Effects of L1 Use on L2 Text Quality:

Rethinking Cognitive Process of Formulating L1 Texts during L2 Writing

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Abstract

The first language (L1) use is vital to developing the quality of second-language (L2) writings. Establishing a clear argument with the logical flow in L2 can be a daunting task for learners with low L2 proficiency. To determine if L1 use is positively related to students' L2 texts, the researcher conducted a comparative study with 77 Japanese L2 learners. It examines differences amongst L2 argumentative essays resulting from four writing processes. The participants were divided into two focused groups, the experimental group formulating L1 texts and then translating into L2, and the contrast group composing texts directly in L2. Then, each group was divided into two sub-groups: One composing their texts using a writing framework, and the other with no framework. Over three L2 classes, each group experienced the writing process respectively. They submitted the essays before and after the processes. Two experienced L2 instructors assessed students' pre- and post-texts, and compared the texts of each group cross-sectionally and longitudinally. The results show that participants in the experimental group with the framework significantly improved their L2 text quality. Thus, the teaching of argumentative writing should incorporate the process of L1 formulation with a framework into a process-focused approach to efficiently facilitate students' L2 writing.

Keywords: first language use, second language writing, process approach, translation, text quality, writing framework

1. Introduction

1.1 Background of the Study

Logical organization and high clarity of message are crucial aspects to produce comprehensible writings. Establishing a clear argument with the logical flow in a second language (L2) can be a daunting task for learners. Especially, L2 learners with lower levels of L2 proficiency cannot visualize the detailed flow of their L2 texts, nor logically organize their critical arguments in their L2 (Hinkel, 2002; Tsuji, 2016). To solve such writing problems which require cognitive efforts, Stapa & Majid (2012) recommend applying the Process Approach into L2 writing classrooms. The approach has emerged out of numerous criticisms of the product approach emphasizing rhetorical drills (Silva, 1990), and the theories of it have impacted L2 writing instructions (Hyland, 2003). In contrast with the product approach focusing mainly on the final written products, the process approach focuses on the recursive writing procedures (Rusinovci, 2015). The most influential writing model for the process approach, constructed by Hayes & Flower (1980), demonstrates that writing is a cognitive and recursive process including the phases of planning, translating, and reviewing. Zimmermann (2000, p. 74) states that "there can hardly be any doubt that the Hayes and Flower (1980) model of the L1 writing process has been most influential in L1 as well as L2 writing research."

Along with the paradigm shift in the teaching of writing from the product to the process approach, the use of a first language (L1) has been recognized as one of the writing strategies for L2 learners (Kim & Yoon, 2014). L1 use has become the focus of attention in L2 writing research in recent decades. Proponents of L1 use claim that it can reduce cognitive loads (Kim & Yoon, 2014; Qi, 1998; Wang, 2003; Wang & Wen, 2002; Woodall, 2002), activate L2 learners' ability to think analytically (Storch & Wigglesworth, 2003; Swain & Lapkin, 2000; Tsuji,

2018a), and help L2 learners to generate and organize their ideas on the topic or enhance content (Beare, 2000; Karim & Assai, 2013; Lally, 2000; Lucas & Katz, 1994; Roca de Larios, Murphy, & Manchón, 1999; Stapa & Majid, 2012; Whalen & Menard, 1995; Woodall, 2002; Yigzaw, 2012). Despite their different uses, every level of L2 learners uses their L1 during their L2 writing to some extent (Van Weijen, Bergh, Rijlaarsdam, & Sanders, 2009; Wang & Wen, 2002). Learners tend to use their L1 when cognitive efforts are required (Cohen & Brooks-Carson, 2001; Van Weijen *et al*., 2009). The aforesaid benefits are particularly important for limited proficient L2 writers or less experienced L2 writers since they have a stronger tendency of relying on their L1 use (Kim & Yoon, 2014; Wang & Wen, 2002).

1.2 Previous Studies

A number of previous studies have provided profound insights into pedagogical implications for L2 writers' L1 use. Based upon the results, the learners' L1 use during their L2 writing is deemed to be conflicting with one another. Some previous researches have investigated how L2 writers' L1 use is related to L2 text quality and reported that L1 use negatively affects its quality (e.g., Cohen & Brooks-Carson, 2001; Van Weijen *et al*., 2009). For instance, Van Weijen *et al*. (2009) states that L2 use appears to be positively related to L2 text quality for goal setting, generating ideas, and structuring (p. 246). The participants' L2 competence in these studies is an upper-intermediate or advanced level, which differs from that of the present study. From some studies targeting lower L2 proficient writers, the conclusions regarding the influence of L1 use on L2 text quality were different. While Akyel's 1994 study shows that L1 use for developing content is not directly related to L2 text quality, most of the studies (e.g., Lally, 2000; Stapa & Majid, 2012) report that L1 use positively affects the quality of L2 written texts. The L1 use in the phase of planning what-and-how to write is important to L2 writers with lower proficiency, as their insufficient L2 competence obstructs outputting memory information stored in their L1 or generating ideas directly in their L2 (Scott, 1996).

The cognitive activity in the phase of planning, however, may not be enough for novice L2 writers to directly transfer to the phase of translating into L2. Many of the studies indicate that L2 learners with lower proficiency tend to use a direct-translation method whereby they directly translate L1 sentences into L2 (Fujii, 2012; Kim & Yoon, 2014; Sasaki, 2002, 2004; Uzawa & Cumming, 1989; Wang & Wen, 2002; Wolfersberger, 2003). Kim (2011) discusses how the grammar-translation method is indispensable for L2 learners' successful written communication. Specifically, less proficient L2 learners tend to establish L2 texts by formulating the generated ideas in L1 and then translating them into L2 (Fujii, 2012; Uzawa & Cumming, 1989). They employ the method as a writing strategy "to compensate for their limited ability to write in their L2 (Kim & Yoon, 2014; Manchón, Murphy, & Roca de Larios, 2007; Van Weijen *et al*., 2009, p. 236; Yigzaw, 2012). In Sasaki's 2002 study, the novices spent most of the writing time translating the generated L1 ideas into L2 due to their low L2 proficiency (p. 76). They paid much less attention to the basics of writing, such as the establishment of clear content with a logical flow. These studies suggest that the phase between planning and translating is necessary for novice writers. Stated differently, the process of formulating L1 texts before translating them into L2 is vital.

Studies directly comparing L2 texts formulated from L1 texts with directly composed L2 texts are far and few between. The most relevant research is Kobayashi & Rinnert's 1992 comparative analysis. The study examines the differences between English compositions of 48 Japanese university students, constructed in two writing processes: One writing first in L1 (Japanese) and then translating into L2 (English), and the other composing directly in L2 (p. 183). The results demonstrate that lower proficient students would significantly benefit from the translations in terms of content, organization, and style, compared with direct compositions in L2. This conclusion is in alinement with Uzawa's 1996 study, indicating that translating from L1 into L2 positively influences the L2 writing process. Similarly, the importance of translation techniques has been supported by recent studies of Fujii (2012), Ghobadi & Ghazali (2015), and Joyce (2018). Fujii (2012), for instance, investigates 128 Japanese L2 learners' perceptions and attitudes towards two types of writing tasks: composition in L2 (English) and translation of a passage from L1 (Japanese) into L2 (p. 32). The results of the questionnaire reveal that 94% of the participants firstly form L1 sentences and then translate their ideas into L2 during their L2 writing.

In the same vein as Kobayashi & Rinnert (1992), Cohen & Brooks-Carson (2001) explore two essay writing tasks: One writing in L1 (English) and then translating into L2 (French), and the other writing directly in L2. The study involved 39 participants with intermediate L2 proficiency. While one-third of the participants produced better L2 texts on the translated task, the majority did better on the direct-writing task. These data suggest that direct writing in L2 may be more effective for the majority of L2 learners. Likewise, Zimmermann's 2000 study, exploring the writing process of L2 learners in a German context, emphasizes the importance of tentative L2 formulations before the actual act of writing. A majority of the participants directly wrote L2 texts without tentative formulations in L1.

Zimmermann (2000) clearly states that "[t]here is very little evidence in our data that L2 writing consists to a large extent in translating tentative L1 formulations into the L2" (p. 87). The participants in the study were all considered to have a certain level of L2 proficiency. Taking into consideration that advanced writers often do not depend much on their L1 during their L2 writing (Van Weijen *et al.*, 2009), the result, suggesting only a minor L1 influence on L2 formulating, is rational.

The outcomes of Kobayashi & Rinnert's 1992 study were partially contradictory to that of Cohen & Brooks-Carson (2001), and entirely inconsistent with Zimmermann (2000). The students' level of L2 proficiency is considered to be a main factor in the incompatible results. The participating students in Kobayashi & Rinnert (1992) have an intermediate L2 competence, varying from low intermediate to low advanced (p. 187). As mentioned earlier, L2 learners with lower proficiency tend to employ the direct-translation method as a writing strategy (Fujii, 2012; Kim & Yoon, 2014; Van Weijen *et al.*, 2009). On the contrary, the participants in the two latter studies have a higher level of L2 proficiency. Another factor may be related to the origins of the two languages (Woodall, 2002). While Japanese and English in Kobayashi & Rinnert's 1992 study are noncognate languages having different etymological origins, French and English in Cohen & Brooks-Carson's study are etymologically related languages called cognate languages. German is also a cognate language to English in Zimmermann's 2000 study.

Considering the aforesaid findings of the studies on limited proficient L2 learners (Fujii, 2012; Kobayashi & Rinnert, 1992, 2002, 2008; Sasaki, 2002; Sasaki & Hirose, 1996; Uzawa, 1994, 1996; Uzawa & Cumming, 1989), the process of formulating the generated L1 ideas into L1 sentences before translating into L2 could contribute to learners' producing better L2 texts. Establishing L1 tentative texts during the process-based L2 writing would address the problems stated in the opening paragraph. Tsuji (2017) supported the importance of this process during the L2 writing process. Specifically, it may allow students to clearly visualize the detailed flow of the texts, and thoroughly consider the logic and clarity for their L2 writing. It could be a potential writing process for lower L2 proficient writers to develop their L2 text quality (Parts of this section were discussed in Tsuji (2017, 2020).

1.3 Purpose of the Study

Many of the studies indicate that translation from L1 into L2 during the L2 writing process can be of benefit for limited proficient L2 writers (Fujii, 2012; Ghobadi & Ghasemi, 2015; Kobayashi & Rinnert, 1992, 2008; Sasaki, 2002; Sasaki & Hirose, 1996; Uzawa, 1994, 1996; Uzawa & Cumming, 1989; Yigzaw, 2012). However, few studies have investigated its influence on L2 text quality. Comparative studies between L2 texts translated from L1 texts and L2 texts written directly in L2 have seldom been carried out, and studies including the framework for promoting L2 writers' cognitive processes are even rarer. With very limited empirical studies, how the influence of L1 formulated texts occurs on L2 text quality remains unclear. To examine the effectiveness, the present study will incorporate the process of formulating L1 texts. In so doing, a writing framework involving the *modular writing technique* (Fujishiro, 2009, 2011) will be introduced into L2 writing classes. The techniques to facilitate L1 use should be incorporated in L2 writing classrooms (Yigzaw, 2012). The *modular-writing* framework may efficiently support students' cognitive processes for developing the logic and clarity of their L2 texts, taking into consideration Fujishiro's 2009 and 2011 studies. These studies conclude that the *modular writing technique* is one effective approach to writing. A module is regarded as the smallest unit of an essay. In the present study, the target writing task is a short argumentative essay, in which modules are referred to as claim, reasoning, evidence, and conclusion.

This investigation focuses on the assessment of the L2 text quality influenced by the process of formulating L1 texts, and the use of the writing framework. It involves the following four groups: the group of formulating L1 texts using the writing framework, the group of formulating L1 texts with no framework, the group of directly composing L2 texts with the framework, and the group of directly composing L2 texts with no framework. The study aims to answer the following research questions (RQ).

1) Do L1 texts formulated before being translated into L2 contribute to developing the quality of L2 written texts in terms of logic and clarity?

2) Does the writing framework contribute to developing logic and clarity?

3) Which group, of the four, improves the quality of L2 texts to the greatest degree?

The first RQ is to clarify how the process of formulating L1 texts influences the quality of L2 written texts, and the second seeks to identify the effectiveness of the writing framework given to promote students' cognitive processes. The third RQ is to compare L2 texts produced by the four groups for identifying which group

improves the most. The answers to the above questions will contribute to raising awareness of the importance of L1 formulations during the L2 writing process.

2. Method

2.1 Participant Students

This comparative study was conducted with 77 learners of English as a foreign language (EFL) during the fall semester of 2017 at a large private university in western Japan. The participants were all first-year university students and had studied English for at least six years (from Grade 7 to Grade 12) in secondary schools. They were all required to register in an English course for their first and second year in university.

The participants were divided into four groups by alphabetical order of their family name. No groups were formed according to students' L2 proficiency level or academic achievement. The level of the students' English proficiency was lower-intermediate on average, varying from elementary to upper-intermediate, based upon their self-reported TOEIC (Test of English for International Communication produced by Educational Testing Service [ETS]) scores. The mean TOEIC score of all participants was 498.85. It is the equivalent of the A2 or B1 level in CEFR (Common European Framework of Reference for Languages). There is no significant difference in the English ability of each group. The four groups were split into two focused groups: The experimental group ($n = 39$) was allocated the task of formulating L1 texts before translating them into L2, and the contrast group ($n = 38$) was allocated the task of composing L2 texts directly in L2. The mean TOEIC score of the experimental group was 488.46, and the contrast group was 509.50. The experimental and contrast groups were then divided into two separate groups: One was given a writing framework, and the other not provided with the framework. Nearly half of the students used the framework to strategically promote their cognitive processes for the logical development and clarification of ideas. Thus, four groups were determined for this study: the experimental group using the writing framework ($n = 20$), the experimental group with no framework ($n = 19$), the contrast group with the framework ($n = 21$), and the contrast group with no framework ($n = 17$).

2.2 Research Design

The writing task was an argumentative essay of approximately 250-300 words. Students paired up to determine a topic similar to that of TOEFL (Test of English as a Foreign Language produced by ETS) Independent essays. Before beginning with the treatment, a planning session was carried out in their L1 for two 90-minute classes. As the planning process of Hayes & Flower's 1980 model demonstrates, all the participating students were instructed to choose a topic of mutual interest to themselves, and generate ideas stored in their long-term memory, collect related information, and consider the detailed flow of the essays. After the session, students in the experimental group were assigned to submit both L1 written texts and L2 texts. Students in the contrast group were assigned to submit L2 written texts only. The L2 texts, collected before the first class of the treatment session, were the pre-texts for this study.

The treatment session required three classes for all participants to learn the fundamentals of essay writing. During the first 90-minute class, the instructor showed examples of an excellent and unsatisfactory L2 written essay to have students identify differences between the essays, and then emphasized how an argumentative essay should be organized and clarified. Based upon the knowledge provided, students had a group discussion for producing better revisions of their essays. The experimental group used their texts formulated in L1 for the discussion, while the contrast group used their L2 written texts. Students were assigned to write their revisions in the following procedure: formulating L1 texts and then translating them into L2 for the experimental group, and directly composing L2 texts for the contrast group. During the second and third classes, the instructor presented some of the students' essays as examples for activating their analytical thinking and shared constructive commentary. Students were then instructed to proceed to group discussions on their texts. After the treatment session was over, students were all asked to submit their final L2 texts, used as the post-texts for this study. The students in the experimental group were also assigned to submit their L1 texts, which served as data for previous studies conducted by the researcher (Tsuji, 2018b, 2019).

2.3 Writing Framework as a Technique

The basis of the writing framework was constructed by Tsuji (2016). This framework was reconstructed for an argumentative essay by Tsuji (2018a), focusing on Fujishiro's *modular writing technique*. Then, it was modified for improvement by Tsuji (2018b) (Note 1). The aforesaid Tsuji's studies explain this module-based writing (MW) framework as follows. It includes two sections, which are the why section and the 5W1H section. The 5W1H in this study is defined as not only the who, what, where, when and the how of an incident, but also any interrogative questions such as what, in what way, how long, and how much. The why section is for facilitating

less experienced writers to establish consistent logic through the writings (Fujishiro, 2009, 2011). This section requires students to clearly state the claims, demonstrate the persuasive reasons supporting the claims, provide appropriate evidence or data supporting the claims and reasons, and present the conclusion drawn from the arguments. The descriptions in the why section can be an indicator of whether students' ideas or arguments maintain integrity throughout the writing. The 5W1H section plays an important role in elaborating the arguments of each module with clearly appropriate detailed information. Students elaborate the arguments stated in the why section by incorporating some required details regarding the who, what, where, when, and how of the situations or happenings. This section is for achieving clarity for readers to develop a clear, concrete image of the information. The 5Ws and 1H approach (Note 2) is an effective writing methodology to help writers avoid missing important details in reports and academic papers (Fujishiro, 2009, 2011; Regoniel, 2016). The participants in the groups using the framework, a type of graphic organizer, were instructed to firstly deal with the why section, and then proceed to the 5W1H section (See Appendix). Even for the groups with no framework, the participants were also asked to consider the who, what, why, where, when, and how of the situations for improving the logic and clarity of their L2 texts.

2.4 Data Collection and Analysis

2.4.1 Data Collection Procedure

Two sets of the students' texts, L2 texts produced before and after the treatment session, were collected. In total, there were 154 writing samples, 77 pre-texts and 77 post-texts. The students were to submit each text to a cloud-based educational system. Before the submission, all participants used a web-based instructional writing tool for their surface-level grammatical corrections. Two experienced raters assessed participants' texts before and after the treatment, using a writing rubric developed by Tsuji (2019).

2.4.2 Data Analysis

This study uses the Module-based Writing Rubric (MWR), developed by Tsuji (2019), for assessing students' L2 texts. It consists of three performance criteria (Logic, Clarity, and English), focusing on the essential keys of Fujishiro's *modular writing technique*. The definitions of each criterion were determined, considering the particular learning objectives Japanese EFL students are expected to achieve. Tsuji's 2019 study explains that the logic emphasizes the consistency amongst the four respective modules (the claim, reasoning, evidence, and conclusion), while the clarity requires the inclusion of necessary detailed information in each module. The first criterion (Logic) also covers the intra-module coherence, which is necessary for ensuring inter-module coherence. A third criterion, English, assesses L2 use and expression. Each criterion involves a six-level task description ranging from Score 0 (*ungradable*) to Score 5 (*excellent*). Tsuji (2019) concludes that the rubric confirms its validity and reliability. The rubric (Note 3) shown in Table 1 is a translated version of Tsuji (2019), which is reported in Tsuji (2021). Tsuji's 2019 rubric was developed for educational assessment in L2 writing classrooms.

Table 1. Module-based Writing Rubric adapted from Tsuji (2021)

	Logic: Establishing consistent logic through the writing	Clarity: Achieving clarity in the writing	English: Displaying competent language use and expression through the writing
5	A text at this level accomplishes the following: It effectively describes the arguments with a logical flow. It effectively states the claims related to the topic, and they are clearly supported with appropriate reasons and evidence. It effectively presents the conclusion that can be drawn from the arguments. Each module is relevant to the topic, and there is logical consistency between the modules.	A text at this level accomplishes the following: It effectively allows readers to develop a clear, concrete image of the information. It effectively describes/elaborates the arguments of each module with the clearly appropriate 5W1H information, and it effectively explains the unfamiliar words.	A text at this level accomplishes the following: It effectively conveys the meaning behind a sentence and makes it easily comprehensible. It effectively conveys an idea in one sentence and renders it easily comprehensible. The subject is appropriately stated, and the main verb semantically and grammatically aligns with the subject. The parts of the sentence follow the correct grammatical forms of a sentence with very few mistakes. It effectively uses heads and modifiers, and it has very little redundancy in a sentence.
4	A text at this level accomplishes the following: It generally describes the arguments with a logical flow. It generally states the claims related to the topic, and they are necessarily supported with reasons and evidence. It generally presents a conclusion that can be drawn from the arguments. Each module is generally relevant to the topic, and there is substantial logical consistency between the modules.	A text at this level accomplishes the following: It generally allows readers to develop a clear, concrete image of the information. It generally describes/elaborates the arguments of each module with enough 5W1H information, and it generally explains the unfamiliar words.	A text at this level accomplishes the following: It generally conveys the meaning behind a sentence and makes it comprehensible. It generally conveys an idea in one sentence and renders it comprehensible. The subject is stated, and the main verb generally aligns semantically and grammatically with the subject. The parts of the sentence follow the grammatical forms of a sentence with occasional minor mistakes. It generally uses heads and modifiers, and it is slightly redundant in a sentence.
3	A text at this level accomplishes the following: It describes the arguments with a somewhat logical flow. It states the claims related to the topic, and they are somewhat supported with reasons and evidence. It presents the conclusion that can be drawn from the arguments, though some points are occasionally illogical. Each module is relevant to the topic, though there are some logical inconsistencies between the modules.	A text at this level accomplishes the following: It allows readers to develop a clear image of the information, though it is occasionally obscured. It describes/elaborates the arguments of each module with 5W1H information, though some of them are obscured. It somewhat explains the unfamiliar words.	A text at this level accomplishes the following: It conveys the meaning behind a sentence, though some points are occasionally unclear. It conveys an idea in one sentence and renders it readable. The subject and the main verb are stated, though semantically and grammatically mistakes have been occasionally made. The parts of the sentence somewhat follow the grammatical forms of a sentence. It uses heads and modifiers to some degree, and it is occasionally redundant in a sentence.
2	A text at this level reveals one or more of the following: It describes the arguments with a limited logical flow. It attempts to state the claims related to the topic and to demonstrate reasons supporting the claims, but the claims and/or reasons are inappropriate or insufficient. It attempts to describe the evidence, but the information provided is inappropriate or insufficient. It attempts to present the conclusion, but it is largely inconsistent with the arguments. It attempts to establish logical consistency between the modules, but there is limited consistency.	A text at this level reveals one or more of the following: It attempts to allow readers to develop a clear image of the information, but it is largely limited. It attempts to describe/elaborate the arguments of each module with 5W1H information, but they are inappropriate or insufficient. It attempts to explain the unfamiliar words, but they are inappropriately or insufficiently explained.	A text at this level reveals one or more of the following: It attempts to convey the meaning behind a sentence, but it makes little sense. The subject is insufficiently aligned semantically and grammatically with the verb. The parts of the sentence insufficiently follow the grammatical forms of a sentence. It attempts to use heads and modifiers, but it is inappropriately used. It attempts to avoid redundancy, but it is largely redundant in a sentence.
1	A text at this level is seriously flawed due to one or more of the following: It describes the arguments with no logical flow. It fails to state the claims related to the topic and to demonstrate reasons supporting the claims. It fails to describe the evidence with little or no information, and it fails to present the conclusion. It establishes little or no logical consistency between the modules.	A text at this level is seriously flawed due to one or more of the following: It fails to allow readers to develop an image of the information. It fails to describe/elaborate the arguments of each module with 5W1H information, and it fails to explain the unfamiliar words.	A text at this level is seriously flawed due to one or more of the following: It fails to convey the meaning behind a sentence, and it makes no sense. The subject is not semantically or grammatically aligned with the verb. The parts of the sentence do not follow the necessary grammatical forms of a sentence. It fails to use heads and modifiers, and it fails to avoid redundancy in a sentence.
0	A text at this level has little or no description. It has scant information for judgment.	A text at this level has little or no description. It has scant information for judgment.	A text at this level has little or no description. It has scant information for judgment.

Note: The 5W1H includes all interrogative elements required for a clear argument.

3. Results and Discussion

3.1 Descriptive Analysis on the Effectiveness of the L1 Formulating Process

The 154 texts written in L2 (77 pre-texts and 77 post-texts) were evaluated for two criteria in writing: Logic and Clarity. All compositions were scored by two experienced L2 instructors with the rubric. Before the evaluation, three texts were randomly selected and assessed together for confirming evaluative consistency between the two raters. Prior to the data analysis, using Pearson product-moment correlation coefficients, the interrater reliability for each criterion between the two raters was calculated as .74 for the logic in pre-texts; .70 for the clarity in pre-texts; .75 for the logic in post-texts; .73 for the clarity in post-texts. The results demonstrated that the r-value signified enough strength for the correlation. The researcher judged that the rating was adequate for further analyses and simply averaged the rating scores of the two raters. The students' scores reported henceforward were all these averaged scores.

A two-way ANOVA was performed on the L2 texts of 77 participants to examine the effect of the writing processes (one formulating L1 texts and then translating them into L2, and the other composing directly in L2) and the versions of L2 texts (the first draft of texts and the final draft of texts) on the logic and clarity in the final L2 written texts. It was also performed on the overall L2 text quality influenced by the writing processes and the versions of L2 texts. The two independent variables are the writing processes and the versions of L2 texts. The dependent variables are the quality levels of L2 texts in terms of the logic and clarity in the final L2 text. The results of the two-way ANOVA are presented in Table 2.

Table 2. Results of two-way ANOVA on L2 text quality ($N = 77$)

		Pre-text	Post-text	F			η^2		
		M (SD)	M (SD)	Process	Version	Interaction	Process	Version	Interaction
Logic	A	2.04 (0.52)	2.65 (0.62)	14.53*	59.19*	10.02*	0.12	0.11	0.02
	B	1.77 (0.55)	2.02 (0.59)						
Clarity	A	2.03 (0.39)	2.58 (0.52)	10.56*	122.19*	1.11	0.08	0.21	0.00
	B	1.76 (0.46)	2.21 (0.51)						
Total	A	4.06 (0.88)	5.24 (1.08)	13.28*	104.63*	6.09*	0.06	0.50	0.03
	B	3.53 (0.99)	4.24 (1.07)						

Note. A = Experimental group translating L1 texts into L2 ($n = 39$); B = Contrast group composing directly in L2 ($n = 38$)

*$p < .05$

Simple main effects analysis of the logic showed that there was significant improvement in the versions of L2 texts [$F(1, 75) = 59.19$, $p = .000$, $\eta^2 = 0.11$]. There was statistically significant interaction between the effects of the writing processes and the versions of L2 texts on the logic [$F(1, 75) = 10.02$, $p = .002$, $\eta^2 = 0.02$]. A post hoc Bonferroni test showed that the experimental and contrast groups differed significantly at $p < .05$. The score difference between pre- and post-texts was 0.62 in the experimental group, and 0.26 in the contrast group. The score difference between the two groups was 0.27 in the pre-texts, and 0.63 in the post-texts. The analysis of the logic showed that the experimental group formulating L1 texts significantly improved the logic of L2 texts more than the contrast group directly composing in L2 ($p < .05$). Regarding the clarity, the simple main effects analysis showed that there was significant improvement in the versions of L2 texts [$F(1, 75) = 122.19$, $p = .000$, $\eta^2 = 0.21$]. However, there was no interaction between the effects of the writing processes and the versions of L2 texts on the clarity [$F(1, 75) = 1.11$, $n.s.$]. The analysis of the clarity showed that both groups significantly improved the clarity in L2 texts, but there was no difference between the groups. The data on logic reveals that logic was established more consistently while formulating L1 texts than directly composing L2 texts, while the data on clarity indicates that there were no differences statistically between the two different writing processes. The results from logic can be interpreted that students' limited L2 proficiency obstructs their understanding of what has been written in L2 texts, leading to the failure of evaluating inter-module consistency. The outcomes from clarity demonstrate that, regardless of which process students use, they can elaborate their arguments with the required detailed information. It verifies that both of the processes contributed to developing the clarity of L2 texts.

Simple main effects analysis of the overall text quality showed that there was significant improvement in the versions of L2 texts [$F(1, 75) = 104.63$, $p = .000$, $\eta^2 = 0.50$]. There was statistically significant interaction between the effects of the writing processes and the versions of L2 texts on the overall quality of L2 texts [$F(1,$

75) = 6.09, $p = .016$, $\eta^2 = 0.03$]. The eta squared ($\eta^2 = 0.03$) can be interpreted that the experimental group improved their L2 texts more than the contrast group. A post hoc Bonferroni test demonstrated the significant differences between the two groups. The results showed that the score difference between pre- and post-texts was 1.17 in the experimental group, and 0.72 in the contrast group ($p < .05$). The score difference between the two groups was 0.54 in the pre-texts, and 0.99 in the post-texts ($p < .05$). These data indicate that the post-L2 texts produced by the experimental group were significantly more improved in overall text quality than those in the contrast group. Therefore, it is concluded that the process of formulating L1 texts is more effective for learners with low L2 proficiency to develop their arguments with a more logical flow.

3.2 Descriptive Analysis on the Effectiveness of the Writing Framework

A two-way ANOVA was performed on the L2 texts of 77 participants to examine the effect of the writing processes (the four types of writing processes) and the versions of L2 texts on the logic and clarity in the final L2 written texts. It was also performed on the overall L2 text quality influenced by the writing processes and the versions of L2 texts. The results (Note 4) of the two-way ANOVA are shown in Table 3.

Table 3. Results of two-way ANOVA ($N = 77$)

		Pre-text	Post-text	F			η^2		
		M (SD)	M (SD)	Process	Version	Interaction	Process	Version	Interaction
Logic	A	1.96 (0.45)	2.36 (0.54)	6.79*	64.56*	6.60*	0.16	0.11	0.03
	B	2.11 (0.59)	2.94 (0.56)						
	C	1.79 (0.54)	1.98 (0.49)						
	D	1.75 (0.57)	2.09 (0.71)						
Clarity	A	1.92 (0.31)	2.41 (0.53)	5.02*	122.66*	1.05	0.11	0.21	0.01
	B	2.13 (0.44)	2.75 (0.45)						
	C	1.76 (0.39)	2.17 (0.44)						
	D	1.75 (0.55)	2.28 (0.61)						
Total	A	3.88 (0.72)	4.76 (1.04)	6.26*	110.62*	4.20*	0.15	0.16	0.02
	B	4.24 (1.00)	5.69 (0.93)						
	C	3.55 (0.90)	4.14 (0.87)						
	D	3.50 (1.11)	4.37 (1.30)						

Note. A = Experimental group with no framework ($n = 19$); B = Experimental group with the framework ($n = 20$); C = Contrast group with no framework ($n = 21$); D = Contrast group with the framework ($n = 17$)

*$p < .05$

Simple main effects analysis of the logic showed that there was significant improvement in the versions of L2 texts [$F(1, 75) = 64.56$, $p = .000$, $\eta^2 = 0.11$]. There was statistically significant interaction between the effects of the writing processes and the versions of L2 texts on the logic [$F(1, 75) = 6.60$, $p = .001$, $\eta^2 = 0.03$]. The results were significant at the $p < .05$ level, and then the researcher proceeded to a detailed analysis of the interaction. A post hoc Bonferroni test showed that the experimental group with the framework (Group B) differed significantly from the other three groups at $p < .05$. The score difference between pre- and post-texts was 0.40 (0.11) in Group A ($p = .001$), 0.83 (0.11) in Group B ($p = .000$), 0.19 (0.10) in Group C ($p = .071$, *n.s.*), and 0.34 (0.12) in Group D ($p = .005$). The figure in each parenthesis is the standard deviation (SD). The score in each group was not statistically different in the pre-texts, but was significantly different in the post-text at $p < .05$. The score of Group B was statistically higher than the other three groups. The difference between Group B and the other three groups was 0.58 (0.18) with Group A ($p = .014$), 0.96 (0.18) with Group C ($p = .000$), and 0.85 (0.19) with Group D ($p = .000$). Comparing the two contrast groups, Group C and D, the score between the two was not statistically different in the post-texts. The analysis of the logic showed the experimental group formulating L1 texts with the MW framework significantly improved the logic of their L2 texts more than the other three groups. Simultaneously, the clarity of the final L2 texts was significantly improved [$F(1, 75) = 122.66$, $p = .000$, $\eta^2 = 0.21$]. However, there was no interaction on the clarity amongst the four groups [$F(1, 75) = 1.05$, *n.s.*].

These data reveal that the consideration of the why contributes to developing the logic of L2 texts. Having stated this, it should be duly noted that the participants in the groups with no framework (Group A and C) had less consistent logic in their L2 texts. They were assumed to have more difficulties in ensuring inter-module coherence as they had no framework for separating the main arguments from the detailed information. The Why

section in the MW framework contributes more if it is used while formulating L1 tentative texts. This conclusion is supported by the results that there were significant differences between Group B and D. In other words, the framework was not effectively used while composing in L2. It is confirmed by the results that there were no differences between Group C and D. Stated previously, students' low L2 proficiency has more possiblility to cause ineffective assessment of inter-module coherence. Furthermore, the data indicates the consideration of the required detailed information contributes to developing the clarity of L2 texts, regardless of whether the students use the MW framework or not. It is perhaps largely owing to the design of the language classes: Even though students had no framework to use, the educator instructed them to consider putting detailed information in their writing. However, elaborating the main arguments did not contribute to improving logic. Accordingly, the L2 texts produced by the participants in the groups using no framework were more likely to have a conclusion lacking persuasiveness.

Regarding the total score of L2 text quality, the simple main effects analysis showed that there was significant improvement in the versions of L2 texts [$F(1, 75) = 110.62$, $p = .000$, $\eta^2 = 0.16$]. There was statistically significant interaction between the effects of the writing processes and the versions of L2 texts on the overall quality of L2 texts [$F(1, 75) = 4.20$, $p = .008$, $\eta^2 = 0.02$]. A post hoc Bonferroni test was performed to examine the differences amongst the four groups. The results showed that the score difference between pre- and post-texts was 0.88 (0.18) in Group A ($p = .000$), 1.45 (0.18) in Group B ($p = .000$), 0.60 (0.17) in Group C ($p = .001$), and 0.87 (0.19) in Group D ($p = .000$). The score of each group was not statistically different in the pre-texts, but was significantly different in the post-texts. The score of Group B was statistically higher than the other three groups: The difference was 0.92 (0.33) with Group A ($p = .040$), 1.55 (0.32) with Group C ($p = .000$), and 1.32 (0.34) with Group D ($p = .001$). All of the data indicate that Group B differed significantly from the other three groups at $p < .05$. The post-L2 texts produced by Group B were significantly more improved in the overall text quality than those in the other groups. Therefore, it is concluded that the process of formulating L1 texts and then translating them into L2 is more effective than directly composing L2 texts. Furthermore, the L1 formulating process incorporating the MW framework is even more effective for producing higher-quality L2 texts.

4. Pedagogical Implications for L2 Writing Instruction

The findings of this study (Note 5) could have some pedagogical implications for L2 writing instruction. Firstly, the process of formulating L1 texts provides the opportunity for L2 learners to clearly visualize the detailed flow of their texts, leading to the development of content areas in L2 writings. Writing instructors should be aware that the phase of planning is not enough for limited proficient L2 learners to produce logically developed L2 texts. Previous studies suggest that low proficient L2 learners tend to pay more attention to L2 grammatical issues while translating the generated L1 ideas into L2 (e.g., Sasaki, 2002), and employ direct translation as a writing strategy (e.g., Fujii, 2012). Based upon the findings of previous studies and the results of the present study, teachers in L2 writing need to emphasize such cognitive processes conducted in the students' L1. In particular, if educators emphasize the process of formulating L1 texts in which students can focus on considering how an argumentative essay should be organized and clarified, then students can focus on the L2 language issues in the phase of translating into L2. More specifically, students can focus on producing comprehensible L2 sentences by logically ordering the parts of sentences or choosing appropriate L2 words in context. Thus, the process of formulating L1 texts before translating them into L2 is recommended for novice writers with limited proficient L2. Secondly, the writing framework develops content areas in L2 texts. Students using the framework while formulating L1 texts are more likely to have acquired the fundamentals of an argumentative essay, particularly how to logically develop ideas or achieve coherence on a text, than those who received no framework during L2 writing. The MW framework facilitated students' analytical thinking of how to achieve coherence amongst the modules. The structure of it helped students establish straight-line logic in a text, separating the main ideas from the detailed information. Specifically, the framework allowed students to visualize the overall flow of a text and judge whether it was logical or not in the why section, and then it led them to proceed to the 5W1H section for elaborating the statements described in the why section. The findings suggest that the framework focusing on the *modular writing technique* promotes students' cognitive processes and contributes to the development of L2 text quality. However, the use of the writing framework cannot be effectively used as a technique while directly composing L2 texts if the level of students' L2 proficiency is insufficient, considering the results that there were no statistical differences in the post-L2 texts between the two contrast groups. Thirdly, it would be beneficial for students to have a training of such cognitive processes for formulating L1 texts, bearing in mind the positive effects of formulating L1 texts on L2 writing quality drawn from this study. The necessity of such training was also discussed by Tsuji (2020). In this way, educators can provide opportunities for L2 learners to develop fundamental writing techniques. The experience of L1 writing strengthens the writing competence of establishing

coherence in L2 texts as Kobayashi & Rinnert (1992) state that "writing behaviors and strategies acquired in the first language generally operate in second-language writing" (p. 184). With intensive practices, they may internalize the basics of writing and apply them to their L2 texts. It may be of value to find out how much training low proficient students, whose L1 is noncognate to their L2, need in order to acquire the skills of composing their texts directly in L2.

5. Limitations and Suggestions for Future Research

While this study reported important insights into the process of formulating L1 texts during L2 writing, there are some limitations in the design of this study. The first possible limitation is that the present study included only participants with low L2 proficiency. As the level of L2 proficiency influences the amount of L1 use while writing in L2 (Wang, 2003; Wang & Wen, 2002; Woodall, 2002) and the way of using L1 as a writing strategy (Kim & Yoon, 2014; Wolfersberger, 2003), the findings reported in this study cannot be applied to students with a higher level of L2 proficiency. Several studies suggest that high-proficient students do not need the phase of formulating in L1 before translating into L2 (e.g., Van Weijen *et al.*, 2009; Zimmermann, 2000). The second limitation lies in the lack of control over the ability of participants' general writing skills. The participating students had a certain level of L1 writing before entering university, which implies that they had different abilities in general writing skills. As the direct influence of the writing skills was observed to some extent in the quality of L2 texts (Hirose & Sasaki, 1994; Sasaki & Hirose, 1996), it would be sensible to include the students' general writing competence or control this variable for future research. Another limitation is that the task included in this study is a single genre, which is an argumentative essay. Considering that L1 influence differs across genres (Kim & Yoon, 2014; Zimmermann, 2000), the findings may be owing to "a genre-specific effect" (Zimmermann, 2000, p. 87). If so, they may not be applied to other writing genres. Finally, the results from this study come from the writing condition where the participants thoroughly considered clear arguments with a logical flow without a time limit. To determine the effects of L1 formulating activity on the development of students' L2 writing competence, this study should have involved a timed writing task regarding a particular topic before and after the treatment session.

Considering these limitations and suggestions, further investigation adopting a longitudinal and multiple-genre text design is required in the future. It may contribute to determining how much training students need in order to internalize an understanding of the basics of writing, to apply the fundamental knowledge of the tasks to the actual L2 writing, and to directly translate into L2 from the planning phase. Needless to say, the timed L2 writing tasks before and after the treatment session should be required to examine the educational effects of formulating L1 texts during the L2 writing process on L2 text quality.

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Notes

Note 1. Tsuji (2018b) compared two types of writing frameworks and then concluded the framework focusing on Fujishiro's 2009 *modular writing technique* was more effective. Thus, the MW framework was used in this study as a writing technique.

Note 2. The 5Ws and 1H approach includes the who, what, why, where, when, and the how of the situations. In the MW framework of this study, however, the 5W1H was separated into two sections: one section involved only the Why of the situation for establishing the basis of the argument, and the other involved the rest of four Ws and one H. This study used the terminology 5W1H instead of 4W1H for Japanese students' better understanding.

Note 3. The basis of the writing rubric was designed by Tsuji (2018a). Tsuji's 2019 rubric was developed by thoroughly examining Japanese EFL learners' writing challenges while using the Independent Writing Rubrics (ETS, 2004) as a reference. Tsuji's 2021 article is a translated version of Tsuji's 2019 study reported in Japanese. Accordingly, more details of the Module-based Writing Rubric are described in Tsuji (2021).

Note 4. The present study includes parts of the results used in Tsuji (2018b). Tsuji's 2018b study, focusing on Research Question 2, was reported only in Japanese.

Note 5. The present study was derived from Tsuji's 2020 unpublished doctoral dissertation accepted by Kyoto University, Japan. It includes a part of the findings of the dissertation involving previous Tsuji's studies.

Appendix

A Sample of the Module-based Writing Framework

The Why section Aim of establishing a consistent logic amongst the four respective modules	The 5W1H section Aim of achieving the clarity by elaborating the arguments stated in the why section
Claims	Claims
2 Reasons: Be consistent with the statement	2 Reasons
(1) (2)	(1) (2)
Evidence 1: Be consistent with the 1st reason	Evidence 1
Evidence 2: Be consistent with the 2nd reason	Evidence 2
Conclusion: Be consistent with the claims	Conclusion

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