materials and GMO videos was also given to all participants before conducting the second phase.

In phase 2 (from week 10 to week 17), the students in the control group still used the fixed small-groups while the students in the experimental group adopted the opportunistic collaboration environment where all students were in one community. Both groups built their knowledge with the same topic: “What are the pros and cons of GMOs? How can people use GMOs appropriately?” As aforementioned, the two groups adopted different KB learning environment settings. The experimental group adopted opportunistic collaboration, which did not use the fixed small-groups setting. That is to say, the whole group members started with the same shared, top-level goal (i.e., What are the pros and cons of GMOs? How can people use GMOs appropriately?). The participants in the experimental group elaborated sub-goals (i.e., different perspectives concerning the GMOs) as their works proceeded (Zhang et al., 2009). Unlike the control group, the participants in the experimental group in the second phase were responsible for the growth of all views; no one was assigned to work in specific Knowledge Forum views. Daily, the participants were free to explore any problem from any view. After the two groups finished the second phase, they were required to finish the posttest in Week 17.

3.3 Data Collection and Data Analysis

In order to explore university students’ self-efficacy of argumentative essay writing, a revised model called Argumentation Self-Efficacy Writing Scale (ASEWS) was adapted from Bruning et al. (2013) in this study. Bruning et al. (2013) argued that the SEWS might have potential utility for research. It provides minimal information about the sources of students’ writing self-efficacy beliefs. The original SEWS consists of 16 items corresponding to the three categories of writing-related experience: ideation, conventions, and self-regulation and three focal dimensions (ideation, conventions, and self-regulation) aiming to predict the writing achievements from the affective experience (Bereiter & Scardanakuam 1987; Pajares & Johnson, 1996; Schunk & Zimmerman, 2007). In this study, besides the items of SEWS, two more dimensions related to argumentative essay writing were adapted and added to explore the students’ argumentative ideation and self-regulation (For the details of the items, please refer to Appendix 5). The participants rated their English argumentative essay writing self-efficacy on a 0 to 100 scale ranging from no confidence to complete confidence (Bandura, 2006).

Bruning et al. (2013) found out that the internal consistency of coefficients of the three subscales (ideation, conventions, and self-regulation) of original SEWS was between .80 and .91. and .90 for the total scale. The two added subscales (argumentation ideation and argumentation self-regulation) added to the instrument used in this research have also been tested. Their internal consistency of coefficients was .94 and .90, respectively, all exceeding the threshold of .50 for attitude and preference assessments (Tuckman, 1999). The overall reliability and validity of the 28 items were further tested. Regarding the reliability, Cronbach’s alpha coefficient was .96, more significant than the recommended value of .60 (Bagozzi & Yi, 1988). As for the validity of the 28 items, the loading values ranged from .61 to .79, which were statistically significant and greater than that of the recommended value

of .45 (Bentler & Wu, 1993; Joreskog & Sorbom, 1989). A paired-samples t-test was conducted to explore the changes in students' overall improvement of self-efficacy of argumentative essays. Then a one-way ANCOVA was conducted to determine a statistically significant difference between the experimental and control group.

4 Results

4.1 Students' Overall Improvement of Self-efficacy

Table 1 displays the comparison results of the students' perceptions of self-efficacy of English argumentative writing before and after the two knowledge-building learning activities. A paired-samples t-test was conducted in five dimensions: ideation, argumentation ideation, conventions, self-regulation, and argumentation self-regulations. First, there was a significant difference in the scores for students' perceptions of self-efficacy of English argumentative writing on Ideation ($M=50.9$, $SD=12.81$) and after the two KB learning activities on Ideation ($M=67.7$, $SD=16.92$); $t(65) = -9.33$, $p < .001$. Next, there was a significant difference in the scores for students' perceptions of self-efficacy of English argumentative writing on Argumentation Ideation ($M=51.5$, $SD=13.38$) and after the two KB learning activities on Argumentation Ideation ($M=70.73$, $SD=19.02$); $t(65) = -9.34$, $p < .001$. Then, there was a significant difference in the scores for students' perceptions of self-efficacy of English argumentative writing on Conventions ($M=58.2$, $SD=16.33$) and after the two KB learning activities on Conventions ($M=63.6$, $SD=15.14$); $t(65) = -2.62$, $p < .05$. And then, there was a significant difference in the scores for students' perceptions of self-efficacy of English argumentative writing on self-regulation ($M=56.4$, $SD=16.90$) and after the two KB learning activities on self-regulation ($M=63.5$, $SD=17.49$); $t(65) = -3.36$, $p < .01$. Finally, there was a significant difference in the scores for students' perceptions of self-efficacy of English argumentative writing on argumentation self-regulation ($M=53.1$, $SD=15.11$) and after the two KB learning activities on argumentation self-regulation ($M=69.2$, $SD=19.28$); $t(65) = -8.26$, $p < .001$. The results implied that the students believed that they had more confidence in improving their ideas, arguments, conventions, self-regulation, and argumentation self-efficacy in the argumentative essay writing tasks after finishing the two knowledge-building learning activities.

Table 1: The results of paired samples t-test of the five dimensions in the ASEWS

Dimensions		M	SD	t	p
Ideation	pretest	50.97	12.810	-9.33***	.000
	posttest	67.78	16.920		
Argument Ideation	pretest	51.54	13.328	-9.34***	.000
	posttest	70.73	19.021		
Conventions	pretest	58.23	16.330	-2.62*	.011
	posttest	63.69	15.145		
Self-regulations	pretest	56.44	16.906	-3.36**	.001
	posttest	63.56	17.492		
Argument self-regulations	pretest	53.19	15.116	-8.26***	.000
	posttest	69.28	19.280		

* $p < .05$ ** $p < .01$ *** $p < .001$

4.2 The Effects of Knowledge Building Based Instruction on the Two Groups of Students' Self-Efficacy of English Argumentative Essay Writing

A paired-samples t-test was conducted to compare the five dimensions of the self-efficacy of English argumentative essay writing before and after implementing the two KB learning activities. As shown in Table 2, regarding the experimental group, there were significant differences in the scores for Ideation before (M=54.8, SD=11.69) and after the implementation of the two KB learning activities (M=80.1, SD=11.28); $t(65) = -10.7, p < .001$. Argumentation Ideation before (M=56.5, SD=12.27) and after the implementation of the two KB learning activities (M=84.6, SD=12.88); $t(65) = -12.3, p < .001$. Argumentation self-regulation before (M=57.5, SD=11.59) and after the implementation of the two KB learning activities (M=82.0, SD=14.28); $t(65) = -10.0, p < .001$. Similar results were also found in the control group. As shown in Table 2, there were significant differences in the scores for Ideation before (M=47.2, SD=12.88) and after the implementation of the two KB learning activities (M=56.1, SD=12.48); $t(65) = -4.7, p < .001$. Argumentation Ideation before (M=46.8, SD=12.71) and after the implementation of the two KB learning activities (M=57.6, SD=12.48); $t(65) = -4.0, p < .001$. Argumentation self-regulation before (M=49.1, SD=16.98) and after the implementation of the two KB learning activities (M=57.2, SD=15.32); $t(65) = -3.5, p < .001$. It is noted that there was also a significant difference in the scores for Self-regulations before (M=49.4, SD=16.68) and after the implementation of the two KB learning activities (M=59.9, SD=17.57); $t(65) = -3.6, p < .001$ in the control group. The results implied that the students in both experimental and control groups have reflected in their beliefs about their abilities to generate ideas or ideas related to argumentation and have learned how to manage their anxieties and emotions that can accompany argumentative essay writing.

Table 2: The Results of Two Groups of Students with the Paired Samples T-Test

Groups	Dimensions	Experimental Group (n=32)				Control Group (n=34)				
		M	SD	t	p	M	SD	t	p	
	Ideation	Pretest	54.8	11.69	-10.7***	0.00	47.2	12.88	-4.7***	0.00
	Posttest	80.1	11.28	56.1			12.48			
	Argument	Pretest	56.5	12.27	-12.3***	0.00	46.8	12.71	-4.0***	0.00
	Ideation	Posttest	84.6	12.88			57.6	13.78		
	Convention	Pretest	61.7	14.25	-1.9	0.58	54.9	17.65	-1.7	0.09
	s	Posttest	67.5	16.43			60.0	13.02		
	Self-regulati	Pretest	63.9	13.82	-1.1	0.25	49.4	16.68	-3.6***	0.00
	ons	Posttest	67.4	16.81			59.9	17.57		
	Argument	Pretest	57.5	11.59	-10.0***	0.00	49.1	16.98	-3.5***	0.00
	Self-regulati	Posttest	82.0	14.28			57.2	15.32		

*** $p < .001$

In order to understand the effects of the two KB learning activities on the two groups of students' perceptions of self-efficacy, a One-way ANCOVA was conducted to determine a statistically significant difference between the control group and experimental group on the

five dimensions in the self-efficacy of English argumentative essay writing controlling for the pretest. As shown in Table 3, the adjusted means of the posttest were then further analyzed, excluding the effects of the pretest.

Table 3: Adjusted Means of the Two Groups of Students' Self-Efficacy of English Argumentative Essay Writing

Dimensions	Experimental Group	Control Group
Ideation	78.91	58.36
Argument Ideation	82.61	59.55
Conventions	66.28	61.24
Self-regulations	63.58	63.54
Argument self-regulations	79.50	59.65

Before conducting the One-way ANCOVA, the homogeneity of regression coefficients within groups was also tested. As shown in Table 4, the *p* values of the five dimensions were more remarkable than .05, and there were no significant differences. Thus, the null hypothesis was accepted. The coefficients of the covariant (the pretest of the five dimensions) and the dependent variables (the posttest of the five dimensions) will not be different about the independent variant (KB learning activities).

Table 4: The Test Results of the Homogeneity of Regression Coefficients within Groups

Dependent Variables	F	df1	df2	<i>p</i>
Ideation	.164	1	64	.687
Argument Ideation	.193	1	64	.169
Conventions	.104	1	64	.748
Self-regulations	.040	1	64	.843
Argument self-regulations	.097	1	64	.757

Table 5 shows the results of the two groups of students' analysis of covariance. The results showed a significant effect of the opportunistic collaboration structure on the overall scores ($F=17.611, p=0.000$) in English argumentative essay writing self-efficacy after controlling for the pretest. In addition, there were significant effects of the opportunistic collaboration structure on Ideation ($F=57.528, p<.001$); Argumentation Ideation ($F=49.503, p<.001$); and Argumentation Self-regulation ($F=39.859, p<.001$) in the ASWES after controlling for the pretest. However, there were no significant effects on Conventions and Self-regulation. It was revealed that after the two KB learning activities with different structures (experimental group=opportunistic collaboration; control group=fixed small-groups), the experimental group had more confidence to generate ideas and ideas related to argumentation, had more confidence to manage the anxieties and emotions during their argumentative essay writing tasks. However, the results also suggested that the two groups had no difference in the conventions (mechanics) or self-regulations after using different knowledge-building learning structures.

Table 5: The Results of the Two Groups of Students' Analysis of Covariance

Dependent Variables	Sum of Squares	df	Mean square	F	p
Ideation	6421.27	1	6241.27	57.52***	0.000
Argument Ideation	7599.63	1	7599.63	49.50***	0.000
Conventions	401.66	1	401.66	2.14	0.148
Self-regulations	0.02	1	0.02	0.00	0.993
Argument self-regulations	5988.79	1	5988.26	39.85***	0.000
Overall	2201.52	1	2201.52	17.61***	0.000

*** $p < .001$

5. Discussion

5.1 Students' Overall Changes of Argumentation Self-efficacy Writing

The results derived from the questionnaire in this study were analyzed quantitatively by adopting a paired samples t-test. As for the ideas generation (ideation and argument ideation) dimensions, Bruning et al. (2013) have argued that they showed the writers' judgments of their ideas' availability, quality, and ordering. The findings in this study revealed that after the students experienced the two KB learning activities, they had more confidence to generate more ideas or ideas for their argumentative writing. The finding is also consistent with the three KB principles: Real ideas and authentic problems, improvable ideas, and idea diversity which were proposed by Scardamalia (2002). Students have more confidence in identifying their problems, treating their ideas as improvable artifacts, and understanding the ideas surrounding them, including the opposing ideas. The third dimension in ASEWS is self-efficacy for writing conventions. Conventions refer to a set of generally accepted standards for expressing ideas in writing in the target language (Fayol, Almargot, & Berninger, 2012). Conventions provide the structures within which writers direct their ideas effectively (Bruning et al., 2013). This study showed that overall, students believed in more confidence in using the writing conventions. Regarding the self-regulation dimensions (self-regulation and argument self-regulation), they reflected the writers' confidence in directing themselves successfully in the writing tasks (Zimmerman & Bandura, 1994; Zimmerman & Kitsantas, 2007). As Bruning et al. (2013) have discussed, self-regulation skills are needed because writing can be difficult and tedious. If writers have better self-regulation skills, they might have the ability to manage the anxieties and emotions that accompany the writing. This study also revealed that the students perceived better self-regulation skills after they experienced the KB learning activities.

5.2 The Effects of Knowledge Building Based Instruction on the Two Groups of Students' Self-Efficacy of English Argumentative Essay Writing

In order to understand the effects of the two KB learning activities on the two groups of students' perceptions of self-efficacy, a One-way ANCOVA was conducted to determine a statistically significant difference between the control group and experimental group on the five dimensions in the self-efficacy of English argumentative essay writing controlling for the pretest. The results showed a significant effect of the progressive knowledge building setting on the overall scores in the self-efficacy of English argumentative essay writing after controlling for the pretest. The experimental group with the progressive knowledge building

setting, especially the opportunistic collaboration environment designed in KBLA2, showed more confidence than the control group with the conventional setting. As Zhang et al. (2009) proposed, the opportunistic collaboration led to more pervasive, flexible, and greater knowledge advances. Students in this setting may have more chances to generate ideas. The major findings in this study also revealed that students in the progressive knowledge building setting had a higher level of confidence in ideation and argument ideation than students in the conventional setting. It should also be noted that there were no significant effects on conventions and self-regulation. The experimental and control groups students might not differ in their confidence in the lower-level process. This situation deserves more attention from knowledge building and EFL educators. The finding implies that students believed they had higher confidence in their argumentative essay writing in several dimensions, but not the conventions dimension. The result may suggest that more research may be needed to help students improve their confidence when writing argumentative essays.

6. Conclusion

Argumentative essay writing has been gaining more and more attention. This study is the first attempt to adopt knowledge-building-based instruction to see if learners have higher writing self-efficacy. The findings in this study may validate the effects of knowledge-building pedagogy and its instructions on the higher education argumentative essay writing courses. The findings may also offer some suggestions to the English educators or researchers. Although the present study has yielded findings with theoretical and practical implications, its design is not without flaws. First, not everyone is familiar with the knowledge-building process. The biggest challenge is finding evidence that can be adapted to their arguments. Second, students' informal reasoning abilities are not well trained. A more detailed course design should consider training students' informal reasoning before conducting the KB-based instruction. The present study has demonstrated that KB-based instruction benefits students' argumentative essay writing self-efficacy. However, the relationship between their self-efficacy and essays performance was not discussed. Further research is therefore warranted in the relationship.

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