Online study of frequency list vocabulary with the WordChamp website

John Spiri
Tokyo University of Agriculture and Technology

ABSTRACT

The intentional study of vocabulary is an effective way for learners to increase their vocabulary in the target language. Word frequency lists help learners determine the most useful words to study. In order to systematically study vocabulary, learners may first take a test to determine their vocabulary knowledge, then drill the appropriate words. However, to date, classroom teachers and researchers have focused on traditional methods of intentional study, i.e., non-computer. The worldwide web offers numerous ways to help students study systematically by providing various vocabulary level tests, word frequency lists, and opportunities for language learners to study frequency word vocabulary intentionally. A preliminary study checked the effectiveness and viability of WordChamp study in Japanese university English Communication courses, then a follow-up study compared the usefulness of WordChamp drilling with paper study of frequency word vocabulary. Finally, the way each method was viewed by learners, evidenced by an attitudinal survey, was noted.

KEYWORDS: *vocabulary, frequency, CALL, WordChamp*

Introduction: Corpora and word frequency lists

A corpus, which Cambridge (2006) defines simply as "a large collection of samples of a language held on a computer," actually existed before the electronic age. In 1953, Michael West created the General Service List (GSL), based on text published between 1938 and 1949, and compiled a ranked list of the most useful English words for non-native speakers to study. Eight years later, the compilation of the Brown Corpus, which was based on one million words of printed American English, ushered in the age of electronic corpus-based linguistic research (Horváth, 1999, p. 39). Word frequency lists, the focus of this paper, are built from corpora.

While a great number of corpora presently exist from a variety of sources, the British National Corpus (BNC) is one of the most comprehensive and most utilized for vocabulary research. The BNC contains 100 million samples of both written and spoken language; 75% of the written texts were chosen from informative writings, i.e., fields of applied sciences, arts, finance, while 25% of the written texts were imaginative, that is, literary and creative works (Leech et. al., 2001, p. 1). Accordingly, a word frequency list of the BNC is a useful tool for researchers of English, in particular British English. As with other word frequency lists, the first 2,000 words on the BNC are considered useful for general language

purposes, such as reading simple texts and for everyday conversations.

In 2000, Avril Coxhead of Massey University created Academic Word Lists (AWL) which begin after the 2,000th word on the BNC. In particular, these academic words lists, which contain 570 word families, are meant for students aiming to study at an English speaking tertiary institution.

These frequency lists, and many others, are available online (see Appendix A) and can be utilized by material writers, researchers, and students aiming to drill the most useful words. As explained in the next section, word frequency lists are the foundation on which intentional study of vocabulary lie. Thus, this study utilized frequency list vocabulary to compare online study using WordChamp with vocabulary study on paper.

Intentional study of vocabulary: Some issues

Intentional learning of vocabulary, as opposed to incidental learning, involves direct explanation by an instructor, learner awareness and acquisition of vocabulary learning strategies, and drilling of individual words by learners. Groot (2000, p. 61) notes that "[i]ncidental acquisition of these words (the thousands of high frequency words) is only possible to a point, because they do not occur often enough in the foreign language learning material." To address this issue, many researchers have pointed out the usefulness of intentional learning of vocabulary (e.g., Laufer, 2005; Hunt & Beglar, 1998; Langenberg, 2000; Nation, 2001). Still, learners have to make decisions about which words are most useful to study because it is not practical for a learner to attempt to learn every unknown word encountered. Word frequency lists, which rank words based on how often they appear in writing or speaking, give teachers and learners an idea of the most useful vocabulary to study. For example, learners who are aware of their vocabulary level will know which graded readers are most appropriate for them to read, as well as which words to drill. Similarly, an awareness of learners' levels informs teachers for material selection and about pedagogical concerns such as *when* to pre-teach vocabulary. In particular, there are advantages to focusing on studying the most common 2,000 words in English.

Studies show that knowing the most common 2,000 word families (all the forms of a given word) allows readers to comprehend approximately 80% of the average novel or approximately 83% of the average newspaper article (Nation, 2007; Nation & Waring, 1997). Even more encouraging is the fact that knowledge of the first 2,000 word families gives learners coverage (knowledge of the vocabulary of a spoken or written text) of approximately 96% of informal spoken language (Schonell, Meddleton, & Shaw, 1956, cited in Nation & Waring, 1997). Nation & Waring also note that knowledge of just 2,600 word families would give learners coverage of 96% of the average novel for teenagers. Knowledge of the most common 2,000 words has obvious advantages to language learners.

At the same time, knowledge of the most common 2,000 words is ultimately insufficient for language learners aiming for fluency. For example, some researchers contend that to comprehend just 70% of an authentic nonfiction text it will take knowledge of as many as 5,000 words (Laufer, Meara, & Nation, p. 3). In order to

achieve sufficient comprehension, learners need far more than 80% coverage (a percentage which amounts to not knowing one out of every five words). Nation (2007) estimates the level of coverage needed for reasonable comprehension of a given text is actually 95% (Mikulecky, 2007; Nation, 2007). Similarly, Mikulecky (2007) indicates that present-day vocabulary researchers such as Laufer & Nation have confirmed estimates made by Betts in 1946, described below.

- 99% coverage is for independent, enjoyable reading.
- 98%-95% coverage calls for some instructional support.
- Below 95% coverage is inadequate and leads to learner frustration.

After mastering the 2,000 most common words of English, a next step for methodical learners would be learning vocabulary from the "academic word lists" which on Avril Coxhead of Massey University's lists start at "Sublist 1 Families," or word family number 2,001. Academic Word lists can enable students to build on their vocabulary knowledge of the high frequency words (the most common 2,000). Students who are considering studying outside their own countries, for example, would find these words particularly useful.

As it has been shown that intentional vocabulary study via paper lists and vocabulary notebooks is an effective way to learn new words, the focus of this research is to ascertain whether intentional study by computer, specifically WordChamp, is equally or more effective than paper study, and whether it is perceived as more or less enjoyable and effective to students.

Vocabulary learning principles in online study of frequency words

Researchers have articulated numerous principles for learners and teachers to consider in regard to vocabulary acquisition. In one paper alone, Laufer, Meara, & Nation (2005) each wrote ten "best ideas for teaching vocabulary" for a total of 30. Some researchers emphasize that learners will only recall and truly learn a word after encountering it numerous times (Waring, 2001; Nation, 1990). Similarly, Ledbury (2000, p. 1) notes that "The act of recalling a word makes it more likely that a learner will recall it again later". In that sense, whether a learner who drills vocabulary online thoroughly learns the word or not does not matter as much as the exposure to the word. Each exposure is a step of the learning process, as Massaro, Bosseler, & Light (2003) explain: "Knowing a word is not an all-or-none proposition" (p. 1). Ledbury also notes that "words need to be recycled to be learned." The nature of high frequency words means that they will be encountered more often than lower frequency words, which should satisfy the principle of recycling.

The worldwide web provides numerous organized lists and makes them readily available to learners regardless of the length, which is a huge advantage over paper copies. In addition, websites can be hyperlinked, that is, words can be clicked to receive further explanation, examples, or definitions. These same features make vocabulary drills more attractive online. Scores can be immediately tabulated, and with some websites like wordchamp.com described below, learner time spent studying and quiz results can be tracked and put into graph form. These are powerful features for learners, teachers, and researchers.

Study with word lists

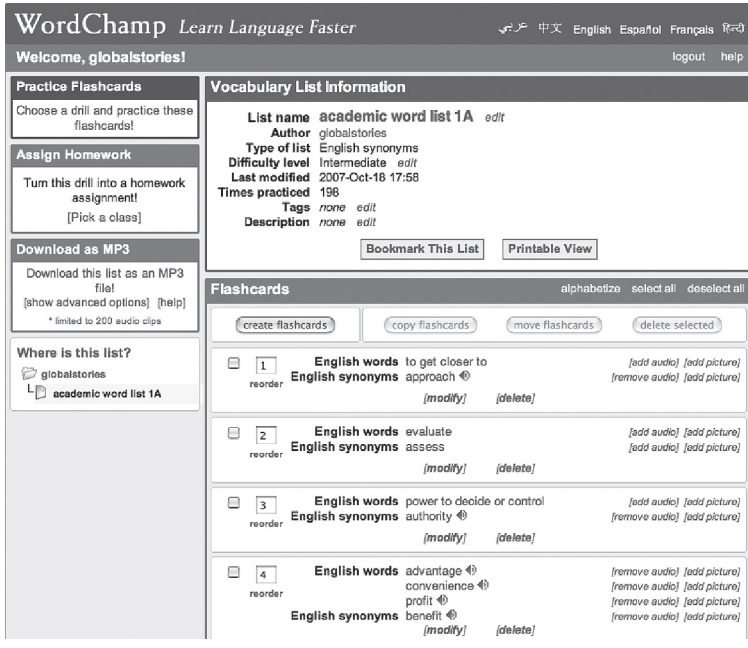
It is not always readily apparent to learners and teachers exactly how to best utilize word lists. Certainly, a combination of awareness of words and their relative usefulness (via word frequency lists) and vocabulary learning strategies will give learners the tools for systematic study of the target language. Given the effectiveness of intentional study of vocabulary and the certainty that words on frequency lists are useful, drilling the words should be an effective language acquisition strategy. The worldwide web is a very powerful vocabulary learning resource because of its wealth of materials, its universal availability (to everyone with a computer with internet connection), the fact that it can give learners immediate feedback automatically, and its application with independent language learners. This paper will now describe the website that was utilized for systematic study of vocabulary in this study, WordChamp (WC), and report and discuss the results of a preliminary and follow-up study of its effectiveness.

Rationale for choosing the WordChamp website

WordChamp is a free website offering numerous drill options for language learners to study vocabulary. Users, after creating a user name and password (free), create their own vocabulary lists for drilling in virtually any language (see Figure 1).

My interest in utilizing WC for Japanese university students' English acquisition started with my own extensive use of the website's vocabulary drilling

Figure 1
A user-created vocabulary list for drilling on WordChamp



functions. Over the course of two years, I created WC flashcards of *kanji* (Chinese characters) based on the level that they are taught in Japanese schools. The WC flashcards I created range from "kanji first grade" through "kanji sixth grade 2" (grades 5 and 6 were separated into two groups to keep each group around 125 words), and on through "kanji gen (general) use 2. While the lower levels ("kanji first grade") are generally easier than latter levels, the level of difficulty is somewhat mixed due to the fact that a low level (and hence simple) radical could be used to create a somewhat difficult kanji, even in the lower levels. Furthermore, the flashcards created were personalized to serve my language learning needs.

After choosing the desired group of flashcards to study, the "drill" function allows Japanese language learners to view a kanji and type in the *hiragana* (Japanese phonetic script) for that word. When the hiragana reading is incorrect, learners can choose either "OK" or "override". The former accepts the mistake, which causes that kanji to remain with the flashcards, in this case to be studied for at least two more tries. "Override," on the other hand, will eliminate that word from the group of flashcards for that study session. All flashcards are presented to the learner in random order. This is a key feature which is difficult to duplicate with paper study. To date, I have created 2,208 Japanese flashcards, taken 210 drills, and practiced 17,486 words, statistics readily available on the WC website. My informal observations are that this is a very effective and even enjoyable study method, but for maximum effectiveness, the kanji must be encountered outside the lists. It was my conviction that such study would work equally well for learners of English, which motivated me to conduct the research described in this paper.

In addition, WC has received positive reviews as an educational, and vocabulary-learning online resource. Kilickaya (2007) writes that WC is "rich" in terms of "the content, materials, vocabulary lists and the facilities provided to the learners and teachers of any language. The access to over 127,000 recordings of native speakers, the database currently holding 2,494,798 flashcards in 112 languages and "Web Reader" is really fascinating" (p. 298-299).

Japanese university students, the focus of this study, can create either English-Japanese or English-English lists. These lists, like all lists created on WC, are then available to all users of WC. However, for expediency, I created all the English-English flashcards that the students drilled for this study. After that, WC classes were set up for students to join after inputting a password (which WC generated and I provided them). The WC classes allowed students to access the drills with a minimum of time spent learning to navigate the website. The WC classes also give the instructor access to student related statistics such as the days they studied, the amount of time they studied, and the ratio of correct to incorrect answers they submitted while drilling.

For the word lists I created, four English-English drills are available. Students may test all drilling methods, which include audio. However, the lists were designed to be studied by choosing the "Synonyms" drill.

If students do not review the list beforehand, guessing the precise English word from the synonym or definition (during the first drilling) is indeed difficult (even for native speakers). Thus, the teacher can provide a word list beforehand (which I did). Conversely, even with no list, flashcards answered incorrectly

display the synonym/definition and then can be returned to the deck (again, unless the user chooses "override") for subsequent study (see Figure 2).

As mentioned above, the WC website also allows educators to create cyber classrooms where assignments can be assigned and monitored (see Figure 3).

Figure 2
A WordChamp synonyms drill

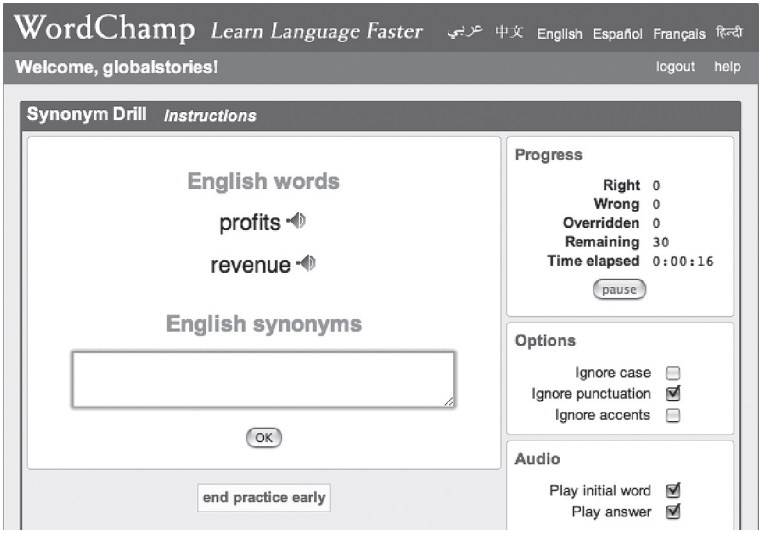
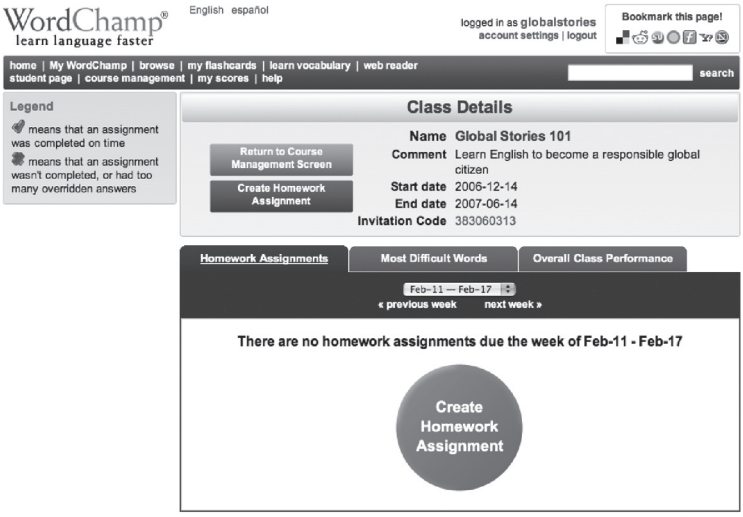


Figure 3
A WordChamp cyber classroom (teacher's display)



Preliminary research of students drilling academic words on WordChamp

The following research was conducted on first and second year students at a university of technology in Japan to determine whether online vocabulary study with WC can be effectively incorporated into a university English Communication course which does not regularly meet in the computer room, and also to determine to what extent the length of time students study WC will result in higher quiz scores.

Procedures

1. A pretest of 60 words from the first band of academic words (2,000-2,060) was administered. Students answered "yes I know it," "I think I know it," and "No, I don't know it." This was used to determine whether students would drill at the 1,000, 2,000, or academic word level.
2. Half the students in each of three classes were assigned to study the first 30 words from the Academic Word List (AWL) using WC; the other half studied the second 30 AWL words on a different WC page. Students were given lists of words on their list, and were told to, while doing the Eng-Eng WC drill, look up words that they didn't fully understand in a dictionary.
3. With an in-class internet connection and projector, I demonstrated how to use WC.
4. After four weeks, all students were given a quiz consisting of 20 of 30 words from the first 30 AWL words, and 20 of 30 words from the second 30 AWL words. The quiz was fill in the blanks, with the 20 words written at the top of the page, and did not utilize the target vocabulary definitions used on WC. This was to avoid testing a rather superficial memorization of the words (because students might be able to choose the right synonym on WC without understanding the word at all).
5. Data showing total amount of time each student studied was gathered.
6. Quizzes that students took in class were graded and scores recorded.
7. A comparison was made of test results of the two quizzes students took, one of the words they studied, and one of the words they did not study. Graphs comparing those scores for the students who studied the longest period is shown below. Scores of students who studied very little or not at all were not compared because no difference between the scores could be predicted.
8. Students were encouraged to take an online attitudinal survey created on surveymonkey.com.

Quiz Results

Figure 4 is the graph of the eight students who studied list 1 (30 words) for the longest time (5.8 to 1.9 hours of study). The left bar shows the results of the quiz of the words they studied; the right bar shows the results of the quiz they did not study.

Figure 5 is the graph of the eight students who studied list 2 (30 words) for the longest time (3.9 to 2.6 hours of study). The right bar shows the results of

Figure 4
Quiz results for students who studied list 1 longest

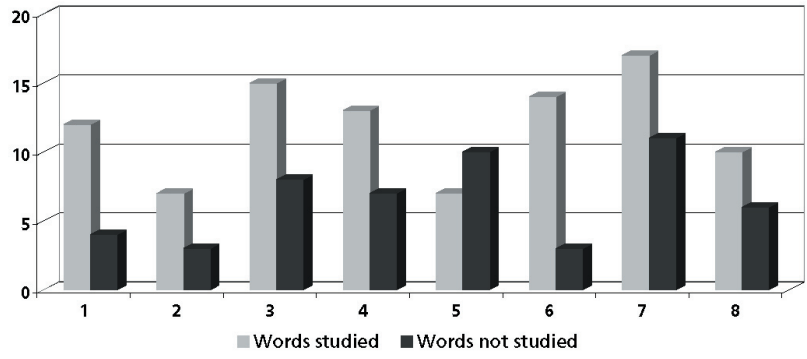
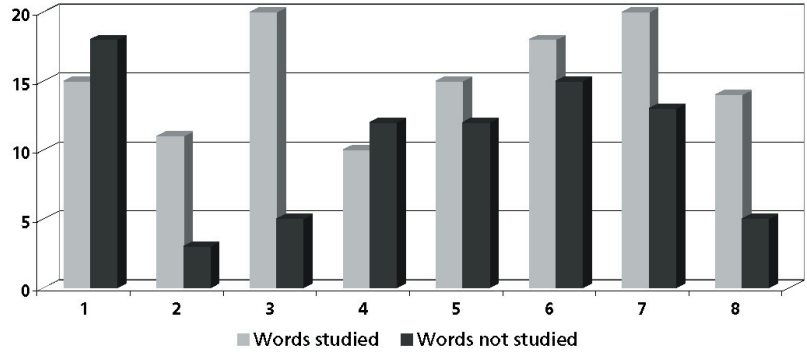


Figure 5
Quiz results for students who studied list 2 longest



the quiz of the words they studied; the left bar shows the results of the quiz they did not study.

Attitudinal survey results of preliminary study

Students were given five or six choices on a likert scale to answer questions related to vocabulary study. Approximately one-third of the students participating in the study took the quiz.

For Question 3, "Using WordChamp was..." 13 of 29 (44.8%) students chose "very easy" or "easy" while 13 (44.8%) chose "not too difficult."

For Question 4, "For learning new vocabulary Word Champ is..." 22 of 29 (75.9%) chose "very useful" or "quite useful" while the remaining seven (24.1%) chose "a little useful." None chose "not very useful" or "not useful."

For Question 5, "I feel WordChamp is..." 15 of 29 (51.7%) chose "very enjoyable" or "quite enjoyable" while 12 (41.4%) chose "a little enjoyable."

The remaining two (6.9%) chose "not very enjoyable" while none chose "not enjoyable" or "terrible and boring."

For Question 6, "Would WordChamp be useful for you to learn words related to your area of study...?" 10 of 29 (34.5%) chose "yes it would be quite useful" and 15 (51.7%) chose "it would be a little useful." Four (13.8%) chose "it wouldn't be so useful" and none chose "it wouldn't be useful at all."

All of the 14 comments left for the last optional question were either positive or neutral including "WordChamp is useful for me because I can learn not only spelling but also pronunciation," "Word champ is enjoyable but that is very difficult," and "It is very interesting! But I want to learn special word of engineering."

From this preliminary study it is clear that WC was a viable and effective tool which most students enjoyed using. The question remained, however: how would WC study compare with paper study of vocabulary both in terms of effectiveness and student interest.

Discussion of results of preliminary study

Of the eight students who studied list 1 for the longest amount of time, seven scored higher on the test of the words they had studied, with the most dramatic difference being student 6 who scored 14/20 on the studied words and only 3/20 on the words not studied. As for the eight students who studied list 2, six scored higher on the test of the words they had studied, the most dramatic being student 2 who scored 20/20 on words studied and 5/20 on words not studied. As expected, as the amount of time studied decreased, so did the difference between scores on the two tests. Thus, this research demonstrated that studying with WC, like other forms of intentional study of vocabulary (e.g., Laufer, 2005; Hunt & Beglar, 1998; Langenberg, 2000; Nation, 2001), leads to vocabulary acquisition. Moreover, because the test (fill in the blanks) was different from the WC quiz (synonym matching), students demonstrated an understanding of that word rather than just achieving a superficial memorization.

A weakness of the study, however, was that it did not indicate whether studying with WC is more or less effective than studying with traditional methods of vocabulary drilling, such as vocabulary notebooks and vocabulary cards (see results of spring 2008 study below for those results). A weakness of the attitudinal survey was the relatively small number of students who took it, just 29 of the 72 students who partook in the study. This was due to the fact that students were not brought to the computer room, and that completion of all homework was in fact optional. Students were encouraged and reminded to study vocabulary over the course of several weeks while they were instructed to take the survey on just two short occasions. A caution is that students who most enjoyed WC were the ones who bothered to answer the survey.

The results of the attitudinal survey were also indicative that WC is an effective tool for vocabulary acquisition. Despite studying on their own, outside of class, all students found it easy to use or "not too difficult." Likewise, the vast majority (93.1%) found it somewhere between "a little enjoyable" to use and

"very enjoyable." It stands to reason that finding such drilling enjoyable will lead to vocabulary acquisition. Finally, some students were impressed with the fact they could listen to audio of the words being spoken by native speakers.

Comparison study of students drilling frequency words on WordChamp vs. on paper

This follow-up study was, like the first study, conducted on first and second year students at the same university of agriculture and technology in Japan to determine whether online vocabulary study with WC is more or less effective than traditional paper study, as evidenced by quiz scores. In addition, an attitudinal survey was given to determine which method of study, paper or WC, students preferred.

Procedures

1. Students were asked to discuss with a partner and decide who felt more comfortable using computers. That student—which in some cases was determined at random by "stone, scissors, paper"—was assigned to use WC to study. Based on their reactions, students almost exclusively found it more desirable to study by paper.
2. Thirty academic words were chosen from Avril Coxhead's "Sublist 1 Family" set of academic vocabulary. This set is essentially the easiest, with words starting at the 2,001st level of frequency.
3. Those studying by paper were given the list of words with definitions written in English; those studying by WC were given a list of words with no definitions (because the definitions would appear automatically when drilling online).
4. Paper study students were told to drill by covering the vocabulary word, or the definition, and try to recall the covered side. Furthermore, students were encouraged to either rewrite the words in a vocabulary notebook, if they had one, or create flashcards which would allow them to change the order of the words. Students were reminded that it is far more effective to study often for short periods of time rather than one or two long sessions. Finally, paper-study students were told to keep track of the amount of time they studied because that was a key aspect of this research.
5. After four weeks, all students were given two quizzes, one consisting of 20 of 30 words from the vocabulary list they had been given to study, and one consisting of 20 words they had not studied at all. The quiz was matching and contained the same definitions as the WC flashcards (which were also the same definitions I provided paper-study students).
6. Paper-study students wrote the amount of time they studied directly onto the quiz paper; data showing total amount of time each WC student studied was available on the website.
7. Quizzes that students took in class were graded and scores recorded.

Quiz results

Figures 6 and 7 are the graphs of students who studied for the longest time (over 119 minutes over a four week period) respectively for students who studied WC (11 students) and students who studied on paper (nine students).

Figures 8 and 9 are the graphs of the students who studied for the second longest period of time (90–119 minutes over a four week period) respectively for students who studied WC (two students at left) and students who studied on paper (five students at right). The left bar indicates the words studied for WC while the right bar indicates the words studied for paper.

Figures 10 and 11 below are the graphs of the students who studied for the third longest period of time (60–89 minutes over a four week period) respectively for students who studied WC (14 students at left) and students who studied on paper (17 students at right). The left bar indicates the words studied on WC while the right bar indicates the words studied for paper.

Figure 12 shows average scores for students who studied at least 60 minutes (27 WC students at left; 31 paper students at right).

Figure 6
Students who studied WC for more than 119 minutes

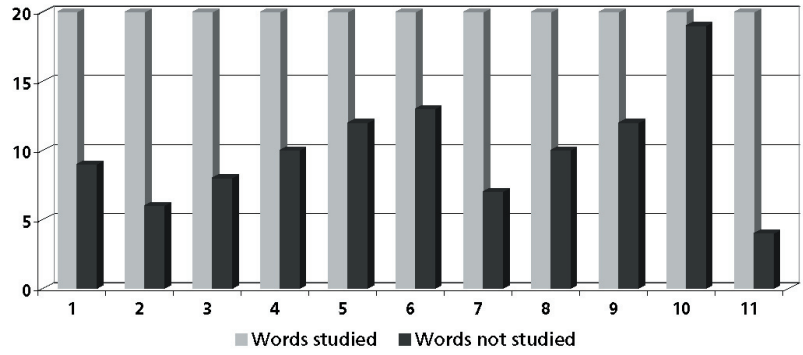


Figure 7
Students who studied paper for more than 119 minutes

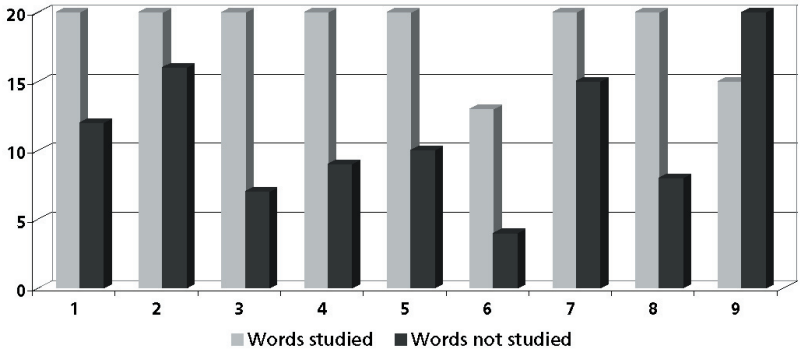


Figure 8
Students who studied WC for 90–119 minutes

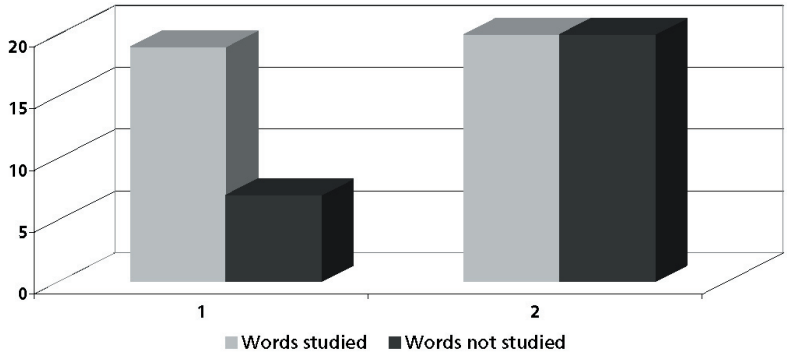


Figure 9
Students who studied paper for 90–119 minutes

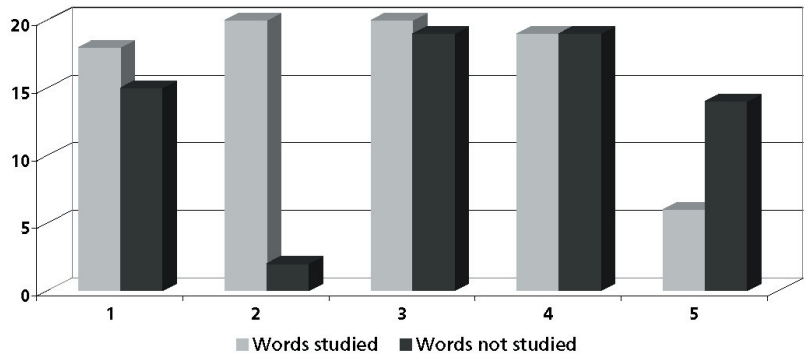


Figure 10
Students who studied WC for 60–90 minutes

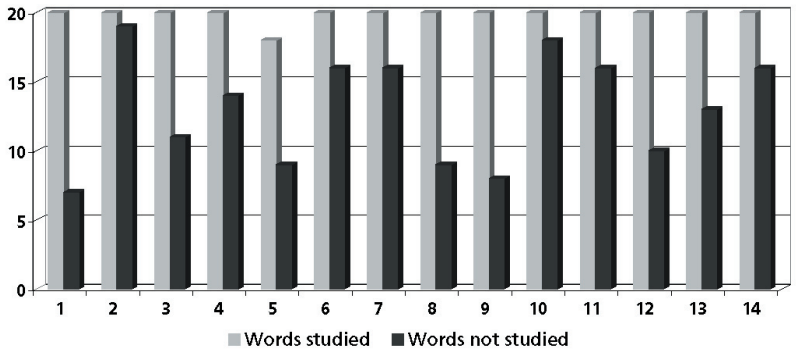


Figure 11
Students who studied paper for 60–90 minutes

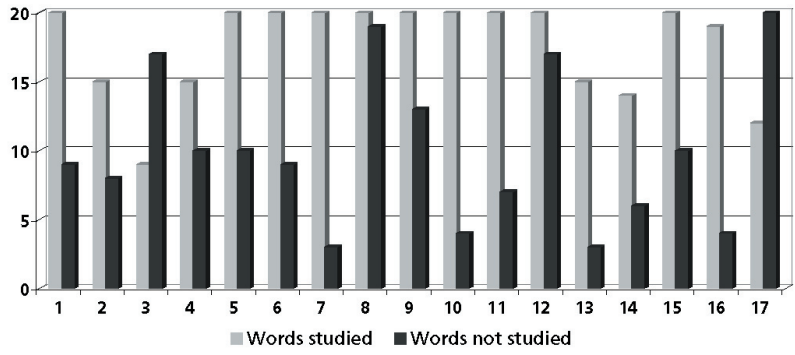
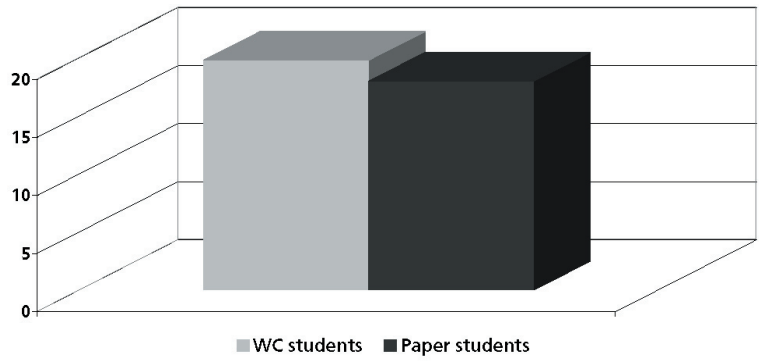


Figure 12
Average scores for students who studied at least 60 minutes



Attitudinal survey results for spring 2008

Question 1: How enjoyable is studying vocabulary by paper (5.5 average answer); How enjoyable is studying by computer? (6.9 average answer)

Question 2: How useful is studying vocabulary by paper? (6.4 average answer); How useful is studying vocabulary by computer? (5.5 average answer)

Discussion of results of follow-up study

Students who studied at least 60 minutes on WordChamp performed better on quizzes than students who studied at least 60 minutes on paper, scoring 19.8 correct out of 20 questions compared with an average of 17.7 correct out of 20 questions. There are several possible reasons for this difference. First, it could be surmised that the more motivated students were the ones who chose to study by computer; getting a user name and password, and only being able to study online are far less convenient than studying a list of words. Second, because it

takes more time and focus to get to a computer and log on, the study time could have been higher quality than the study time of paper students, who might have reviewed the words while watching TV or while riding a train, which inherently has more distractions than a computer room. Third, while instructions were given for ways to study via paper, this was not emphasized, and students may in fact have not known how to effectively study on paper. Fourth, it's conceivable that students who studied by WC also printed the list, or defined the words, and studied on paper as well, while the opposite did not happen (verifiable by students enrolled in the WC class). It should be noted that the scores on follow-up survey were significantly higher than on the preliminary survey most likely due to the fact that the follow-up survey utilized the exact same definitions while the preliminary survey asked students to use the words in a sentence, which is inherently more difficult.

The results of the attitudinal survey, however, are somewhat difficult to reconcile because students who studied by paper perceived that activity as more effective than students who studied on WC, 6.4 compared to 5.9 (based on scales to 10 (highest)). One explanation for this would be that the students who couldn't figure out how to effectively use WC gave it an extremely low score while studying by paper needs no learning curve. However, this explanation is surprising given students who studied by WC claimed it was more enjoyable than students who studied on paper, 6.9 to 5.5 (based on scales to 10 (highest)).

These studies indicate that both methods of intentional study of vocabulary, WC and paper study, are effective for acquiring vocabulary, and that WC is more effective than paper.

Suggestion for future research

Ideally, a study could be set up to include a pretest that allows students to study the vocabulary at their individual level. Furthermore, rather than focus on a single study method (in this case wordchamp.com), learners could choose a drilling method. For example, two online methods (WordChamp and Lexxica, for example) and two traditional methods (vocabulary notebooks and vocabulary cards, for example) could be offered to students. In that way, in addition to researching how much students learned with their study method, a more thorough comparison of vocabulary-acquisition study methods can be made.

Also, focusing on frequency word vocabulary is just one option for language teachers and learners. Such words are, by their nature, useful to all language learners. However, teachers and students can also create their own lists, which might be even more useful. Lists can be created pertaining to a particular course or textbook. Similarly, ESP (English for Specific Purposes) lists can be created by teachers and/or learners. Such user-created 'flashcards' can be made on WC, as well as on paper. In this way, learners would have the option of creating L1–L2 definitions.

CORRESPONDENCE

Any correspondence should be directed to John Spiri, Tokyo University of Agriculture and Technology (johnspiri@mac.com).

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Appendix A: Table of links to word frequency lists online

URL	Comments
http://www.languages.salford.ac.uk/staff/dickins.php	Extended version of *A General Service List of English Words*
http://language.massey.ac.nz/staff/awl/sublists.shtml	Based on the BNC list, contains 10 word group word families of 60 words each (save the last group which has 30)
http://www.edict.com.hk/lexiconindex/frequencylists/words2-5k.htm	Words listed by frequency: the second 2,000–5,000 most frequent words from the Brown Corpus (1,015,945 words).
http://www.auburn.edu/~nunnath/engl6240/wlistgen.html	This contains the general service list with number of appearances for each word.
http://www.wordcount.org/main.php	An aesthetic version of a word frequency lists.
http://www.lextutor.ca/lists_download/	The English 1000 and 2000 lists are versions of West's (1934) *General Service List*; the Academic Word List was by Averil Coxhead.
http://ogden.basic-english.org/words.html	Organized as follows: Operations (100 words); Things (400 general words); Things (200 picturable words (with picture list); Qualities (100 general words); and Qualities (50 opposites). Ogden, the author, made the order himself.
http://devoted.to/corpora/	Links to some obscure lists