Modern English Education, Vol. 15, No. 2, Summer 2014

The Role of Interactionally Modified Output in Content-Based Instruction*

Kyung-Ju Lo
Dongduk Women's University

Lo, Kyung Ju. (2014). The role of interactionally modified output in content-based instruction. *Modern English Education*, *15*(2), 47-69.

This study investigates the relative effects of using two different types of interactionally modified output (IMO), oral and written, in an immersion content-based instruction (CBI) class to promote linguistic gain. Students in the experimental group (n=23) were asked to read a content-specific article and then to produce a written summary in pairs. They were then provided with a subsequent opportunity to modify interactionally the initial output by referring to the source text. Students in the control group (n=27) spent the same amount of time orally summarizing and modifying their initial output. The results of the posttest taken after 10 weeks of treatment yielded significant gain in content lexis and grammar (verb tenses) for both oral and written IMO groups albeit oral IMO group's gain in grammar was only marginally significant. The findings also revealed that while oral IMO was more effective for students of relatively lower proficiency in improving their content lexis, written IMO was more effective in enhancing grammar knowledge. Relatively higher proficiency students, however, found written IMO to be far more beneficial in improving their content lexical knowledge and grammar. The findings are discussed and pedagogical implications are suggested.

**[interactionally modified output/content-based instruction/
상호작용으로 수정된 출력/내용 중심 교수법]**

I. INTRODUCTION

In today's world, global competence means being equipped with both expertise in a specific field and the ability to communicate in English. In order to communicate fluently

* This study was supported by the Faculty Research Grant of Dongduk Women's University in 2013.

www.kci.go.kr

on a content-specific area, one needs not only to be well-versed in the subject matter, but also to have knowledge of related vocabulary and grammar (Muncie, 2002). To meet this goal, content-based instruction (CBI), a pedagogical approach that integrates content of the subject and language learning, has drawn much attention from researchers and academicians in second language acquisition (Cook, 2001; Swain, 1985, 1996, 2001; Swain & Lapkin, 2000). The language skills taught through CBI hone in on the students' needs insofar as the content requires them, precluding instruction of discrete grammatical features that are not related to the content. Students choose to take a CBI course because they consider the content of the course to be of value and importance to them despite the difficulty of having to concurrently process both the semantic and syntactic aspect of the message. Nevertheless, their earnestness in trying to understand the meaning of the content through the second language (L2) works as a powerful intrinsic motivator that leads to language learning (Cantoni-Harvey, 1987; Y. J. Bang, 2013). The effectiveness of CBI in L2 acquisition has been documented by many researchers and practitioners (Kowal & Swain, 1997; Snow & Brinton, 1997; Swain, 1985, 1996, 2001; Swain & Johnson, 1997).

The two types of interactional output required in this study are oral and written production by a pair of low to intermediate proficiency L2 learners. It has been documented that learner-learner interaction promotes attention to form, thus paving way for more opportunities to produce output and L2 learning (Mackey, 2009). By interacting with peers to produce an output, learners "talk to each other about the task, presenting their ideas and perspective, asking questions providing information, suggesting plans of action, and so on" (King, 1992, p.89). Through this process, learners are provided with ample opportunity to restructure their cognitive spheres and thinking processes (H. S. Choe & H. J. Yu, 2012). However, one difficulty the learners may face in the course of interactionally producing output is their limited L2 knowledge which invariably leads to utterance that does not conform properly to L2 morphosyntax (Gass & Varonis, 1985, 1989; Pica, Lincoln-Porter, Paninos & Linnell, 1996). However, subsequent opportunity to modify their output prompts learners to engage in syntactic processing on a cognitive level to correct any linguistic problem they encountered in their initial output (Swain & Lapkin, 1995). It is through this modification process that their linguistic resources are utilized and new linguistic forms are internalized (Pica, Holliday, Lewis & Morgenthaler, 1989). A plethora of studies attests to the effectiveness of modified output on second language acquisition (Nassaji, 2007; Oliver, 2000; Panova & Lyster, 2002; Pica et al., 1989; Sheen, 2004). Furthermore, when modified output is induced in a collaborative learning climate, learners' interaction becomes busier, making way for more opportunities to utilize their linguistic knowledge in an attempt to correctly modify the problematic linguistic features (Gass & Varonis, 1989).

In spite of all the positive findings by practitioners and theoreticians of the benefits of

www.kci.go.kr

CBI and modified output, there is comparatively little practitioner research conducted on output especially with emphasis on the type of instructional practice and classroom setting (Anthony, 2008). This study aims to fill the void in associating CBI with modified output, in particular, interactionally modified output, by testing for lexical and grammatical gain via pre- and post-test. Furthermore, very few studies have examined the influence of proficiency on modified output between nonnative speakers (Iwashita, 2001). In that regard, the present study attempts to investigate the relationship between proficiency levels and interactionally modified output as it will provide a guideline as to which pedagogical approach would be optimal for L2 learners of certain proficiency. The present study addresses the following research questions:

1) Does written interactionally modified output outperform oral interactionally modified output in terms of linguistic gain?
2) Is there a significant difference in the lexical and grammatical gains made by the written and oral output groups respectively?
3) Is there any relationship between proficiency levels and the type of interactionally modified output?

II. LITERATURE REVIEW

1. Content-based instruction

Content-based instruction (CBI) caters to each content-specific field that consists of language built upon the social practices and contexts characteristic in the particular field (Johns, 2003). A CBI class makes for a natural backdrop for learners to come in constant contact with language forms in their attempt to use the target language meaningfully while simultaneously conveying content-specific knowledge to each other (Y. Bang, 2013). Compared to the conventional learning of L2, i.e., learning and memorizing discrete grammar items, CBI makes for a more challenging and interesting learning climate because the students are constantly encountering language items and structures while they are learning a subject matter of interest. According to Rodgers (2006), language development naturally occurs in CBI because in order to communicate the views and concepts of the content, learners must be equipped with necessary functional linguistic abilities. From the perspective of L2 acquisition, considerable empirical evidence supports the effectiveness of CBI (Brinton, Snow & Wesche, 1989; Davison & Williams, 2001; D. H. Kang, 2008; Rodgers, 2006). Rodgers used three tasks (a composition, a cloze test, and selective oral interviews) to test for content and language gains and reported significant

www.kci.go.kr

improvement in content knowledge and functional linguistic ability. D. H. Kang's study on the effects of CBI on English as a Foreign Language (EFL) students revealed improvement in listening and speaking skills after CBI. However, he found relatively lower proficiency students to have trouble understanding the lesson. A substantial body of research has investigated the role proficiency plays in CBI and found that in contrast to high proficiency learners who achieved both content and linguistic gain, lower proficiency students encountered difficulties in making linguistic gains simply because they were too absorbed in processing the meaning of the content (Brinton et al., 1989; Davison & Williams, 2001; D. H. Kang, 2008; Mohan & Beckett, 2003; Snow & Brinton, 1997). In their attempt to understand the subject matter, i.e., comprehend meaning, learners lose focus of L2 learning and their outputs show lack of accuracy to show for it (Grim, 2008; Swain, 1985). Given that the medium of instruction is in L2, proficiency of the learners is critical to understanding the content being taught (Ballman, 1997; Shook, 1996). To overcome this hurdle, a pedagogical approach called focus on form[1] was found to offer equilibrium between meaning and L2 form and a plethora of literature documents the effectiveness of focus on form within a meaningful context (Doughty & Williams, 1998; Ellis, 2001; Muranoi, 2000; Samuda, 2001; Swain, 1998). Another pedagogical method to facilitate L2 acquisition is to focus on the role of noticing when producing output (Swain, 1995, 1998, 2005; Swain & Lapkin, 1995, 1998).

2. Modified Output

The importance of output was highlighted by Swain in her Comprehensible Output Hypothesis (Swain, 1985, 1995, 2000). In her Comprehensible Output Hypothesis, Swain claimed that output is a necessary mechanism of language acquisition regardless of input (Swain, 1985, 1995, 2000). Modified output stems from the above-mentioned Swain's (1985) Comprehensible Output Hypothesis and it is a modification of an earlier utterance in response to a request or a statement by the interlocutor in seeking for clearer comprehension of meaning. It also requires cognitive awareness on the part of L2 learners as they strive to make discerning judgment on usage of a linguistic form (Epsten, 2003). Modified output is a subsequent opportunity for learners to modify their initial output and in the process of doing so utilize their latent L2 knowledge and internalize new linguistic forms. Izumi, Bigelow, Fujiwara and Fearnow (1999) and Izumi and Bigelow (2000) follow suit in a slew of researches done to prove the effectiveness of output and modified output. They claim that learners' use of target language becomes considerably more

[1] Ellis (2001, pp. 1-2) defines focus on form as "any planned or incidental instructional activity that is intended to induce language learners to pay attention to linguistic form."

www.kci.go.kr

accurate as learners engage in output-input-modified output process. In other words, the problematic linguistic form in the initial output is repaired with the assistance of relevant input (e.g. source text, native speaker, corrective feedback, etc.) and a modified output with significant improvement in use of the problematic linguistic is produced (Ellis, 2005). Ellis argues that it is precisely the excruciating attempt on the part of the learner to produce an output that is intelligible with a focus on form that induces L2 acquisition.

3. Interactionally Modified Output

Interaction plays a key role in L2 learning as learners collaborate to pool their linguistic resources and consolidate existing knowledge (J. Hwang, 2011). Wong Fillmore (1992) notes that in an interactive class that requires collaborative problem-solving tasks with peers, L2 learners engage in more verbal exchanges with their peers than their native speaker instructor. This is a natural outcome in an interactional learning climate since the feedback that is usually provided by the teacher now rests on the shoulder of the peer students (Harris, Schmidt & Graham, 1998). In situations when students are partnered with a student of different proficiency, the role of an expert can fall on any member in the peer group (H. S. Choe & H. J. Yu, 2012). According to H. S. Choe and H. J. Yu, an expert refers to someone with a better understanding of the language. They claim that peer learning occurs when each member in a peer group takes on a role as an expert and encourages and promotes other peers in the group. There are some drawbacks to this dynamics, however, in that there may be numerous situations in which comparatively higher proficiency student acting as the expert may feign comprehension at an erroneous utterance by the other party. According to Aston (1986), “interlocutors sometimes feign comprehension in order to keep the conversation going, reaffirm satisfactory communication, and maintain a satisfying rapport” (p. 139). If so, even in the case of both parties encountering difficulties understanding the opposite party’s utterance, no modification would occur, which hinders the metalinguistic function of output for L2 acquisition that enables learners to control and internalize linguistic knowledge (Swain, 1995).

A substantial body of evidence has documented the pedagogical implications of interactional output and modified output. Iwashita (2001) found mixed level dyads to generate more interactional moves but the frequency did not lead to a significant amount of modified output. Leeser (2004) focused on the impact of learners’ L2 proficiency on language-related episodes (LRE) and concluded that proficiency played a key role in the quantitative outcome of LREs. Following suit, a study by Watanabe and Swain (2007) suggested that proficiency difference in paired learners do not necessarily affect the occurrence of LREs. The latest study by H. S. Choe and H. J. Yu (2012) reported students

www.kci.go.kr

of different proficiency levels of English to be active participants in the feedback discussion in an L2 writing class.

Anthony (2008) claims that writing in and of itself is an exercise in output. More specifically, when the output-based activity is carried out by the learners without teacher intervention, students have to reprocess and restructure their interlanguage in order to come up with more accurate and more comprehensible output (Shehadeh, 2001). Peers "collaborate to generate ideas, exchange texts, and construct feedback on the content and form of written drafts." (Hedgecock, 2005, p.605). It is evident that while interacting, active interaction between the learners encourages exchange of ideas and feedback on the written output, thereby resulting in improved accuracy of linguistic knowledge (Hedgecock, 2005). The collaborative effort of the learners to utilize their linguistic knowledge to deliver meaning and form to each other is manifested in their written output. There, however, will be an occasion when learners encounter a problematic linguistic form or an apparent error on a written production. The saliency of the error on the written output enables L2 learners' cognitive awareness on the problematic form and pushes them to negotiate for the correct form. In such a case, when learners are provided with relevant input such as a source text to assist in modifying their output, repeated cross testing of their hypotheses with the correct linguistic forms in the source text would boost grammatical accuracy in the written production (Rosa & Leow, 2004).

III. METHODOLOGY

1. Subjects

This study was conducted in two Business English classes that were offered to non-English majors at a women's university located in Seoul. One class was a selective credit course offered to intermediate level students. Students enrolled for this class were mainly junior and senior students who were genuinely interested in learning about business English. The other class was for low level students and it was a compulsory credit course for non-English major sophomores. However, the two classes had an identical course syllabus and were taught by the researcher. The course objective was to foster general business English for students desiring to enter the job market after they graduate. The classes were held two times a week with each class lasting 75 minutes. The current study took place in the 1st semester of 2012 for the duration of 10 weeks. The textbook used for the classes was *The Business Pre-intermediate* (Richardson, Kavanagh & Sydes, 2008), and it contained both mechanical (e.g., traditional fill-in-the-blank and word matching exercises related to content-specific lexis and grammar) and meaningful tasks (e.g.,

www.kci.go.kr

content-specific problem-solving collaborative work). Due to the default nature of the two classes, the researcher had to compare two heterogeneous groups. The researcher labeled the class with the lower pretest mean as the experimental group (EG). EG was asked to produce a written output whereas the class with the higher pretest mean was labeled the control group (CG) and was asked to produce an oral output. The decision was based on the premise that if EG's gain is significantly bigger than CG's, it would be safe to assert the effectiveness of written interactionally modified output as opposed to oral output.

Before testing for difference between the two groups, the researcher closely examined the subjects' pre- and post-test scores in the two classes and discarded the scores of two subjects who submitted incomplete posttest papers owing to tardiness. Therefore, CG had a sample size of 27 and EG a sample size of 23. Table 1 shows the data size of CG and EG, pretest means of CG and EG respectively, self-assessed proficiency of the subjects, and the year of the subjects.

TABLE 1
Description of CG and EG

Items		Control Group (CG)	Experimental Group (EG)
Data size		27	23
Pretest mean (lexis)		0.4850	0.4783
Pretest mean (grammar)		0.6677	0.5466
Self-assessed proficiency	High	0	1
	Intermediate	24	10
	Low	4	13
Year in college	Sophomore	25	12
	Junior	3	6
	Senior	0	6

2. Tasks and Procedure

The diverse array of tasks offered in the book encompassed four major aspects of the language skills; listening, speaking, reading, and writing. And, given the communicative nature of this content-specific class, much of the tasks required pair or group work. The classes were modeled after an immersion class and only English was used to communicate in class, i.e., between the instructor and the student and among students themselves. To accommodate the students' needs in terms of deficiency of knowledge in both business and English, the researcher designed the course syllabus such that the content taught in class, i.e., business, comprised general business matters. The treatment was designed in

www.kci.go.kr

continuum with the syllabus' reading section and took place 6 times over the course of 10-week treatment. The reading section pertained to the topic of the chapter being covered at the time.

There were three phases to the treatment. In the first phase, the instructor introduced the topic of the article to the students by sharing anecdotes and telling the class related stories about the topic to get the students interested. Then, she engaged the students in choral reading whereupon if there were any questions about the vocabulary and grammar, she gave a thorough explanation to the entire class. After the choral reading, the students had 10 minutes to read the passage individually. Then in the second phase, the students in EG were paired up and asked to produce a written summary of the article with the book closed for 10 minutes. After the 10 minutes were up, the teacher told the students to open the book and to look at the source text for 5 minutes during which they had an opportunity to negotiate on any problematic linguistic form on the preliminary summary. The sparing time allotted for the students to modify their output was to prevent any plagiarizing or direct copying from the source text in the process of modifying their initial output. The last phase consisted of 5 minutes during which the students were asked to close the book and to finish the summary for them to be submitted to the instructor.

The researcher did not elicit any particular grammatical feature in their output because the task given was of meaning-focused nature in a CBI instructional setting. Samples of the EG's students' modified output is shown in Appendix 1. It was announced before the treatment that the submitted summaries would not be graded and counted as just classroom activity. Over the course of 6 times, this activity was done with 6 different partners. The reason the researcher mixed the students in their interaction is to generate more interactional moves based on Iwashita's (2001) finding that mixed level dyads provide more interactional moves than same level dyads. In sum, a total of 20 minutes was given to the students in the EG to produce a written output, then to modify it. All three phases of the treatment were identical for CG except for the type of output required. In other words, in the second phase, students in CG were asked to summarize the article orally for 10 minutes and then for the following 5 minutes they had a chance to refer to the source text to negotiate on any problematic linguistic forms they had previously encountered while exchanging dialogues with their partners. Finally in the last phase, CG had 5 minutes to produce an orally modified output. To note, the amount of dyads that took place between the non-native learners was not measured in this study as the focus of the study was solely on measuring linguistic gain. There was no instructor intervention during the treatment and the only feedbacks the learners exchanged during the interaction were solely their own in an attempt to push students to come up with more comprehensible output (Shehadeh, 2001).

www.kci.go.kr

3. Data Collection Instruments and Analysis

A pretest was given prior to the treatment to assess the students' lexical and grammatical knowledge prior to the treatment. The test consisted of writing down 42 content words that were in the chapters covered during the course. The definition of the word was given in the first language (L1) and the students were required to write down the L2 version of it. The first letter of the word was given to confine the word within the boundary of the textbook and to prevent exploitation of similar words that the students were already familiar with. Grammar section of the test consisted of 35 questions that required filling in the blanks with correct verb tenses to complete the sentences. The pretest scores were also used to gauge the proficiency of the students as the subjects did not have a standardized test score on which to base their proficiency. The pretest consisted of 42 lexical questions and 35 grammar questions. Each question was allotted 1 point if correct and 0 point if wrong. Each student's score was computed by dividing the number of correct answers by the total number of correct answers on a 1 scale.[2] The mean was calculated from the converted scores of the students. An identical set of questions was used for the posttest after 10 weeks of treatment during which 6 written modified outputs were produced by the EG. Excerpts of the lexical and grammatical test from the pre- and posttest are provided in Appendix 2.

Gauss 5.0, a language-based statistics package, was used for statistical analysis. In addition, to overcome the small sample size and to increase the power of the statistical test, we compute the Hotelling's T^2 statistic to explore whether gains in lexis and grammar are different from zero, thus measuring overall gains or losses. The Hotelling's T^2 statistic is a multivariate version of a student's t-statistic, which tests the differences among the multivariate means of different populations. Its finite sample distribution is proportional to the F-distribution.

4. Target Form

The target forms in this study were of lexical and grammatical nature. Target content lexis was chosen by the researcher based on its relation to the subject matter of the class, business. The researcher especially chose the target lexis from the articles that were selected for the interactionally modified output activities. To test for authenticity of the content words, the words were reviewed by a fellow instructor teaching another business English class. With regard to grammatical target form, verb tenses were chosen to represent grammar knowledge. The verb tense is an aspect of grammar which non-native

[2] If a student got 35 questions correct for the lexical test, then her score would be computed as 35/42=0.8333.

www.kci.go.kr

speakers find most difficult to use properly (Bryant, 1984; Hinkel, 2004; Meziani, 1984) and it is also the "most frequently mentioned objects of goals by the ESL learners" (Zhou, 2009, p. 38). For Koreans especially, using verb tense accurately is quite a challenging task because the Korean language does not have grammatical time reference (B. J. Kim, 2011). Furthermore, verbs have several semantic functions that are confusing to L2 learners (B. J. Kim, 2011). In light of the intricate nature of verb tenses, Roberts and Cimasko (2008) have also pointed out verbal errors to be the most distinguishable salient production error in their studies of non-native speakers L2 learning. Given the abundant literature on the importance of accurate verb tense usage, the researcher chose verb tenses as proxy for learners' grammar skill. Moreover, B. J. Kim chose verb tenses as the target form in her study investigating the effects of corrective feedback in a business English writing class.

IV. RESULTS AND DISCUSSION

1. Outcome after the Oral and Written Interactionally Modified Output

First, we tested for any difference between the two groups in their pretest and posttest scores respectively. Table 2 shows that the pretest means in lexis of CG and EG are 0.4850 and 0.4783 respectively, and thus their difference is quite small. In contrast, CG outperformed EG in grammar (0.6677 vs. 0.5466). The statistical significance of those differences will be investigated in Table 3.

There is no significant difference between CG and EG in their lexical scores of the lexis pretest and posttest. There, however, is a significant difference between the two groups in their pretest grammar scores. EG has a lower mean grammar score (0.5466) compared to the mean grammar score of 0.6677 for CG and the difference was statistically significant at 95% confidence level. The Hotelling's T^2 statistic, 5.5609 is marginally significant at 90% confidence level (with p-value of 0.0760), which indicates that the control group's overall pre-test performance is superior to the experimental group.

With the results of the first statistical analysis, we investigate whether there is a significant gain for content lexis and grammar in the two groups respectively after the treatment. As for the lexis posttest scores, the two groups do not demonstrate statistically significant difference either as shown by the p-value at 0.3925. With regard to the grammar posttest scores, the difference between the two groups is not statistically significant as shown in its p-value at 0.3739. The Hotelling's T^2 statistic is statistically insignificant, which indicates that the posttest performance in lexis and grammar is not statistically different between the two groups.

www.kci.go.kr

TABLE 2

Gain in Lexis and Grammar between CG and EG

Item	Mean(M)^{EG}	M^{CG}	M^{EG}- M^{CG}	*t*	*df*	*p*
Pretest(lexis)[1)]	0.4783	0.4850	-0.0067	-0.1458	48	0.4423
Pretest(grammar)[1)]	0.5466	0.6677	-0.1211	-2.1772	48	0.0172**
Posttest(lexis)[2)]	0.6356	0.6235	0.0121	0.2743	48	0.3925
Posttest(grammar)[2)]	0.6832	0.6974	-0.0141	-0.3235	48	0.3739

1) Hotelling's T^2 statistic for the pretest=5.5609 F-value=2.7225 p-value=0.0760*

2) Hotelling's T^2 statistic for the posttest=0.3358 F-value=0.1644 p-value=0.8489

*p<.10, **p<.05

A positive outcome was reported after 10 weeks for both groups in lexis and grammar. As shown in Table 3, the lexical gain was slightly bigger in EG at 0.1573 over CG's 0.1384 and both numbers proved to be statistically significant. Naturally, given that the topic of discussion is that of an unfamiliar subject matter, students would encounter difficulty establishing clear connections between L2 form and meaning, especially in immersion and bilingual classrooms where linguistic features of learners' interlanguage account for incomplete L2 development (Lightbown, 1992). Ultimately, content lexis to which both parties had access from previous reading would have to be incorporated into their broad spectrum of lexical modifications when negotiating for clear comprehension. And, if an instance occurred such that a targeted content word could not be incorporated in the learners' range of lexical use, they had the source text to fall back on for lexical modification. Therefore, through the course of such moves lexical gain in both groups is explained.

With regard to grammar, both EG and CG improved over their pretest scores with EG posting a mean change of 0.1366 and CG a mean change of 0.0296. However, EG shows a statistically significant gain with the p-value of 0.0005 whereas CG shows only a marginally significant gain with the p-value of 0.0898. Whereupon the students in CG glided over syntactic errors in their verbal exchange as long as meaning was comprehensible to both parties the students in EG were obliged to make modifications because the salience of production errors made them acutely aware of the errors committed and spurred them to engage in active negotiation for the correct form. In the process of modifying a problematic form, the source text acted as would a native speaker in providing an array of possible choices that better conform to L2 morphosyntactic form. Both Hotelling's T^2 statistics in Table 3 are statistically significant, which imply that both the written output and the oral output methods are effective in enhancing the students' ability in both lexis and grammar. When we combine the results with those of Table 2, we can hypothesize that EG managed to catch up to CG's high grammatical competence after the

www.kci.go.kr

written interactionally modified output treatment. We formally test this hypothesis in Table 4.

TABLE 3
Linguistic Gain in CG and EG after the Treatment

	Lexis				Grammar			
	M^{post}-M^{pre}	*t*	*df*	p	M^{post}-M^{pre}	*t*	*df*	*p*
EG[1)]	0.1573	8.4232	22	0.0000**	0.1366	3.8327	22	0.0005**
CG[2)]	0.1384	6.4414	26	0.0000**	0.0296	1.3791	26	0.0898*

1) Hotelling's T^2 statistic for EG= 91.4422 F-value = 43.6429 p-value = 0.0000**
2) Hotelling's T^2 statistic for CG= 48.8623 F-value = 23.4915 p-value = 0.0000**
*p<.10, **p<.05

2. Difference in Linguistic Gains Made by Oral and Written Interactionally Modified Output

The difference in lexical gain between the two groups did not produce a significant result as shown in Table 4. In grammatical gain, however, the difference was significant as shown it its p-value of 0.0053. This statistical analysis confirms the efficacy of written interactionally modified output, i.e., the boost in EG's performance is attributable to the treatment such that the grammar competence of EG managed to catch up to that of CG's despite the considerably lower scores posted for the pretest. Thus the results in Table 4 confirm the aforementioned hypothesis. Overall, EG showed more improvement in both vocabulary and grammar but only grammar showed more significant gain over that of CG's. Nevertheless, the Hotelling's T^2 statistic is significant with p-value of 0.0258, which insinuates that EG's gains in both sections are overall greater than CG's gains.

TABLE 4
Difference in Linguistic Gains of CG and EG

	A[1)]	B[2)]	A-B[3)]	*t*	*df*	*p*
Lexis	0.1573	0.1384	0.0189	0.6521	48	0.2587
Grammar	0.1366	0.0296	0.1070	2.6568	48	0.0053**

1) A= M_{EG}^{post}-M_{EG}^{pre}
2) B= M_{CG}^{post}-M_{CG}^{pre}
3) Hotelling's T^2 statistic for the difference in gain of EG and CG = 8.0806
F-value=39561 p-value=0.0258**
**p<.05

www.kci.go.kr

3. Relationship between Proficiency and Interactionally Modified Output

At this juncture, there arises a need to test whether the outperformance by EG was in fact a natural outcome since the students who made up the CG already had a higher grammar proficiency and it is possible that regardless of any treatment administered, a positive outcome for CG would be a highly unlikely event. In contrast, the students in EG were of low grammatical proficiency and any treatment would contribute to bolstering their performance. The incongruity of proficiency standard of the subjects in the CG and EG was a stumbling block in asserting written interactionally modified output as the more effective pedagogical method. Put differently, our inference from the statistical test is biased toward the superiority of written interactionally modified output if the gains are a decreasing function of grammar proficiency.

Therefore, we need a formal statistical test which eliminates such a potential bias in order to make a bias-free conclusion on the superiority of the written interactionally modified output. To do so, we conduct a regression analysis wherein the gains in lexis/grammar are regressed against the lexis/grammar pretest scores. To differentiate EG from CG, we add an indicator variable into an intercept and a slope where the indicator variable is 1 if the sample belongs to EG and 0 otherwise[3].

The intercept and the slope of CG are α_0 and β_0 respectively whereas those of EG are $(\alpha_0+\alpha_1)$ and $(\beta_0+\beta_1)$ respectively. As such, the difference in the intercept between the two groups is α_1 and that in the slope is β_1. A regression equation for grammar is similarly defined. The estimation results are graphically illustrated in Figure 1 and Figure 2.

First, we examine the lexical gain. Figure 1 illustrates the scatter plots of CG and EG in lexis along with their fitted regression lines where x axis refers to lexical pretest scores and y axis to the gains made after the treatment. First, it is clear that the scatter plots of EG and CG are steadily distributed along the x axis, which indicates no difference of proficiency on lexis between the two groups, a finding tabulated in Table 4. As such, a potential bias in measuring the difference of gains in lexis due to heterogeneity in proficiency does not exist in this case. Second, the two scatter plots are also steadily distributed along the y axis, which implies that the gains from the two pedagogical treatments are almost the same, which graphically illustrates our finding.

---

[3] yilexis =α0+α1I i + (β0 + β1I i) xilexis +ei
where yilexis =gains in posttest score of student i in lexis, xilexis pretest score of student i in lexis
I i = {1 if i∈EG, 0 if i∈CG}, ei=error term

www.kci.go.kr

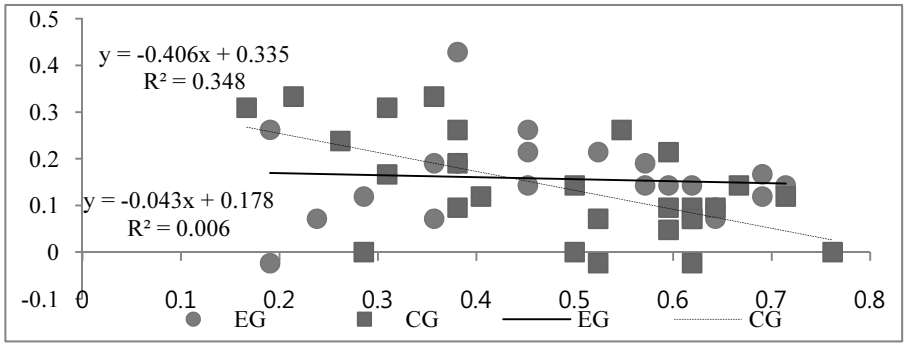

FIGURE 1 Trend Lines of CG and EG in Lexical Gain

However, the way to achieve the similar amount of gains is different between the two groups. Both regression lines are downward sloping, which indicates that the gains in lexis are higher for the students of lower pretest scores on lexis; i.e., both pedagogical methods are more effective for low proficiency students. However, CG's trend line shows a higher intercept and a stronger downward trend. In contrast, even though EG's trend line is slightly downward sloping, The slope of EG is insignificantly different from 0 with p-value of 0.3597, which means that the trend line of EG in Figure 1 is, in fact, almost like a horizontal line. As such, the written interactionally modified output turns out to be equally effective for students of all proficiency while the oral interactionally modified output is more effective for low proficiency students and less so for high proficiency students. We compute a cross point of the two trend lines using a simple algebra. CG's trend line surpasses that of EG's until the cross point of 0.43 upon which the trend is reversed. So we can conclude that the oral interactionally modified output is more effective for low proficiency students on lexis while the written output is more effective for high proficiency students on lexis.

In terms of grammatical trend, both trend lines are downward sloping; i.e., gain on grammar tends to decline as the students are more proficient on grammar. Table 2 displayed the higher overall grammar proficiency of CG over that of EG and this phenomenon is confirmed in Figure 2 where a scatter plot of CG is skewed to the right while that of EG is more evenly distributed. As such, unlike the lexis case, EG's grammatical gain tabulated in Table 4 may be an outcome of the bias. Suppose that the two trend lines are identical, thereby no difference in gains between the two groups. However, even in such a case, EG's average gain centered upon mainly low proficiency students should be greater than CG's gains centered upon high proficiency students. That is, there is indeed a bias toward EG in the test results documented in Table 4. So, we need an inference which takes into account such a bias.

www.kci.go.kr

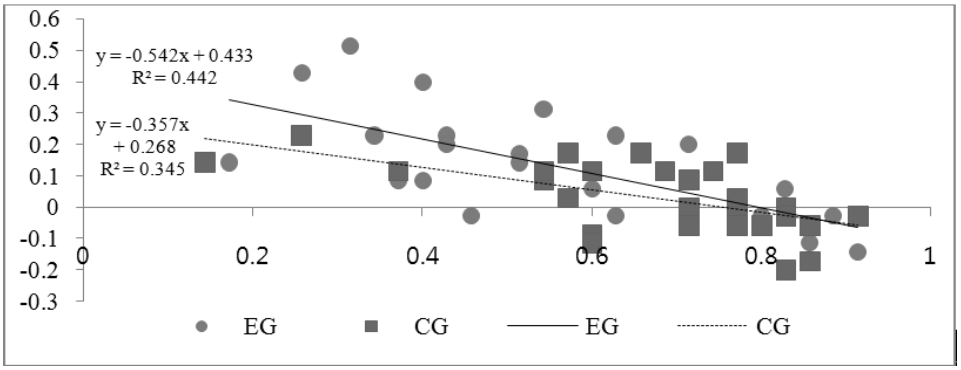

FIGURE 2 Trend Lines of CG and EG in Grammatical Gain

We do so by checking the cross point along with a formal test on parameter estimates. First, EG's trend line surpasses CG's until the cross point of 0.89 as shown in Figure 2. In other words, any student whose pretest score on grammar is below 0.89, the written output is more effective. There are only two samples after the 0.89 cross point which signifies that only 2 students got higher scores than 0.89, i.e., EG excelled over CG in grammar in 96% of the samples.

Second, consider the following inequality conditions:

(1) $y_{EG}= \alpha_{EG} + \beta_{EG}\, x > y_{CG}= \alpha_{CG} + \beta_{CG}\, x$ for all x

where y_{EG} and y_{CG} refer to a fitted EG's gain and a fitted CG's gain in grammar respectively while x denotes the pretest score in lexis. As such, the above inequality mathematically manifests a condition that the EG's trend line is above the CG's trend line across the whole domain of x. The inequality condition's necessary and sufficient condition is

(2) $\alpha_{EG} - \alpha_{CG} \geq 0$ and $\beta_{EG} - \beta_{CG} \geq 0$

where one inequality holds strictly. The difference in the slope between the two groups (β_{EG}-β_{CG}) is -0.18512, but it is statistically insignificant with p-value of 0.1327, i.e., we cannot reject the null that β_{EG}-β_{CG}=0. With regard to intercepts (α_{EG} - α_{CG}), the difference of the intercept value between EG and CG (α_{EG} - α_{CG}) is 0.1649 and this value is statistically marginally significant with p-value of 0.0624. Thus, we showed that the inequality conditions in (2) hold, and so does the inequality condition in (1). Simply put, this statistical result indicates that EG's trend line is placed above the CG's trend line where both lines are parallel. In a nutshell, the grammatical gain made by EG is always higher than that of the CG regardless of the subjects' pretest scores. Note that this inference

www.kci.go.kr

is free from the aforementioned bias. In sum, both CG and EG brought about significant gain in grammar, albeit marginally significant for CG.

V. CONCLUSION

The findings of this study are two-fold. First, interactionally modified output, be it in oral or written form, in an immersion content-based instruction is effective in promoting learners' accurate usage of target lexical and grammatical features. The bigger grammatical gain made by EG over CG regardless of the subjects' proficiency underscores the importance of a written output on which salient production errors spur L2 learners to engage in active negotiation for a correct form with a heightened cognitive awareness. Subsequent opportunity to negotiate with each other on the detected linguistic errors by referring to the source text facilitates acquisition of the syntactic aspect of L2. Second, students in an immersion class of CBI setting are faced with a double challenge to understand the meaning of a specific subject matter through L2. Furthermore, low proficiency learners are confronted with difficulties in making a linguistic gain amidst their struggle to understand the meaning of the content being taught. The findings of this study indicate that for relatively low proficiency students, oral interactionally modified output is more effective in gaining lexis knowledge and written interactionally modified output in grammar knowledge. In contrast, for high proficiency students, written interactionally modified output dominates the oral interactionally modified output in both lexical and grammatical gain. As such, the operationalization of this pedagogical approach, i.e., the written interactionally modified output, may be an alternative solution to bridging the gap between understanding the subject matter and gaining linguistic accuracy for students of all proficiency in an immersion content-based class.

The current study, although trying to establish a more substantial ground on employing an interactionally modified output in an immersion content-based class, is limited on several grounds. First, future study calls for a research design in which the samples in the groups are homogenous so that we could determine the effectiveness of the treatment more precisely therein. Second, "measures" of "noticing" is worth investigating in addition to the quantitative measurement of linguistic gain to lend weight to adopting interactionally modified output in CBI. Third, interactionally modified output may not be solely accountable for the lexical gain made by both CG and EG. In fact, the gain may have come from constant exposure to the target content words throughout the 10 weeks of instruction. As such, the results of this study cannot be conclusive and generalized. The findings of this study propose to L2 teachers a pedagogical approach that leads to acquisition of L2 within content teaching. Given the growing demand for students with both linguistic competence

www.kci.go.kr

and professional expertise, this study suggests the need to extend the present line of research for more in-depth study on finding a more systematic and effective approach on L2 immersion content-based instruction.

REFERENCES

Anthony, A. (2008). Output strategies for English-language learners: Theory to practice. *The Reading Teacher, 61*(6)*,* 472-482.

Aston, G. (1986). Troubleshooting in interaction with learners: The more the merrier? *Applied Linguistics, 7*(2), 128-143.

Ballman, T. (1997). Enhancing beginning language courses through content-enriched instruction. *Foreign Language Annals, 30*(2)*,* 173-186.

Bang, Youngjoo. (2013). EFL college students' perceptions toward content-based learning. *Modern English Education, 14*(1), 23-47.

Brinton, D., Snow, M., & Wesche, M. (1989). *Content-based language instruction.* Philadelphia: Newbury House.

Bryant, W. H. (1984). Typical errors in English made by Japanese ESL students. *JALT Journal*, *6*, 1-18.

Cantoni-Harvey, G. (1987). *Content-area language instruction: Approaches and strategies.* Reading, MA: Addison-Wesley.

Choe, Hohsung, & Yu, Ho-Jung. (2012). Interactional details in group peer feedback in an L2 writing class. *Modern English Education, 13*(1), 133-147.

Cook, V. (2001). *Second language learning and language teaching* (3rd ed.). London: Arnold.

Davison, C., & Williams, A. (2001). Integrating language and content: Unresolved issues. In B. Mohan, C. Leung, & C. Davison (Eds.), *English as a second language in the mainstream: Teaching, learning and identity* (pp. 51-70). Harlow, UK: Longman Pearson.

Doughty, C., & Williams, J. (1998). *Focus on form in classroom second language acquisition.* Cambridge, UK: Cambridge University Press.

Ellis, R. (2001). Introduction: Investigating form-focused instruction. *Language Learning, 51,* Supplement I, 1-46.

Ellis, R. (2005). Measuring implicit and explicit knowledge of a second language: A psychometric study. *Studies in Second Language Acquisition, 27*(2), 141-172.

Epsten, R. (2003). *The pocket guide to critical thinking* (2nd ed.). Victoria: Wadsworth Group.

Gass, S., & Varonis, E. (1985). Task variation and non-native/non-native negotiation of

www.kci.go.kr

meaning. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 149-161). Rowley, MA: Newbury House.

Gass, S., & Varonis, E. (1989). Incorporated repairs in nonnative discourse. In M. Eisenstein (Ed.), *The dynamic interlanguage* (pp. 71-86). New York: Plenum Press.

Grim, F. (2008). Integrating focus on form in L2 content-enriched instruction lessons. *Foreign Language Annals*, *41*(2), 321-346.

Harris, K., Schmidt, T., & Graham, S. (1998). Every child can write: Strategies for composition and self-regulation in the writing process. In K. Harris, S. Graham, & D. Deshler (Eds.), *Teaching every child every day: Learning in diverse schools and classrooms* (pp. 131-167). Cambridge, MA: Brookline Books.

Hedgecock, J. S. (2005). Taking stock of research and pedagogy in L2 writing. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 597-613). Mahwah, NJ: Erlbaum.

Hinkel, E. (2004). Tense, aspect and the passive voice in L1 and L2 academic texts. *Language Teaching Research, 8*(1), 5-29.

Hwang, Junghee. (2011). L2 Proficiency similarities versus differences in pair work and their effects on peer interaction. *Modern English Education, 12*(3), 23-45.

Iwashita, N. (2001). The effect of learner proficiency on interactional moves and modified output in nonnative-nonnative interaction in Japanese as a foreign language. *System, 29*(2), 267-287.

Izumi, S., & Bigelow, M. (2000). Does output promote noticing in second language acquisition? *TESOL Quarterly, 34*(2)*,* 239-278.

Izumi, S., Bigelow, M., Fujiwara, F., & Fearnow, S. (1999). Testing the output hypothesis. *Studies in Second Language Acquisition, 21*(2), 421-452*.*

Johns, A. M. (2003). Genre and ESL/EFL composition instruction. In B. Kroll (Ed.), *Exploring dynamics of second language writing* (pp. 195-217). Cambridge, UK: Cambridge University Press.

Kang, Dong-Ho. (2008). An exploratory study of university EFL students' participation in CBI. *English Language Teaching, 20*(1), 19-40.

Kim, Bu-Ja. (2011). Incorporating oral corrective feedback into the business English writing class. *English Language & Literature Teaching, 17*(3), 73-98.

King, A. (1992). Facilitating elaborative learning through guided student-generated questioning. *Educational Psychologist, 27*(1), 111–126.

Kowal, M., & Swain, M. (1997). From semantic to syntactic processing: How can we promote it in the immersion classroom? In R. Johnson & M. Swain (Eds.), *Immersion education: International perspectives* (pp. 284-309). Cambridge, UK: Cambridge University Press.

Leeser, M. (2004). Learner proficiency and focus on form during collaborative dialogue.

www.kci.go.kr

Language Teaching Research, 8(1), 55-81.

Lightbown, P. M. (1992). Can they do it themselves? A comprehension-based ESL course for young children. In R. Courchêne, J. St. John, C. Thérien, & J. Glidden (Eds.), *Comprehension-based second language teaching: Current trends* (pp. 353-370). Ottawa: University of Ottawa Press.

Mackey, A. (2009). *Input, interaction and corrective feedback in L2 learning*. Oxford: Oxford University Press.

Meziani, A. (1984). The English tense system: A pedagogic analysis. *International Review of Applied Linguistics in Language Teaching, 26*(4), 281–294.

Mohan, B., & Beckett, G. (2003). A functional approach to research on content-based language learning: Recasts in casual explanations. *Modern Language Journal, 87*(3), 421-432.

Muncie, J. (2002). Finding a place for grammar in EFL composition classes. *ELT Journal, 56*(2), 180-186.

Muranoi, H. (2000). Focus on form through interaction enhancement: Integrating formal instruction into a communicative task in EFL classrooms. *Language Learning*, *50*(4), 617-673.

Nassaji, H. (2007). Elicitation and reformulation and their relationship with learner repair in dyadic interaction. *Language Learning*, *57*(4), 511-548.

Oliver, R. (2000). Age differences in negotiation and feedback in classroom and pairwork. *Language Learning*, *50*(1), 119-151.

Panova, I., & Lyster, R. (2002). Patterns of corrective feedback and uptake in an adult ESL classroom. *TESOL Quarterly*, *36*(4), 573-595.

Pica, T., Holliday, L., Lewis, N., & Morgenthaler, L. (1989). Comprehensible output as an outcome of linguistic demands on the learner. *Studies in Second Language Acquisition, 11*(1)*,* 63-90.

Pica, T., Lincoln-Porter, F., Paninos, D., & Linnell J. (1996). Language learners' interaction: How does it address the input, output and feedback needs of L2 learners? *TESOL Quarterly, 30*(1)*,* 59-83.

Richardson, K., Kavanagh, M., & Sydes J. (2008). *The business pre-intermediate*. Oxford: Macmillan Publisher.

Roberts, F., & Cimasko, T. (2008). Evaluating ESL: Making sense of university professors' responses to second language writing. *Journal of Second Language Writing, 17*, 125-143.

Rodgers, D. (2006). Developing content and form: Encouraging evidence from Italian content-based instruction. *Modern Language Journal, 90*(3), 373-386.

Rosa, E., & Leow, R. (2004). Computerized task-based instruction in the L2 classroom: The effects of explicitness and type of feedback on L2 development. *Modern*

www.kci.go.kr

Language Journal, *88*(2), 192-216.

Samuda, V. (2001). Guiding relationships between form and meaning during tasks performance: The role of the teacher. In M. Bygate, P. Skehan, & M. Swain (Eds.), *Researching pedagogic tasks: Second language learning, teaching and testing* (pp.119-140). Harlow, UK: Longman.

Sheen, Y. (2004). Corrective feedback and learner uptake in communicative classrooms across instructional settings. *Language Teaching Research, 8*(3), 263-300.

Shehadeh, A. (2001). Self and other-initiated modified output during task-based interaction. *TESOL Quarterly, 35*(3), 433-457.

Shook, D. (1996). Foreign language literature and the beginning learner-reader. *Foreign Language Annals, 29*(2), 201-216.

Snow, M. A., & Brinton, D. (1997). *The content-based classroom: Perspectives on integrating language and content*. White Plains, NY: Addison-Wesley Longman.

Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235-253). Rowley, MA: Newbury House.

Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principles and practice in applied linguistics: Studies in honor of H. G. Widdowson* (pp. 125-144). Oxford: Oxford University Press.

Swain, M. (1996). Integrating language and content in the immersion classrooms: Research perspectives. *Canadian Modern Language Review, 52*(4), 529-548.

Swain, M. (1998). Focus on form through conscious reflection. In C. Doughty & J. Williams (Eds.), *Focus on form in classroom second language acquisition* (pp. 64-81). Cambridge, UK: Cambridge University Press.

Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97-114). Oxford: Oxford University Press.

Swain, M. (2001). Integrating language and content teaching through collaborative tasks. *Canadian Modern Language Review*, *58*(1), 44-63.

Swain, M. (2005). The output hypothesis: Theory and research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 471-484). Mahwah, NJ: Erlbaum.

Swain, M., & Johnson, R. (1997). *Immersion education: International perspectives*. Cambridge, UK: Cambridge University Press.

Swain, M., & Lapkin, S. (1995). Problems in output and the cognitive processes they generate: A step towards second language learning. *Applied Linguistics, 16*(3), 371-391.

Swain, M., & Lapkin, S. (1998). Interaction and second language learning: Two adolescent

www.kci.go.kr

French immersion students working together. *Modern Language Journal*, *82*(3), 320-337.

Swain, M., & Lapkin, S. (2000). Task-based second language learning: The uses of the first language. *Language Teaching Research, 4*(3), 251-274.

Watanabe, Y., & Swain, M. (2007). Effects of proficiency differences and patterns of pair interaction on second language learning: Collaborative dialogue between adult ESL learners. *Language Teaching Research, 11*(2), 121-142.

Wong Fillmore, L. (1992). Learning a language from learners. In C. Kramsch & S. McConnell-Ginet (Eds.), *Text and context* (pp. 49-66). Lexington, MA: D. C. Heath.

Zhou, A. A. (2009). What adult ESL learners say about improving grammar and vocabulary in their writing for academic purposes. *Language Awareness*, *18*(1), 31-33.

Appendix 1

Excerpts from written productions of students' output and modified output

Title of the article
"Excerpt from the source text"
Student's initial output => Student's modified output

What is small talk?
"There are also some subjects that are not considered acceptable when making small talk."
Negative comments is not also acceptable. => Negative comments are also not considered acceptable.

"Lastly, avoid one word answers, and ask questions to show you…."
Lastly, you shouldn't do short answer. => Lastly, you should avoid short answers.

The seven steps to customer satisfaction
"When you answer a call from a dissatisfied customer you need to greet them in a warm manner."
When the dissatisfied customer call you, you should be kind. => When a dissatisfied customer calls you, you should be kind.

"Once the customer has finished explaining the problem, use your notes to check you have understood the problem correctly."
After listened their problems use your note to check the details. => After listening to their problems use your notes to check the details.

ScotAir's recent performance and trends in the passenger air travel industry
"However, our profits began to fall at the beginning of the year. The reason for this was the arrival of two new low-cost competitors."

www.kci.go.kr

However, the profits are decrease compare to last year due to two low-cost companies. => However, the profits decreased compared to last year due to two low-cost companies.

"As soon as we get the green light, we plan to buy three more planes to add to our fleet."
As soon as the company permits the plan buying 3 more planes, we will be able to catch up. => As soon as the company gives us the green light to buy 3 more planes, we will be able to catch up.

Advertising Space
"The average person not only sees over 500 advertisements every day….."
The average people sees advertisement everyday. => The average people see 500 advertisements every day.

"The advantage of tattoo advertising is that the company name or logo is in full view all through the match and not limited to a 30 second commercial which viewers may switch off anyway."
During sports game, we can see body advertisement unlimited time. => The company name is viewed all through the game and not limited to 30 seconds.

"It is also not possible in all parts of the world where there is no tradition of tattoos or showing so much skin in public is taboo."
But some parts of world find that that is not attractive. => But some parts of the world where tattoo is taboo think that is not attractive.

"We see advertisements everywhere and so traditional forms of advertising are losing their effectiveness."
It will caused by losing their effectiveness. => It will cause losing their effectiveness.

Appendix 2

Excerpts from the lexical and grammatical test in the pre- and post-test

Vocabulary (42 questions)
Please write the correct word in English starting with the alphabet given. The Korean definition is provided for you.
1. 신청서 – a_____, 2. 계약서 – c_____, 3. 특허 - p_____, 4. 예산 – b_____, 5. 기술 – t_____, 6. 동료 – c_____, 7. 시설 – f_____, 8. 혁신적인 – i_____, 9. 신용 – c_____, 10. 부품 - c_____, 11. 경쟁적인 – c_____, etc.

Grammar (35 questions)
1. Fill in the blanks with correct form of the verb.
Hi, Anna, how are things? I'm writing to you from Paris. It's my second time here. If you remember, the first time was when I _____ (be) here on holiday for two weeks with Paulo. It seems like a long time ago.
Anyway, now I'm here to work, and I'm staying for a year. Actually, I _____(arrive) at the beginning of January – more than two months ago. Sorry

www.kci.go.kr

that I _____(not/write) since then. Things are going well. I have a job in a bookshop and I'm learning French – I speak it all the time. I _____(meet) all sorts of interesting people since I got here, including a really nice guy called Alain. Let me tell you about him. We _____(meet) for the first time a couple of weeks ago. He _____(come) into the shop and ------.

2. Complete each sentence by putting the verb into the present perfect or past simple.

① Do you know where Marta is? I _____(not/see) her since lunchtime.
② Yes, I know I need to enter all the sales data into the spreadsheet. Don't worry, I _____(not/forget).
③ News is just coming in. There _____(be) a serious earthquake in San Francisco.
④ ____(you/finish) yet?
⑤ Yes, of course, I ____(finish) ages ago.
⑥ So far this month, we _____(have) 15,000 hits on our new website.
⑦ I ____(not/speak) to my boss yesterday – he was really busy.

Examples in: English
Applicable Languages: English
Applicable Levels: Tertiary

Kyung-Ju Lo
Dongduk Women's University, Department of English
60 Hwarang-ro 13-gil, Seongbuk-gu, Seoul, Korea 136-714
Tel: (02) 940-4364
Email: loju@dongduk.ac.kr

Received 4 March 2014
Revised 9 May 2014
Accepted 16 May 2014

www.kci.go.kr