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The effect of the integration of corpora in reading comprehension classrooms on English as a Foreign Language learners’ vocabulary development

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This study used a randomized pretest–posttest control group design to examine the effect of the integration of corpora in general English courses on the students’ vocabulary development. To enhance the learners’ lexical repertoire and thereby improve their reading comprehension, an online corpus-based approach was integrated into 42 hours of reading comprehension classroom instruction. The results of the analysis of covariance (ANCOVA) revealed that the experimental group outperformed the control group on the posttest suggesting that the main effect of corpus integration has been significant. The findings both theoretically and practically provide hints for teachers, educational policy makers, and future researchers.

Keywords: reading comprehension; vocabulary; online language corpora; Iranian EFL learners

Introduction

The importance of vocabulary for reading comprehension

Vocabulary as “the building block of language” (Schmitt, Schmitt, & Clapham, 2001, p. 53) is one of the basic components of language. In reading comprehension, too, one critical prerequisite is to have adequate vocabulary knowledge. No text comprehension is possible, either in one’s native language or in a foreign language, without understanding the text vocabulary (Lauf er, 1997). It has also been consistently demonstrated that reading comprehension is strongly related to vocabulary knowledge, more strongly than to the other components of reading.

Of course scholars do not posit that reading comprehension is solely vocabulary knowledge. In addition, it includes grammatical competence, an understanding of how texts are organized, background knowledge of the subject matter, and other abilities. What scholars unanimously agree upon is that adequate knowledge of words is a prerequisite for effective reading. In their study, Laufer and Sim (1985) determined that the most pressing need of the foreign language learner was vocabulary, then subject matter knowledge, and only lastly syntactic structure. Laufer (1992) then went a step further to ascertain that 55% of word tokens (running
words) were needed to be understood in order to ensure “reasonable” reading comprehension of the text. Moreover, Read (2000) argues that learners whose vocabulary is below a certain threshold level struggle to decode the basic elements of a text, to the extent that they find it hard to develop any higher level understanding of the context.

In a discussion on whether reading is a language problem or reading problem, Alderson (2000) acknowledged that in the early stages of language learning, it is a matter of language which prevents students from comprehending texts and the main components of the language are words which play a pivotal role.

**What and how much vocabulary should be learned?**

Nation and Meara (2002) hold that the answer to this question depends on two factors: the needs of the learners and the usefulness of the vocabulary items. They believe that the high frequency words need to be the first and main vocabulary goal of learners. In addition, it is possible to increase this number by looking at the needs of the learners and making special purpose vocabulary lists. However, learners need to keep on learning low-frequency words incidentally or deliberately in their own time.

If learners wish to be able to read in English, then the vocabulary in the 2000–5000 frequency band could also be explicitly approached. Beyond this band, words occur less frequently, and learners should concentrate on the specific technical vocabulary they need for specific topics, for example, specialized engineering terminology for engineers. Other than this, time is better spent on developing strategies which enable learners to work with unknown lower-frequency vocabulary on their own.

Based on the British national corpus (BNC), Nation (2006) calculated that if 98% coverage of a text is needed for unassisted comprehension, then an 8000–9000 word-family vocabulary is needed for comprehension of a written text and a vocabulary of 6000–7000 for a spoken text. In his study, he provided some figures as to how many words one needs for comprehending different passages. For example, a vocabulary of 8000–9000 is needed to read a novel and newspapers and 6000–7000 to cope with unscripted spoken English. However, these figures are open to debate and cannot be easily established.

Other studies point to lower figures. For example, Milton and Hopkins (2006) report that both the highest level (C2) of the common European framework and Cambridge English proficiency require only about 4500–5000 word families. Word families are groups of words that are sufficiently closely related to each other to form a “family”. Words can be grouped into families in two main ways: form-based word families are those that are similar in form (such as *family – familiar – unfamiliar – familiarity – familiarize*, etc.), whereas meaning-based word families are words whose meanings are related (e.g. *big – little – size*, etc.). Participants in the present study deal with form-based word families which are used as the basis for the discussions throughout the paper.

In addition, Schmitt (in press) argues that examination of the C2 level reveals that 4500–5000 word families would not be sufficient. Therefore, while learners may be able to cope with a smaller vocabulary, 8000–9000 word families seem to be a more realistic target if they wish to read a wide variety of texts without unknown vocabulary being a problem.
Therefore, it seems that learners must learn a very large number of lexical items to be able to function effectively in English. This learning inevitably includes what Corson (1995, p. 14) refers to as the “lexical bar” which can be conceived of learning demanding and unmanageable vocabulary. Learning such a large number of new words is one of the greatest obstacles facing language learners.

Hence, it is not surprising that the vocabulary sizes of learners as reported in most research studies usually fall short of the size requirements reported above. Reports by Kyongho and Nation (1989) on high school graduates in EFL context countries such as Indonesia, Malaysia, and China, for instance, show that these students possess relatively small vocabularies. In addition, Nurweni and Read (1998) showed that on average the Indonesian students had some knowledge of 1226 English words, a figure that falls far short of the 3000–5000 word range that is widely considered the threshold level for independent reading of un-simplified texts.

Teaching vocabulary

The currently favored language teaching paradigm highlights a focus on meaning-based learning, where language features are learned by using them rather than by focusing on them explicitly (Schmitt, 2007). Incidental learning is important for at least two reasons: meeting a word in different contexts expands what is known about it (improving quality of knowledge), and the additional exposures help consolidate it in memory.

However, while it can be argued that this approach may work for building grammar or proficiency in the four skills, Laufer (2005, pp. 223–250) believes that vocabulary requires a different approach which incorporates explicit attention to learning the lexical items themselves. Schmitt (1997), too, holds that noticing and giving attention to language learning generally makes the learning more effective. Also, deliberate learning is more focused and goal directed than incidental learning. Therefore, it is not surprising that most studies have found direct learning to be more effective than implicit instruction.

Overall, we can conclude that in any well-structured vocabulary program there needs to be the proper mix of explicit teaching and activities from which incidental learning can occur (Nation, 2001; Nation & Meara, 2002; Schmitt, 2000). With beginners, it is probably necessary to explicitly teach all words until students have enough vocabulary to start making use of the unknown words they meet in context. But beyond this most basic level, incidental learning should be structured into the program in a principled way.

Nation and Meara (2002) suggest that teachers focus on strategies that help learners do this incidental or deliberate learning. They go on to suggest the importance of having a well-thought-out plan for helping learners with English vocabulary. The basis for this plan is an awareness of the distinction between high-frequency and low-frequency words, and of the strands and strategies which are the means of dealing with these words.

The use of computers and online corpora in language classroom

Yunus (2007, p. 80) holds that digital technologies known as IT/ICT have been reshaping many aspects of society since inception in the 1970s, especially digital highways such as World Wide Web. These technologies permeate every aspect of
society as they are making headway in schools and education. He further elaborates on the new possibilities that using technology provides for the modernization of the teaching–learning process. Technology enhances the quality of education to meet the requirements set by society. In fact, the use of information technology can help teachers and students meet the challenges of the future. In addition, according to Pennington (2004), the use of computer for classroom purposes changes the balance of power in society with increased access to networks and databases.

Warschauer (2002) believes that language learning has evolved from achieving the end product of grammatical competence to other terms of communicative competence. He refers to the emerging concept of “electronic literacies” including computer literacy (comfort in using computers), information literacy (to find and evaluate online information critically), multimedia literacy (to produce and interpret various documents such as texts, images, and sounds), and computer mediated communication literacy (to know about the methods of online interaction) in order to incorporate technology enhanced communication in the English language curriculum. As Ayres (2002) suggests, the combination of text, audio, and video input makes multimedia an excellent format for language learning materials.

Most, if not all, educationalists such as Paulsen (2001) believe that computer assisted and web enhanced language learning are coming of age. Zapata (2004) refers to the development of computer assisted language learning (CALL) as a “true curricular innovation”. There seems to be a considerable difference between what is actually done in CALL and what could be done. The reasons for this difference are many including restrictions from the technology itself and human resistance to its use (Leffa, 2009). In fact, the acceptance of technology is not an overnight process, rather many researchers and experts believe that is a slow process which has been maturing since 1988 (Kennedy & Levy, 2009; Liaw, Huang, and Chen, 2007).

Current trends demonstrate that technology enhanced language learning is enabling a revitalized and more effective pedagogy but the question is how to harness these technologies and guide our students in their use? Since data-driven learning is a methodology which focuses on the form of the language, using online corpora and concordance programs might be a helpful strategy in bringing about this individualistic approach toward vocabulary learning proposed by scholars and for learners to better deal with the lexical items in the textbook.

A corpus is a large and structured set of texts (written, transcribed speech or both) that is stored in electronic form and analyzed with the help of computer software programs. Corpus linguistics, then, uses large collections of spoken and/or written natural texts (corpora) that are stored on computers.

Biber, Conrad and Reppen (1998) mention four features that are seen as characteristic of corpus-based analyses of language:

(1) It is empirical, analyzing the actual patterns of use in natural texts.
(2) It utilizes a large and principled collection of natural texts, known as a “corpus”, as the basis for analysis.
(3) It makes extensive use of computers for analysis, using both automatic and interactive techniques.
(4) It depends on both quantitative and qualitative analytical techniques.

As Reppen and Simpson (2002) suggest, the use of concordancing tasks in the classroom is a controversial issue. It is strongly advocated by those who favor an
inductive or data-driven approach to learning derived from the work of Johns (1994) which basically deals with the application of tools (concordancers) and techniques from corpus linguistics in the service of language learning (Payne, 2008), but criticized by others who argue that it is difficult to guide students appropriately and efficiently in the analysis of vast numbers of linguistic examples (Cook, 1998).

Most of the studies which have explored the effectiveness of corpus-based techniques in the language classroom, find concordancing to be effective for language learning. Gilmore (2009) argues that the participants in his study were able to significantly improve the naturalness of their writing after only a 90-minute training session and that the majority of students found these online resources beneficial. Other studies such as Gaskell and Cobb (2004) and Todd (2001) find concordance evidence to be useful in helping learners to make corrections in their writing (see Boulton, 2010 for a review).

In another study, Cobb (1997) reports consistent gains by students using concordancing for vocabulary learning. He found improvements in both definitional knowledge and transfer of comprehension to new texts for students who used a concordance compared to those who solely used word lists and dictionaries. In Hadley’s (2001) study, by using this teaching skill, he found his students not only developed their lexical knowledge but improved their writing skill.

There are, however, a number of caveats mentioned by scholars for using corpora in the classroom (see O’Keefe, McCarthy, & Carter, 2007). One issue is that of the technology. In order to use and benefit from corpora, students should be trained in a number of skills: to use the computer, to handle data, to observe and hypothesize from data and assess their hypotheses. In addition using large scale corpora may be time consuming as classroom activities so that when students are faced with an overwhelming amount of data, they may be confused and not participate in the activities. On the other hand, Gavioli (2002) points out some issues in working with small corpora. She mentions that her students tended to overgeneralize language features of a corpus of medical texts to other unrelated domains which was apparently misleading.

Objective of the study

Corpus studies are becoming a common theme for many studies and they can still be the core of further research. The present study attempts to examine the use of corpora in developing EFL learners’ vocabulary knowledge. The following research hypothesis was the backbone of the present study.

- Training students to use online language corpora autonomously in dealing with vocabulary items has a positive effect on their lexical knowledge.

The study

Participants

A total of 70 students took part in this study. They came from two intact classes randomly selected from among over 50 classes of general English in Tehran’s Shahid Beheshti University. The participants were homogeneous in terms of their age, major and English learning backgrounds. They were at the age of 18–20, with an average of 18.4. However, both classes were female dominated which is the norm in most
Iranian Universities. The classes were general English classes consisting of first year students. All participants were majoring in mathematics and had been offered the course as a compulsory one in the first year of their higher education. Their learning backgrounds were similar due to the fact that they had studied English solely within the educational system of Iran: none of them had the experience of studying or living in English-speaking countries. The two classes were randomly assigned to one experimental (group A) and one control group (group B).

**Teaching environment**
The textbook was an English reader that was approved and recommended by the English department in Shahid Beheshti University (Anani Sarab, 2010). It is a book consisting of reading texts followed by vocabulary and grammar exercises. The texts encompass a wide range of interesting everyday topics and aim at expanding the student’s vocabulary and grammar knowledge and thereby improving their reading skills. Items which are perceived to be new to the students are bold faced within the reading texts and a glossary for new words and expressions are provided at the end of each chapter. The activities are mostly in the form of fill in the blanks and multiple choice items requiring the students to apply the language forms presented in the lesson in order to complete the sentences or texts. (A sample activity concerning vocabulary is provided in Appendix 2). The classes were held twice a week (14 weeks overall) with one and a half hour for each session.

**Instruments**
Three types of instruments were used to collect the data. One of them was a reading comprehension test extracted from the international English language testing system (IELTS) which is one of the world’s leading tests of English for higher education. It constitutes test tasks aimed to assess the four language skills. The reading component is used in this study to ascertain the homogeneity of the two groups in terms of their reading comprehension. The reading module of the test consisted of three passages and 38 questions. Examinees were given 1 hour to go through the passages and provide answers on an answer sheet.

Table 1 below shows the structure of the reading module of IELTS exam. The first passage with 11 questions was about a “volcanic eruption”. The second passage’s topic was “people and organizations” followed by 14 questions while the last passage, which had 13 questions, was about “the roll film revolution”.

The second instrument was a vocabulary test package (a pretest and a posttest) each containing 30 multiple-choice items on new words. Multiple-choice vocabulary exercises are regularly used in the students’ textbooks in the present study and are a familiar test format for Iranian language learners. Therefore, they are used as the main data collection instrument to reduce the effect of test method on the results of the study. To develop these tests, a table of specifications indicating the lexical considerations of the course (practice reading, Anani Sarab, 2010) was developed. Authentic sentences containing the specified vocabulary were selected from the corpora to be included in the test. Hence, two parallel 30-item multiple-choice tests were finally developed (one for pretest and one for posttest).

In order to pilot the tests, 76 student’s enrolled in general English courses in Shahid Beheshti University took the tests at the beginning of the educational semester. As a
result of item analysis (item facility, discrimination, and choice distribution), some items were revised. Moreover, the reliability of the pretest was 0.76 and that of the posttest was 0.68 as estimated by Spearman–Brown Prophecy formula. (Sample items from the vocabulary test package can be found in Appendix 1).

In addition, students used a diary to record from the online language corpora, authentic examples containing the second language lexical items they noticed in the textbook as well as their impressions and perceptions about using and working with the online language corpora. Therefore, the diary was required to specifically address the students’ experience of working with the online language corpora, including samples of language they could make sense of and their perceptions of what is enjoyable, easy or difficult about the experience.

**Procedures**

Both groups took the pretest at the beginning of the first educational semester of the year 2010, during a regularly scheduled general English course. Before the test was administered, participants were provided with an explanation of the purpose of the study and assured that the results would have no influence on the course outcomes.

In the second phase, the two groups were taught the course for 28 sessions (42 hours). However, only the experimental group received the treatment which began by a training session in which the students were introduced to the concept of corpora and how they can use them in dealing with vocabulary items. Two online corpora (the BNC: [http://www.natcorp.ox.ac.uk/](http://www.natcorp.ox.ac.uk/) and the COBUILD corpus: [http://www.collins.co.uk/corpus/corpussearch.aspex/](http://www.collins.co.uk/corpus/corpussearch.aspex/)) were used by the instructor in the training session of the course to search for and find information on a few lexical items as a sample for the students to follow later.

Every week in the first class the students were asked to refer to some of the vocabulary items bold faced in the reading texts of their practice book and test them out using a computer concordance (BNC or COBUILD) for the next session. The students, therefore, were required to choose the items perceived by the textbook author to be new for them and bold faced to draw their attention. Then in line with the awareness raising issues, the students were supposed to consult the two online language corpora in their own time and choose several examples that were meaningful to them and write down to keep those examples in their language diaries (information regarding some of these items can be found in Appendix 3).

The students were called on to hypothesize on how to express something in a natural way by using the corpora. In this process, the students were required to keep
in mind certain awareness raising issues in order to identify any regularity in the data. Form based word families (groups of words that are sufficiently closely related to each other to form a “family”) and collocations (words that commonly occur in the vicinity of a target word with greater probability than random chance) were especially emphasized (see Appendix 2). In addition, the students were expected to take into account the part of speech of the item and discover patterns of use for each lexical item especially with regard to synonyms.

The purpose was to engage learners in exploring and noticing the language contexts; during the process of writing down those examples, learners were expected to undergo a cognitive process of digesting the language input. During the process of writing down several authentic examples of the lexical or grammatical items which were the focus of study, it was hoped that the students would become aware of certain regularities in the text – a cognitive process which is called consciousness-raising (Rutherford and Smith 1985).

In the next class of the week, the students attempted to manipulate the material in the course book vocabulary activities (see Appendix 2). Here, while focusing on a particular lexical item, they would share their diaries with the whole class and discuss their findings with the teacher and the other students. In particular, they read aloud the sentences related to lexical items, trying to demonstrate their findings about their use, collocation patterns, and word families to the whole class. Based on their analysis of how the sentences are used, they found themselves in a better position to do the textbook activities. The students’ performances were primarily assessed by the students themselves making judgments about aspects of their own learning when asked to discuss the new information they had acquired about the lexical items (self assessment) (McNamara, 2000). In addition their classmates were supposed to discuss the quality and relevance of what their friends had found (peer assessment) (Richards & Schmidt, 2002). Finally, the teacher made comments on the formal issues and the quality of the information gathered.

In the fourth phase, both groups were provided with the posttest at the end of the semester and during the day of the final examination. Later, the collected data – the scores obtained from the pretest and posttest administrations – were entered into SPSS and analyzed using analysis of covariance (ANCOVA).

Results
The present study investigated the effectiveness of concordancing in students’ vocabulary development. This section presents the results of the study.

Table 2 presents the two groups in terms of number and gender. The number of participants in each group is 35. However, both classes were female dominated which is the norm in most Iranian Universities.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Sex</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>35</td>
<td>M</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>35</td>
<td>M</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>22</td>
</tr>
</tbody>
</table>
Later, the two groups were administered a test on reading comprehension (IELTS test of reading comprehension) to ascertain their homogeneity. Group A had a mean score of 29.29 out of 38 and group B had the mean score of 28.79 out of 38 (Table 3).

An independent $t$-Test was run between the mean scores of the two groups. According to the Levene’s test result (with an alpha level of 0.05), there was no significant difference between the two intermediate groups ($t = 0.98$) which along with the randomization showed that both of the groups (group A and group B) were homogeneous (Table 4).

Table 5 describes the two groups’ achievement regarding the course in the pretest. The experimental group’s mean (12.17 out of 30) and the standard deviation (2.79) is a bit different from those of the control group (11.91 and 2.84, respectively).

The two groups’ achievement in the posttest is shown in Table 6. As the results show, the experimental group has outperformed the control group in the posttest with the mean and standard deviation of 22.97 and 3.22, respectively compared with those (17.77 and 3.37) of the control group.

Before conducting ANCOVA, the homogeneity of regression (slope) assumption should first be tested. The test evaluates the interaction between the covariate (pretest) and the factor (the two groups or two instruction types) in the prediction of the dependent variable (posttest). A significant interaction suggests that the differences on the posttest among the groups vary as a function of the pretest. Table 7 summarizes the test results.

As the table shows, the interaction between the two groups and the pretest is not significant ($F(1, 66) = 0.508, p = 0.479$. that is $p (0.479) > z (0.01)$]. Since the interaction is not significant, the results from ANCOVA will be meaningful and we can proceed with our analysis.

In addition to Levene’s test of equality of error variances, we see that the underlying assumption of homogeneity of variance for ANCOVA has been met [$F(1, 68) = 3.432, p = 0.068. that is $p (0.068) > z (0.01)$]. These results are shown in Table 8.

Based on the data in Table 9, the research hypothesis is accepted [$F(1, 67) = 125.935, p = 0$ that is $p < 0.01$]. In other words, the effect of the between subject factor (groups with different instruction types) on the dependent variable (posttest of vocabulary knowledge) is significant.

In order to ascertain what possible benefits and/or reservations students might perceive from having the chance to use online language corpora in their own time, student diaries in the experimental group were regularly analyzed and recorded. At the end of the class, the diaries were collected, then during the week comments were added before returning the diaries at the beginning of the next lesson.

In line with the findings of previous research conducted on the use of language corpora for instructional purposes, the analysis of diaries revealed both positive and

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Std. error mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC</td>
<td>35</td>
<td>29.2903</td>
<td>2.74704</td>
<td>0.49338</td>
</tr>
<tr>
<td>Control</td>
<td>35</td>
<td>28.7941</td>
<td>3.26394</td>
<td>0.55976</td>
</tr>
</tbody>
</table>
Table 4. Independent samples test to assess the homogeneity of the two groups.

<table>
<thead>
<tr>
<th></th>
<th>Levene's test for equality of variances</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$F$</td>
<td>Sig.</td>
<td>$t$</td>
<td>df</td>
<td>Sig. (2-tailed)</td>
<td>Mean difference</td>
</tr>
<tr>
<td>RC</td>
<td>0.835</td>
<td>0.364</td>
<td>0.989</td>
<td>63</td>
<td>0.051</td>
<td>0.49620</td>
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<tr>
<td>Equal variances assumed</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td></td>
<td>1.005</td>
<td>62.619</td>
<td>0.049</td>
<td>0.49620</td>
<td>0.74616</td>
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<tr>
<td>95% Confidence interval of the difference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

$t$-test for equality of means.
Table 5. Descriptive statistics (pretest).

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-experimental</td>
<td>35</td>
<td>8.00</td>
<td>21.00</td>
<td>12.1714</td>
<td>2.79164</td>
</tr>
<tr>
<td>Pre-control</td>
<td>35</td>
<td>7.00</td>
<td>22.00</td>
<td>11.9143</td>
<td>2.84265</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Descriptive statistics (posttest).

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-experimental</td>
<td>35</td>
<td>16.00</td>
<td>29.00</td>
<td>22.9714</td>
<td>3.22204</td>
</tr>
<tr>
<td>Post-control</td>
<td>35</td>
<td>12.00</td>
<td>27.00</td>
<td>17.7714</td>
<td>3.37888</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Tests of between-subjects effects.

Dependent variable: post-test

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected model</td>
<td>988.518</td>
<td>3</td>
<td>329.506</td>
<td>96.302</td>
<td>0.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>263.778</td>
<td>1</td>
<td>263.778</td>
<td>77.092</td>
<td>0.000</td>
</tr>
<tr>
<td>Groups</td>
<td>35.211</td>
<td>1</td>
<td>35.211</td>
<td>10.291</td>
<td>0.002</td>
</tr>
<tr>
<td>Pretest</td>
<td>512.332</td>
<td>1</td>
<td>512.332</td>
<td>149.735</td>
<td>0.000</td>
</tr>
<tr>
<td>Groups × pretest</td>
<td>1.737</td>
<td>1</td>
<td>1.737</td>
<td>0.508</td>
<td>0.479</td>
</tr>
<tr>
<td>Error</td>
<td>225.825</td>
<td>66</td>
<td>3.422</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30,264.000</td>
<td>70</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Corrected total</td>
<td>1214.343</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *R squared = 0.814 (adjusted R squared = 0.806).

Table 8. Levene’s test of equality of error variances.

<table>
<thead>
<tr>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.432</td>
<td>1</td>
<td>68</td>
<td>0.068</td>
</tr>
</tbody>
</table>

Table 9. Tests of between-subjects effects.

Dependent variable: posttest

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected model</td>
<td>986.781</td>
<td>2</td>
<td>493.391</td>
<td>145.267</td>
<td>0.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>262.785</td>
<td>1</td>
<td>262.785</td>
<td>77.371</td>
<td>0.000</td>
</tr>
<tr>
<td>Pretest</td>
<td>513.581</td>
<td>1</td>
<td>513.581</td>
<td>151.212</td>
<td>0.000</td>
</tr>
<tr>
<td>groups</td>
<td>427.731</td>
<td>1</td>
<td>427.731</td>
<td>125.935</td>
<td>0.000</td>
</tr>
<tr>
<td>Error</td>
<td>227.561</td>
<td>67</td>
<td>3.396</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30264.000</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected total</td>
<td>1214.343</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *R squared = 0.813 (adjusted R squared = 0.807).
negative attitudes toward the use of corpora. There were enjoyment and high motivation among students, as in the following quotation:

I feel excited about this activity. I know I am good at English and I should do my best to find the best collocations and the best examples for words to discuss in class. There are so many beautiful sentences I could never think of and I should select the best.

At the same time concern ranged among the students from the workload imposed to the anxiety in dealing with technology and large amounts of data:

Today I was scared not being able to access BNC because of my low internet speed. But now that I am actually using it I am even more concerned. It is very frustrating to make sense of some of these. It takes a lot of my time and energy to find good examples and finally I am not happy with my findings. I want to be able to comprehend at least most of the sentences here but I think I should work harder to improve my English first.

However, as the sessions progressed, students began expressing fewer concerns about the whole experience. Students even began to write entries in their diaries in response to events in the classroom while discussing their findings with their peers and submitted them before the class had finished.

Discussion and conclusion
This study used a randomized pretest–posttest control group design to examine the effect of the integration of corpora in general English courses on the students’ vocabulary development. The experimental group outperformed the control group on the posttest suggesting that the main effect of corpus integration has been significant. This finding is congruent with those of some other studies (e.g. Cobb, 1997; Gaskell & Cobb, 2004; Gilmore, 2009; Hadley, 2001; Todd, 2001) which also found concordancing to be effective for language learning.

Theoretically, as Conrad (2005) claims, there are a variety of reasons for using corpora in the classroom. The present study confirmed the effectiveness of highlighting the vocabulary in context and then allowing the students to use corpora to hypothesize on how to make natural language which is in line with what Johns (1994) refers to as data driven learning. In practice, too, the findings of this study have implications for both teachers and students in drawing their attention to the potential of online language corpora to be used for classroom purposes.

What was even more interesting was the positive feedback given by students in their diaries on using corpora. Most students believed that online corpora were very useful in helping them broaden their understandings of the new lexical items. They felt that solely using word lists and dictionaries, as they did before, did not provide them with information on how words are used in real situations. The main reasons that students cited for their perceptions on the usefulness of corpora were the autonomy corpora allowed. They also referred to the authority enabled by the opportunity that they have available to review the corpora, to decide what they would like teachers to see in their language diaries. In addition, they felt more motivated when working with corpus data that presented real English examples. Of course using this approach seemed more appealing to some of the learners than the others. These students may be those who are more analytic, logical, visually oriented, and less tolerant of ambiguity (Boulton, 2009; Chan & Liou, 2005; Turnbull & Burston, 1998).
Based on the findings of the present study, educational decision makers are recommended to provide their instructors with in-service training sessions dealing with corpus linguistics. In addition, material developers can benefit from corpus data to improve the content of their products especially with regard to vocabulary. Meanwhile, we recommend the policy makers give more credit to corpus-based approaches toward language learning and teaching.

Acknowledgments

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References


**Appendix 1. Sample items of vocabulary test package**

1. We really expected to have fun at the cinema but the movie was a great……… to us.
   a. blast  b. disappointment  c. coincidence  d. waste
2. They were certain that they will finally……… over the enemy.
   a. suggest  b. harness  c. penetrate  d. triumph
3. There was a considerable overseas sale……… particularly in Canada where there were lots of major retailers going bankrupt.
   a. decline  b. morale  c. quandary  d. breakthrough
4. There are still many experts……… about just how much influence a volcanic explosion can have on the weather.
   a. striking  b. stable  c. skeptical  d. nagging
5. Put on a plate and arrange the tomato on top……… some lemon juice and grind some black pepper onto the salad.
   a. squeeze  b. harness  c. boil down  d. execute
6. The insect discharges a very hot fluid from a special……… at potential predators.
   a. ingredient  b. apnea  c. gadget  d. gland
7. Disabled people will be able to use a hand held transmitter which……… an alarm to alert staff that there is someone outside who requires help.
   a. refurbishes  b. fabricates  c. tickles  d. triggers
8. The data was stamped……… on his memory calendar. He could never forget that.
   a. indelibly  b. rashly  c. allegedly  d. strikingly

**Appendix 2. Textbook activities**

Activity from unit 1, page 7:

Words that are often used together are called collocations. “Commit a crime” is a typical collocation in English. The following are the collocations used in the text along with some alternative ones made out of the key words used in each collocation.

- Shed light; Shed leaves; Shed skin; Shed tears
- Alleged comedy; alleged crime; alleged victim
- Win an award; win a contract; win people’s hearts and minds
- Thanks to; according to; due to

Use the above collocations in the following sentences.

1. The company has……… the contract to build a new power plant outside the city.
2. She has been absent from work……… illness.
(3) Recent research has........ on the causes of disease.
(4) The........ victim made the complaint at a police station in Tehran.
(5) The media’s greatest challenge is to........ the hearts and minds of people.
(6) Some ski resorts opened early this year........ a late October snow storm.
(7) She had not........ a single tear in the funeral.
(8) ........ to one study, 60% of women in India are widows.

Appendix 3. Sample of the students’ findings:

(1) Word families:

Convent

1260 The convent was in the protection of St Sophia and the church was dedicated to her, but changed its dedication when the building was taken over by the nuns of the Salesiane della Visitazione order.

403 When the early, possibly wooden, convent of St Peter in Chichester was replaced in 1075 by a college of secular priests a new church became essential, if only to reinforce the image of episcopal authority.

1217 ‘And a huge contribution to the convent building fund for the new chapel to thank the nuns for doing the needful.’

(2) Collocations

Shed

467 Their reaction should shed some light on the band’s self-confidence.

495 Neither was Noel Coward, and, despite the multitude of other differences between us, that shared fact persists and continues to inform, shape and intensify my love of Brief Encounter and the tears it always makes me shed.

1616 Richard Body has made a brave attempt to shed the mythology and propaganda, and to expose farming objectives to public debate.

479 All but two of them shed weight.