



The Effects of Dictionary App Use on College-level Korean EFL Learners' Narrative and Argumentative Writing

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Studies of a dictionary app in EFL learners' composition are limited in language education research. This study investigated this issue in the view of genres. Two groups of 45 EFL undergraduates participated in the study. One group performed two genre-based writing tasks, narrative and argumentative, with the help of a dictionary app and the other without it. The written outcomes were rated on five components of writing such as vocabulary, grammar, content, organization, and communicative achievement. Lexical diversity and lexical sophistication of each text were measured and words written after dictionary look-up were examined in both accuracy of use and parts of speech. The results found that in the dictionary use condition, scores of vocabulary improved significantly in both genres. The diversity of vocabulary appeared to increase with dictionary aid, but not necessarily in sophistication. These changes were generally apparent in the narrative genre. Accuracy analysis revealed up to 60% of errors were detected in words written after dictionary look-up and the probability of error occurrence was noticeable in the argumentative genre, where the ratio of verb use was high. Implications for further studies are suggested.

Keywords: dictionary app, second-language writing, vocabulary, genres

Introduction

Writing is a complicated and cognitively demanding process (Jennifer & Ponniah, 2017; Olinghouse & Leaird, 2009; Ong & Zhang, 2013). To perform writing, a writer has to generate and organize ideas, develop a plan, review and revise the written text, and monitor the entire process of writing (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). A writer also has to examine the appropriateness of the product outcome in social perspectives under the consideration of the purpose of writing and the intended audience (Ong & Zhang, 2013). When a writer is involved in this complicated writing process, vocabulary plays a major role (Olinghouse & Leaird, 2009) since his or her intended ideas are basically expressed by words in a text (Fletcher, 1993). However, the problem is that mastering the vocabulary required to perform writing is not easy but somewhat demanding, especially for second or foreign language learners (Olinghouse & Leaird, 2009; Schmitt, 2008).

Researchers have marked that language learners' productive vocabulary knowledge capacity (i.e., vocabulary knowledge needed to perform productive tasks) is much smaller than their receptive vocabulary knowledge capacity (i.e., vocabulary knowledge needed to perform receptive tasks) (Fan, 2000; Laufer, 1998; Melka, 1997; Webb, 2008; Zheng, 2009) and this could be a reason why language learners widely experience difficulties in mastering a productive skill (i.e., writing or speaking) more so than for a receptive skill (i.e., listening or reading). To overcome these difficulties and to successfully

convey their messages through a text, language learners tend to get help from a lexical supporting tool, that is, a dictionary.

A dictionary is a commonly used authentic referencing material in ESL and EFL contexts (Liou, 2000). Language learners across levels, from beginners to advanced, generally turn to a dictionary when they face linguistic difficulties (Augustyn, 2013; Hartmann, 2001; Scholfield, 1999). With the prevalence of a smartphone and with the availability of a dictionary app, furthermore, it has become easy for learners to get this aid whenever or wherever they want it (Gao, 2013). That is, accessibility of a dictionary has highly increased.

However, it has to be noticed that using a dictionary app is quite different from using a paper or an e-pocket dictionary. The linguistic information of a dictionary app is deployed within the functional framework of a smartphone operating system. The size of a smartphone screen and touch-sensitive screen display also make a difference in dictionary use. In other words, the way that a dictionary app impacts on learners' writing can differ from the way that a paper or an e-pocket dictionary does since learners' writing performance changes depending on types of dictionary media (Choi & Park, 2013).

This study aims to explore the effects of dictionary app use on Korean EFL learners' writing in the perspective of genres. As linguistic features of L2 writing are significantly affected by the types of genres, genre differences are another important factor that has to be included in L2 writing research (Yoon & Polio, 2017). By examining whether a dictionary app causes any changes on the way that learners perform genre-based writing and by discussing the reasons that cause the changes, this study will provide meaningful implications for language education.

Literature Review

Dictionaries and L2 Writing

Weigle (2002) states that in a broader concept, a writer's use of every available resources during writing is a part of writing ability and in this perspective, the ability to use a dictionary can be seen as a component of writing ability. This infers the way that a dictionary is used needs to be investigated in the studies of L2 writing in order to get deeper understanding on L2 learners' writing ability.

Among early studies exploring the effect of a dictionary in writing, Harvey and Yuill's (1997) study is noticeable. They attempted to directly examine the productive role of a dictionary by measuring language learners' essay outcomes produced by real essay writing tasks rather than a multiple-choice tests, which were frequently employed by their contemporaries. Four different genre-based writing topics (i.e., narrative, argumentative, descriptive and expository writing topics) were given to 211 EFL students in the study and they were all allowed to select one of the presented topics based on their preference. The results showed the students mainly used a dictionary for the purpose of checking spelling and definition of a word. Linguistic information like grammar, synonym, collocation or inflection was reported to be used in lesser frequency, compared to the prior two. This suggests that students tend to seek linguistic aids most related to spelling or meaning rather than others.

Although Harvey and Yuill's (1997) study identified students' main reasons of dictionary use in essay composition, it did not reveal to what extent the use of a dictionary gives impacts on the quality of writing. Because a dictionary is a referencing tool aiding language learners to expend their expressive ability by providing various linguistic information (Ard, 1982), learners' dictionary use could influence the quality of the produced writing outcomes. That is, to get substantial information on the role of dictionary use during writing, the quality of writing outcomes produced with dictionary aid has to be investigated.

In the study conducted by Tall and Hurman (2002), this issue was explored. Students who were learning French as their L2 participated in the study. All the students were assigned to perform two writing tasks in different writing conditions. They wrote essays without a dictionary at first, and then with a dictionary for a second task. This study aimed to examine the following issues: the underlying reasons

of dictionary use, errors in writing caused from dictionary use, and effects of dictionary use on students' essay scores. The results showed that the main reason of using a dictionary was to search for words or expressions to complete the sentences or ideas in essays. The look-up analysis revealed that students had the tendency to directly copy the searched word in their writing without careful consideration on the appropriateness of its forms and usages in the given sentence, which caused a number of errors. The analysis on the quality of text in two different writing conditions (i.e., writing with a dictionary and writing without a dictionary), however, reported that the essay scores increased in a dictionary use condition in spite of those errors. Based on the findings, Tall and Hurman (2002) notes that using a dictionary during writing plays a beneficial role, rather than neutral or harmful, enhancing text quality.

Although Tall and Hurman's (2002) study provides lots of meaningful implications, it has to be pointed out that there was a limitation in carrying out the study. In their study, the two writing tasks were arranged as follows: writing without a dictionary first, and writing with a dictionary second. This indicates there was a possibility that students practiced their L2 writing while they performed the first writing task, and this enabled them to do better in the second writing task. That is, the order of tasks might give an impact on the results of the study.

Identifying this potential problem of an order effect in Tall and Hurman's (2002) study, East (2006) explored the issue in a more systemic way. He examined the productive role of a dictionary in lexical sophistication, lexical accuracy, and text quality targeting L2 students of two levels of language proficiency: upper and low intermediate. Unlike Tall and Hurman (2002), an order effect was considered in his study to prevent any possible bias when having students perform two writing tasks (i.e., writing with a dictionary and without a dictionary). Therefore, a counter-balanced task alignment design was employed. Two argumentative writing topics were given to the students.

The analysis on lexical sophistication reported that in no dictionary use condition, statistically significant differences appeared between the lower and the upper language proficiency groups, whereas in dictionary use condition, no apparent group differences were shown. East (2006) viewed that the main reason of the results lay in the differences of beneficial role of a dictionary in the two language proficiency groups. With a dictionary, the students in lower language proficiency could increase the range of lexical sophistication proportionately much higher than the ones in upper language proficiency, which narrowed the gap of lexical sophistication between the groups. Therefore, it can be said that the beneficial role of a dictionary is much higher in the lower ability group.

In the case of accuracy of words written with the help of a dictionary, it was revealed that the students had the tendency to make a number of errors, up to 50% (i.e., 38% in the upper language proficiency group and 55% in the lower language proficiency group), when they used the searched words in their writing. Lastly, the analysis on text quality showed that scores of writing produced with a dictionary were not significantly higher compared to the ones without it, unlike the results of Tall and Hurman's (2002) study. On these results, East commented that although students could produce lexically more sophisticated text with the help of a dictionary, their tendency to make errors negated or else, confounded these benefits, so that no meaningful increase of text quality was detected when they wrote with a dictionary.

All these prior studies show the way that dictionary use affects on L2 learners' writing in both their writing performances and their writing outcomes. However, the thing that has to be noted is the type of a dictionary used in the studies was a paper one. With the prevalence of smartphone use, language learners today rarely use a paper dictionary, but rather refer to a dictionary app which can be easily operated via a smartphone device (Gao, 2013). Unlike traditional types of a paper or an e-pocket dictionary, the scope of linguistic content provided by a dictionary app is much wider. A larger number of entries, more diverse related words, and a wider range of multimedia content are presented (Gao, 2013). The accessibility of a dictionary app is also noteworthy. Language learners can search for particular linguistic information at anytime, from anywhere, by just touching the dictionary app on the smartphone screen. In terms of language learning, this accessibility is quite beneficial since language learners can be exposed to the target language more frequently, which increases their language learning opportunities. Furthermore, in

today's society where text-based digital communication is widely used through various digital communication tools such as e-mails, text messages, blogs, Facebook, or Twitter, a dictionary app plays an important role by immediately providing linguistic aids for language learners.

Studies looking into the roles of a dictionary app, however, have not been conducted a lot. There are some studies examining the language learners' perception on using a dictionary app (Nam, 2014), as well as features and search function of it (Gao, 2013; Hwang, 2014). Yet, few studies explore the issue of a dictionary app in L2 writing. Considering a dictionary app is a highly needed referencing material for language learners today during writing, studies on it are greatly in need.

Narrative and Argumentative Writing

Genres have been played an important role in L2 writing education (Watanabe, 2017). As a different genre can give a different impact on the linguistic features of texts (Young & Polio, 2017), the importance of genre factors cannot be dismissed in L2 writing research. According to Ravid and Tolchinsky (2000), genres of each text can be differentiated based on its communicative goals, sociocultural practices and roles. Bruner (1986) also designates that differences of genres can be broadly categorized into two types of discourse modes: narrative and non-narrative. Texts involved in a narrative genre generally describe events related to certain people and their actions along with temporal and spatial sequence, however, texts in non-narrative genres tend to emphasize particular ideas or beliefs, arguing or discussing them in a logical fashion (Berman & Slobin, 1994). As the way to deploy ideas is distinctive in each genre, language features appearing in texts can be perceived to be distinguishable according to types of genres (Beers & Nagy, 2009; Ravid, 2005). On the basis of this perspective, several studies were carried out to explore the differences of language features in narrative and non-narrative genres.

Ravid (2005) examined language features in both narrative and expository essays targeting L1 learners, and the results showed that L1 learners tended to produce linguistically more complex texts when they composed non-narrative essay, expository writing. In a study conducted by Way, Joiner, and Seaman (2000), it also appeared that L2 French learners used more complex language in producing expository writing rather than narrative one. Likewise, the study carried out by Lu (2011) proved that L2 English learners employed linguistically more complex expressions in writing an argumentative essay than narrative one.

In terms of lexical features, Yoon and Polio (2017) examined complexity of vocabulary in two genres, narrative and argumentative. They explored differences of lexical sophistication and lexical diversity targeting thirty seven L2 English learners. The findings showed that significantly more sophisticated words were employed in argumentative writing, but on the contrary, significantly more diverse words in narrative writing.

As shown all these studies, it becomes clear that linguistic features of texts are highly affected by types of genres. Therefore, in examining the impact of dictionary app use on language learners' writing, the issue of genres has to be considered. Based on the literature reviewed in this section, three research questions are suggested. They are:

- 1) To what extent does use of a dictionary app affect the quality of EFL learners' genre-based writing: narrative and argumentative?
- 2) To what extent does use of a dictionary app affect lexical richness of EFL learners' genre-based writing: narrative and argumentative?
- 3) What are the features of dictionary look-ups in terms of parts of speech and accuracy of use in genre-based writing: narrative and argumentative?

Methodology

Participants

The participants of the study were two groups of EFL students enrolled in a four-year university located nearby Seoul, Korea. One group consisted of twenty-one students (fourteen males and seven females) and the other twenty-four (twenty-two males and two females). All of them were freshmen and their age ranged from eighteen to twenty-one ($M = 20$ years) in one group and nineteen to twenty-three ($M = 20$ years) in the other group. They took the general English writing classes set up for low-intermediate level undergraduates for a semester. In the survey conducted at the beginning of the semester, students responded that they studied English for ten to thirteen years only in Korea and none of them had overseas learning experience.

To assess the students' level of English writing proficiency and to investigate the group differences in writing, a prewriting test was carried out. The topic of the test was chosen from the main course book used in the classes and the written outcomes were scores by two raters based on FCE analytic scoring rubric in four scoring categories (*content*, *organization*, *communicative achievement*, and *language*). Scores of each scoring category ranged from 0 (the lowest) to 5 (the highest). Therefore, the lowest total score was 0 and the highest was 20. The interrater reliability was examined by the Pearson Correlation Coefficient and the elicited value was 0.87, which indicated the reliability was acceptable.

The results of the scoring showed every student's level of English writing proficiency could be classified into low-intermediate level ($M = 11.02$ and $SD = 3.41$ in one group and $M = 10.42$ and $SD = 3.53$ in the other group) and the examination of the independent t -test proved there were no significant group differences in writing proficiency ($t = 0.58$, $p = 0.52$). Based on the results, one group was determined to be the experimental group and the other was to be the control group.

Instruments

Framework of writing tasks

Two writing tasks, narrative and argumentative writing, were implemented in this study targeting the students in both groups. The tasks were developed based on First Certificate in English (FCE) writing test framework, which covers the issue of genres (Shaw & Weir, 2007). The prompts of narrative and argumentative writing tasks employed in this study were written according to FCE specification. The duration of writing was twenty minutes and the required length was 120 words minimum and 180 maximum. The tasks were implemented in a pen and paper setting.

Scoring criteria

FCE scoring rubric was modified and adapted for scoring. Originally, there are four scoring categories in FCE scoring rubric (i.e., *content*, *organization*, *communicative achievement*, and *language*). However, as this study aimed to examine the effects of dictionary app use in writing, and as it can be assumed that dictionary app use would give a noticeable impact on vocabulary of text (East, 2006), the category of *language* in FCE scoring rubric was divided into *vocabulary* and *grammar* to investigate these impacts specifically. As the description in the category of *language* in FCE scoring rubric consists of the *vocabulary* and *grammar* sections which can be easily separated, it was not necessary for the researcher to change any words when dividing the category of *language* into the category of *vocabulary* and the category of *grammar*. As a result, the finalized scoring categories became *content*, *organization*, *communicative achievement*, *vocabulary*, and *grammar*. In each scoring category, the lowest score was 0 and the highest was 5, indicating the range of total scores would be 0 (the lowest) to 25 (the highest).

Dictionary app

A dictionary app was the main referencing tool used in this study. Since every student carried his or her own smartphone, and since he or she was accustomed to operating this gadget to search for linguistic information, there were no major problems in terms of operation when students performed writing tasks with a dictionary app. Among various dictionary apps, Naver dictionary app was selected for the study because it proved through a survey that a considerable number of students in the experimental group (i.e., 78.9 % of the students) used it as a major referencing material in their everyday lives. The type of a dictionary chosen for the study was a Korean – English/ English –Korean bilingual dictionary as it has been reported in several studies (Choi & Park, 2013; Laufer & Harder, 1997) that a bilingual dictionary is more beneficial for students in lower level of language proficiency than a monolingual one in a writing task.

Procedures

Main writing tasks

The experiment was carried out for two weeks in two separate class sessions. The narrative writing task was given to the students at first, which was followed by argumentative. The experimental group was allowed to use a dictionary app when they composed an essay, and the control group was not. While writing, the students in the experimental group were guided to underline every word written after referring to a dictionary for the dictionary look-up analysis (East, 2006).

Scoring

The writing outcomes gathered through two writing tasks were transcribed using MS words. Each student's writing was kept anonymous and every underlining of marked words was deleted to prevent any possible scoring bias caused from the raters' knowledge about different writing conditions.

Three raters were involved in the rating process. In the beginning of the rating, they examined FCE raters' manual and discussed detailed issues to resolve any uncertainty of the given guidelines. Then practice rating was implemented using three sets of twenty writing outcomes produced by the students from other classes under the same writing topics and conditions as the ones used in the main experiment. Each rater received her own sets of writing outcomes and scored them individually, which was followed by comparison of the scoring results. Any score discrepancies of more than 1 point were discussed and resolved referring to the description of the scoring rubric. After accomplishing the practice rating, the main rating process was followed. Per each essay, three copies were prepared and presented to all three raters. They scored the given essays individually and the comparison of the scoring results was followed. When disagreement or discrepancy of scores of more than 1 point appeared, it was, again, resolved through discussion based on the scoring rubric. After rating, the interrater reliability was examined using Statistical Package for the Social Science (SPSS) Interclass Correlation Coefficient (ICC) on three factors; examinees, genres, and scoring categories. The value of ICC proved to be 0.91 ($p = 0.00$) which ensured the interrater reliability among the raters.

Analysis

Based on the gathered scores of each writing outcome, the group differences were analyzed by making use of the independent *t*-test. Then lexical diversity and lexical sophistication were examined to find out the lexical features of the essays written with a dictionary and without a dictionary. For the investigation of lexical diversity, TTR, CTTR, and RTTR were measured using Lexical Complexity Analyzer (LCA)

(Lu, 2012) and for the investigation of lexical sophistication, the frequency of word use was measured based on Lexical Frequency Profile (LFP) (Laufer & Nation, 1995) in two bands of frequency lists such as *the first 1,000 most frequently used words lists* (K1) and *the second 1,000 most frequently used words lists* (K2). The group differences of each lexical features, lexical diversity and lexical sophistication, were analyzed using the independent *t*-test.

In addition to the analysis on text scores, lexical diversity, and lexical sophistication, words written after looking up in a dictionary were examined in two aspects, accuracy of word use and parts of speech. In the process of investigating accuracy of searched words, 1) relevance of word meaning in a given sentence, 2) accuracy of spelling, and 3) appropriateness of grammar were all evaluated (East, 2006; Fan, 2000; Webb, 2008). When a student made an error in one of these criteria while employing a searched word in his or her writing, that word was perceived as the wrong item and calculated as an incorrectly used dictionary look-up. Parts of speech were also examined according to the function of words written with dictionary aid in a given sentence. They were categorized into groups of nouns, verbs, adjectives, etc. Two raters participated in the accuracy examination and the type categorization of searched words. The raters' interrater reliability was supported based on the Pearson Correlation Coefficient ($r = 0.96$) at 0.01 significance level.

Results and Discussion

The Impact of Dictionary App Use on the Quality of EFL Learners' Genre-based Writing

Score comparison between a dictionary use group and a non-dictionary use group

The first research question was "To what extent does use of a dictionary app affect the quality of EFL learners' genre-based writing: narrative and argumentative?" The results of total score analysis are displayed in Table 1.

TABLE 1
Comparison of Total Scores between Groups

Genre	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Narrative	Experimental group	21	13.14	4.30	43	-0.13	0.90
	Control group	24	13.29	3.59			
Argumentative	Experimental group	21	11.71	4.58	43	0.68	0.50
	Control group	24	10.62	5.95			

According to Table 1, in narrative writing, the mean total score appeared to be 13.14 ($SD = 4.30$) in the experimental group and 13.29 ($SD = 3.59$) in the control group. However, in argumentative writing, it was reported that the mean score was 11.71 ($SD = 4.58$) in the experimental group and 10.62 ($SD = 5.95$) in the control group. These results infer that dictionary app use would be beneficial in argumentative writing rather than in narrative writing. However, since none of the group differences was statistically supported, further investigation on separate components of writing scores (i.e., *vocabulary*, *grammar*, *content*, *organization*, and *communicative competence*) was carried out.

In the further analysis on the scores of each component of writing, it proved that group differences only appeared in the *vocabulary*. In the other four components of writing, no apparent group differences were detected. Table 2 illustrates the results of statistical analysis on the *vocabulary* scores.

TABLE 2
Comparison of Vocabulary Scores between Groups

Genre	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Narrative	Experimental group	21	2.76	0.99	43	2.15	0.04*
	Control group	24	2.21	0.72			
Argumentative	Experimental group	21	2.67	0.66	43	2.55	0.02*
	Control group	24	1.96	1.16			

* $p < 0.05$

The table reports that mean scores were higher in the experimental group in both genres, 2.76 (SD = 0.99) in narrative and 2.67 (SD = 0.66) in argumentative, and these differences were statistically supported (narrative: $t = 2.15$, $p < 0.05$, and argumentative: $t = 2.55$, $p < 0.05$). This result indicates that dictionary use gives a significant impact on one particular component of writing, vocabulary, more so than any other components. When it is considered that L2 learners' major difficulty of writing is based on their lack of vocabulary knowledge capacity (Weigle, 2002) and that a dictionary is a referencing tool which is mainly used to help learners to overcome their lexical limitation, the significance of scoring gap in vocabulary is quite understandable. That is, L2 learners' major difficulty of writing caused by lack of vocabulary knowledge can be resolved when dictionary use is allowed, which contributes to increasing vocabulary scores of writing.

Score comparison between narrative and argumentative genres

In order to identify whether there are any differences on the quality of writing according to a genre variable, score comparison between narrative and argumentative writing was carried out in five scoring components, let alone the total score. Table 3 illustrates the results.

TABLE 3
Scores of Each Scoring Category between Genres

Group	Genre	<i>n</i>	C		CA		O		G		V		Total score	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Experimental group	NA	21	3.09	1.04	2.67	0.86	2.33	0.79	2.28	1.00	2.76	0.99	13.14	4.3
	AR	21	2.67	1.02	2.43	1.07	2.14	1.19	1.81	0.93	2.67	0.66	11.71	4.58
Control group	NA	24	3.37	0.77	2.96	0.91	2.62	0.92	2.12	0.61	2.21	0.72	13.29	3.59
	AR	24	2.62	1.17	2.25	1.15	2.04	1.33	1.75	1.39	1.96	1.16	10.62	5.95

Note. C: content, CA: communicative achievement, O: organization, G: grammar, V: vocabulary
NA: Narrative, AR: Argumentative

The result shows that the scores of narrative writing were higher than the scores of argumentative writing in every scoring component in both groups. This infers that L2 learners would be more proficient in narrative writing than argumentative regardless of dictionary app use. However, in the further analysis, it appeared that only the score differences in *content* and *communicative achievement* could be statistically supported. The results are displayed in Table 4.

TABLE 4
Score Comparison between Genres: Content and Communicative Achievement

Scoring category	Group	Genre	<i>n</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Content	Experimental group	Narrative	21	3.09	1.04	40	-1.35	0.18
		Argumentative	21	2.67	1.02			
	Control group	Narrative	24	3.37	0.77			
		Argumentative	24	2.62	1.17			
Communicative achievement	Experimental group	Narrative	21	2.67	0.86	40	-0.79	0.43
		Argumentative	21	2.43	1.07			
	Control group	Narrative	24	2.96	0.91			
		Argumentative	24	2.25	1.15			

**p* < 0.05

As the scoring component of *content* measures L2 learners' writing ability related to the content development and as the scoring component of *communicative competence* measures the effectiveness of the use of communicative convention, it can be said that both scoring components assess L2 learners' writing ability focusing on the quality of idea development and deployment. Therefore, the fact that the learners in this study scored noticeably higher in *content* and *communicative achievement* when they performed narrative writing without help of a dictionary app says that narrative genre is clearly less demanding than argumentative writing in conveying learners' ideas.

This finding is in line with the result of Yoon and Polio (2017)'s study. They designate that the content of argumentative genre is generally to be more abstract compared to the content of narrative genre, and this abstractness tends to impose a higher cognitive burden on writers while they perform writing. Further, for L2 learners, this cognitive burden would be getting more severe since their vocabulary knowledge capacity is quite limited, which makes it hard for them to fully develop their abstract concept in L2. In other words, L2 learners have to overcome difficulties caused from not only the genre difficulties but also lexical limitation when they perform argumentative writing.

However, the thing that has to be noticed in this study is that no significant group differences were shown between narrative and argumentative when the learners used a dictionary app during writing. This says when the learners got dictionary aid, their cognitive burden caused from their lexical limitation was reduced, and therefore they could concentrate more on the content development and rhetorical convention of their writing, which contributes to eliminating the noticeable genre differences between narrative and argumentative. Based on the findings, it can be said that dictionary use gives a significant impact on the quality of L2 writing in both vocabulary use and idea development.

To find out the specific impact of dictionary use further, examination on lexical richness of writing were followed. This will be discussed in the next section of this chapter based on the second research question.

The Impact of Dictionary App Use on Lexical Richness of EFL Learners' Genre-based Writing

The second research question was "To what extent does use of a dictionary app affect lexical richness of EFL learners' genre-based writing: narrative and argumentative?" For the investigation of the question, analysis on two features of lexical richness in each genre, lexical diversity and lexical sophistication, was carried out. Lexical diversity was calculated in terms of TTR, CTTR, and RTTR, and lexical sophistication was measured based on Lexical Frequency Profile in K1 and K2. Every elicited data was statistically compared based on the independent *t*-test to search for group differences in each section of lexical measurement.

Through the analysis, it appeared that apparent group differences in lexical diversity and lexical sophistication proved in narrative writing and not in argumentative. When considering the results of the previous score analysis which showed the highest vocabulary mean scores in narrative writing compared

to the scores in argumentative writing (see Table 2), this apparent beneficial role of a dictionary app in lexical richness in narrative writing is quite predictable. The results of the independent *t*-test analysis on lexical diversity and lexical sophistication in narrative writing are described in Table 5.

TABLE 5
Group Comparison on Lexical Richness in Narrative

	Lexical features	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Lexical diversity	TTR	Experimental group	21	0.52	0.06	2.79	0.01*
		Control group	24	0.47	0.05		
	CTTR	Experimental group	21	4.25	0.34	2.54	0.01*
		Control group	24	3.97	0.41		
	RTTR	Experimental group	21	6.02	0.48	2.54	0.01*
		Control group	24	5.61	0.57		
Lexical sophistication	K1	Experimental group	21	85.20	5.14	1.04	0.30
		Control group	24	83.47	5.91		
	K2	Experimental group	21	4.36	2.28	-2.53	0.02*
		Control group	24	6.66	3.71		

**p* < 0.05

According to the table, the means of lexical diversity measurements (i.e., TTR, CTTR, and RTTR) were all higher in the experimental group. Significance of group differences appearing in these three measurements (i.e., TTR, *t* = 2.79, *p* < 0.01, CTTR, *t* = 2.54, *p* < 0.01, and RTTR, *t* = 2.54, *p* < 0.01) suggests that dictionary use enables students to produce lexically more diverse text when they compose a narrative essay. The correlation analysis was followed using the Pearson Correlation Coefficient to investigate whether the increase of lexical diversity affected the quality of writing and the results showed a significantly positive relation between the degree of lexical diversity and vocabulary scores in the experimental group in two measurements of lexical diversity, CTTR (*r* = 0.71, Sig. = 0.00) and RTTR (*r* = 0.71, Sig. = 0.00). Based on the results, it can be identified that lexical diversity of narrative writing is a meaningful indicator of text quality.

The effects of app dictionary use on lexical sophistication of narrative writing are also shown in Table 5. The means of lexical sophistication appeared to be higher in the experimental group in K1 (*M* = 85.20, *SD* = 5.14), whereas lower in K2 (*M* = 4.36, *SD* = 2.28). The follow-up independent *t*-test analysis statistically supported the lower sophistication of vocabulary in K2 level in this group (*t* = -2.53, *p* < 0.05). To find out whether the changes of lexical sophistication in narrative writing gave any impacts on the quality of writing, correlation analysis was followed. According to the results, a noticeably negative relation was detected between K2 and vocabulary scores (*r* = -0.50, Sig. = 0.02) in the experimental group, indicating that the increase of lexical sophistication in K2 gives a somewhat negative impact on students' writing when they use a dictionary app.

The reasons that the learners tried to use highly diverse but less sophisticated words when they wrote with a dictionary app in narrative writing and the reasons of negative contribution of lexical sophistication on vocabulary scores can be explained in the view of, first, the features of the genre, and second, students' level of language proficiency. Firstly, compared to argumentative writing, narrative writing mainly focuses on narrating a story based on dynamism (Smith, 2006). As events and states are arranged sequentially according to a causal and consequential relation in this genre (Labov & Waletzky, 1966; Moens, 1987), a writer needs to clearly deploy these events and states in order to help readers to follow the main story without confusion. Therefore, in composing a narrative essay, a writer is required to employ as many diverse words as possible to reduce ambiguity of the connected events and states and to increase readers' understanding. This feature of the narrative writing marks that the use of diverse vocabulary is needed when learners compose an essay of this genre, and when the dictionary aid is given in this situation, the diversity of vocabulary would improve significantly.

Next, the learners involved in this study were evaluated to have low intermediate language proficiency. This means that their linguistic knowledge was limited, and therefore they did not have enough ability to

properly utilize highly sophisticated words referred from a dictionary into their writing. In other words, the more sophisticated words they employed into their writing after referring to a dictionary, the more errors they made, as shown in the results of correlation analysis between lexical sophistication and vocabulary scores in the experimental group. Therefore, in order to avoid errors, the learners tended to choose commonly used words (i.e., less sophisticated words) that were familiar and that were not so troublesome in properly using in their text (Chon, 2008; Hasselgren, 1994), which resulted in decreasing the degree of lexical sophistication in K2 level.

All the findings of this section suggest that further investigation on words looked up from a dictionary is needed to identify to what extent the use of a dictionary gives an impact on students' writing more in detail. This issue, thus, will be presented and discussed in the next section of this chapter.

The Features of Dictionary Look-ups in Genre-based Writing

The third research question was "What are the features of dictionary look-ups in terms of parts of speech and accuracy of use in genre-based writing: narrative and argumentative?" For the investigation, first, classification was carried out based on parts of speech and then each part of speech was counted in narrative and argumentative genres. The results are displayed in Table 6.

TABLE 6
Type of Dictionary Look-ups and Genre

Type of Look-ups	Narrative		Argumentative		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Noun	34	46.6	24	40.0	58	43.6
Verb	13	17.8	18	30.0	31	23.3
Adjective	5	6.8	4	6.7	9	6.8
Adverb	3	4.1	1	1.7	4	3.0
Phrase	15	20.5	13	21.7	28	21.1
Conjunction	3	4.1	0	0	3	2.2
Total	73	100	60	100	133	100

Note. Pearson Chi-Square. Narrative, 10.67 (Sig.= 0.38), and Argumentative, 14.16 (Sig.= 0.08)

According to the table, all dictionary look-ups can be categorized into six parts of speech such as nouns, verbs, adjectives, adverbs, phrases, and conjunctions, and among them, four parts of speech, that is, nouns, verbs, adjectives, and phrases, proved to be mainly used. In total of 133 look-ups, 58 were revealed to be nouns (43.6%), 31 were verbs (23.3%), 9 were adjectives (6.8%), 4 were adverbs (3.0%), 28 were phrases (21.1%), and 3 were conjunction (2.2%). Among them, noticeable differences of frequency of use between genres are shown in nouns and verbs. Nouns were used in narrative writing more, 34 times (46.6%), however, verbs in argumentative, 18 times (30.0%).

This result shows that the use of a dictionary could be differ according to genre features. When learners write narrative essays, they need to employ considerable amount of nouns because narrative genre mainly focuses on telling a story within a specific time frame (Berman & Slobin, 1994). In order to clearly describe particular characters and events in the story, rich vocabulary, especially nouns, is therefore needed. This is the reason why the learners in this study referred to a higher number of nouns when they wrote a narrative essay with dictionary aid. However, when learners write argumentative essays, more verbs have to be used since this genre focuses on discussing or arguing particular concepts or ideas in a persuasive way (Berman & Slobin, 1994). That is, the learners in this study employed a higher number of verbs to effectively argue their opinions and persuade readers.

These assumptions can be supported by the list of verb look-ups detected in each genre. Table 7 illustrates this list.

TABLE 7

Look-up List: Verbs Employed in Narrative and Argumentative Writing

Verbs in narrative writing	Verbs in argumentative writing
Dramatize	Recite
Inhale	Facilitate
Meditate	Assort
Determine	Sense
Develop	Disgust
Decide	Addict
Escape	Claim
Appear	Replace
Absorb	Interrupt
Scatter	Gather
Draft	Protect
Hinder	Emphasize
*Escape	Charge
	Disturb
	Sever
	Connect
	Contact
	Operate

Note. *Escape was used twice in narrative writing

The list shows that in argumentative writing, the learners searched for the verbs like “claim” and “emphasize”, which are related to insisting or expressing certain ideas or opinions. Further, the words like “assort” and “facilitate” were also detected, which are connected to explain abstract reasoning. On the contrary, the verb list in narrative writing shows that verbs related to describing certain events or states such as “appear”, “absorb”, “scatter”, and “draft” were used.

Next, accuracy of dictionary look-up use was examined in terms of genres and parts of speech. The results of accuracy analysis based on genres are displayed in Table 8.

TABLE 8

Accuracy of Dictionary Look-ups in Narrative and Argumentative Writing

Genre	Correct		Incorrect		Total used	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Narrative	32	43.8	41	56.2	73	100
Argumentative	18	30.0	42	70.0	60	100
Total	50	37.6	83	62.4	133	100

The table reports that a total of 133 look-ups were employed during writing and among them, 50 were revealed to be used appropriately whereas 83 inappropriately, designating that 62.4% of the words were wrongly used. In genre based analysis, it was detected that the higher percentage of errors appeared in the argumentative writing (70.0%) than the percentage of errors in narrative (56.2%).

These results can also be explained by the number of verbs used in each genre. As English verb has various forms which are changed according to tense of a sentence or number of a subject, it is not easy for L2 learners, especially the ones in lower language proficiency, to properly employ each verb form after looking up a dictionary in a given sentence under the consideration of tense or number. That is, again, the more verbs learners use in their writing with the help of a dictionary app, the more errors they would make. As shown in the previous results (see Table 6), a higher number of verbs were employed in argumentative writing, and as a result, a higher number of errors were detected in this genre.

Conclusion

The results of the first research question could be taken as evidence supporting East's (2006) study which states using a dictionary during writing does not contribute to increasing the overall text quality. However, in further examination conducted in this study, it appeared that one particular component of writing, vocabulary, was significantly affected by dictionary use in a beneficial way. In other components of writing (e.g., content, organization, grammar, etc.) no apparent impact of dictionary use was detected either positively or negatively.

In genre-based analysis, it was reported that the scores of narrative genre were noticeably higher in two scoring categories, *content* and *communicative achievement*, in a non-dictionary use condition. This indicates that without a dictionary app, argumentative genre tends to be more difficult than narrative for L2 learners. However, the fact that no genre differences were detected in *content* and *communicative achievement* when the learners used a dictionary app says that dictionary use could contribute to reducing difficulties caused by genre differences and enable learners to develop their ideas better.

The results of the second research question show that with a dictionary app, students tended to produce lexically more diverse text by making use of less sophisticated words which were familiar to them. The changes of lexical features proved to be significant in the narrative writing, where the need of diverse vocabulary is considerably high. The results of the third research question also found the occurrence of dictionary look-up errors was affected by the number of verbs used in each genre. Between narrative and argumentative writing, the error occurrence appeared to be noticeable in argumentative where the ratio of verb use was high. This indicates that students have difficulties in properly using verbs looked up from a dictionary in their writing and these difficulties could lead them to make a considerable number of errors when composing an argumentative essay where verbs are highly employed.

The findings of the study suggest some pedagogical implications of dictionary app use in writing classes. First, vocabulary education may be effective if it is combined with dictionary use during writing. Students' vocabulary knowledge capacity is expanded with dictionary aid, which contributes to increasing diversity of vocabulary use. If the increased vocabulary knowledge is processed through a productive task such as writing, it could be retained in their long-term memory more easily (Craik & Lockhart, 1972; Hulstijn & Laufer, 2001). Therefore, guiding students to refer to a dictionary when writing an essay, and giving them opportunities to focus on the words written after dictionary look-up through various class activities is recommended for teachers who aim to improve students' vocabulary knowledge, as well as their writing ability. In addition, it should be noted that the genre relevant to vocabulary education with a dictionary is narrative since students' tendency to employ diverse vocabulary is significant in this genre.

Second, when instruction on language forms is given based on students' own dictionary look-up errors through writing, it can be learned effectively. Students could make a number of errors in the process of employing words searched from a dictionary in their writing and this tendency is highly apparent when they compose an argumentative essay. This says that there exist opportunities for teachers to educate students on several language rules needed to be learned when students compose an argumentative essay with a dictionary app. By having students notice their own errors caused from their lack of grammar knowledge and by guiding them to consider the way to correct these errors, teachers might be able to improve students' knowledge about the rules of language use. Again, as knowledge processed through a productive task such as writing can be effectively retained in students' long-term memory, various rules of language use learned through these tasks could be acquired more easily.

Some limitations of the study are acknowledged. The number of students involved in this study was twenty-one in the dictionary use group and twenty-four in the non-dictionary use group. This means that if a higher number of students participate in further studies, more substantial results could be elicited. Another limitation is gender organization of the participants. This study was conducted targeting students in the college of engineering where males far outnumbered females. As additional recruitment of participants was not an option, the gender ratio could not be controlled and as a result, a noticeably higher

number of male students were involved in this study. Therefore, consideration on gender balance needs to be taken in future research.

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Appendix

The essay prompts used in this study were:

1. Narrative essay

Your professor has asked you to write a story for an international magazine. The story must begin with the following words.

Jane opened a book on the table and saw something in it.

Write your story.

2. Argumentative essay

You have had a class discussion about smart phones. Now your professor has asked you to write an essay, giving your views on the following statement:

There are both advantages and disadvantages to having a smart phone.

Write your essay.