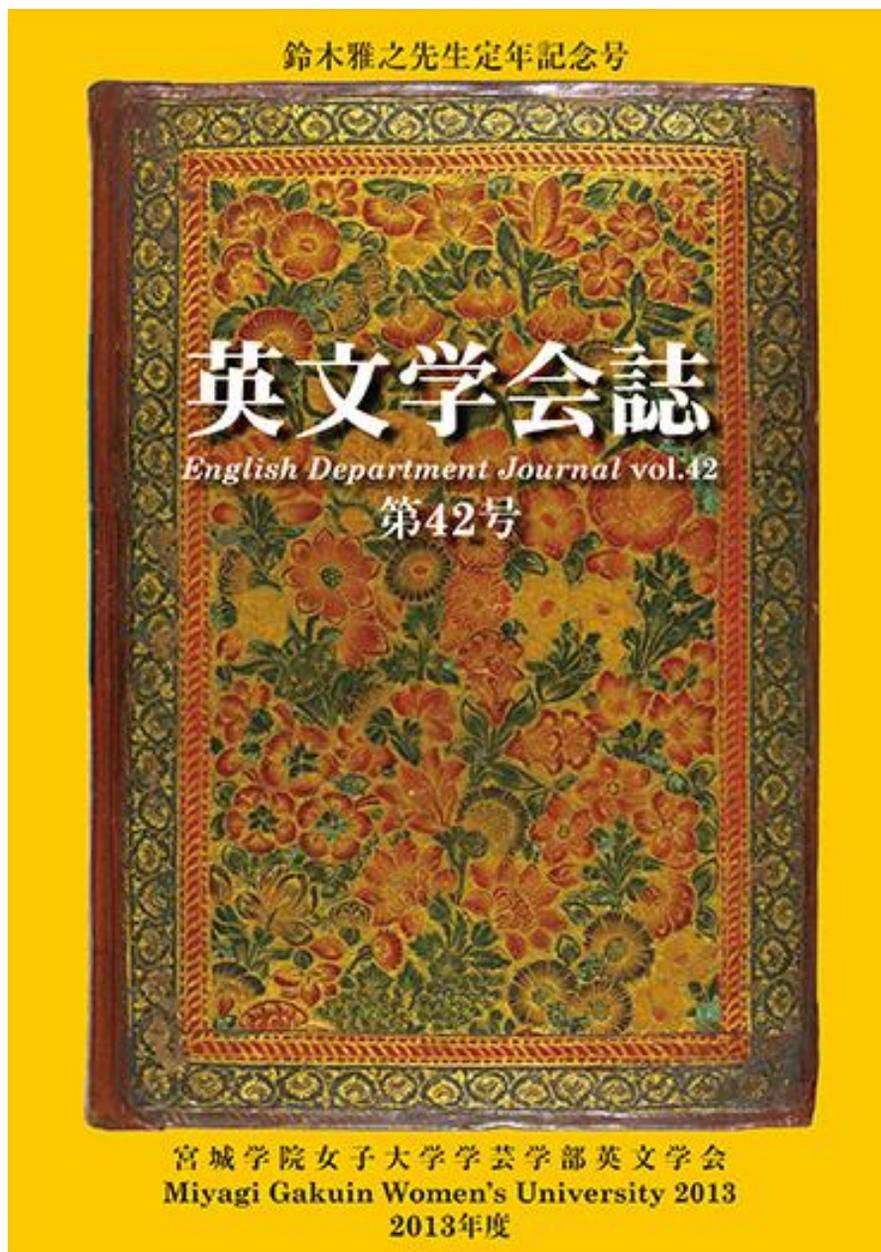# 1500 Word Vocabulary Increase in One Year Studying 10 Minutes Each Day: Is it Possible?

A Case Study by John Wiltshier 2013
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目次

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1500 Word Vocabulary Increase in One Year Studying 10 Minutes Each Day: Is It Possible? A Case Study

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Introduction

The basic building blocks of language are words and grammar. Without a sound knowledge of both, students will be unable to become competent language users. The direct study of grammar has always been a core component of the curriculum in the English department. However, direct study of vocabulary has not. The assumption presumably being that vocabulary will naturally be acquired while studying other classes each day. Although this is perhaps reasonable, limited vocabulary is a major handicap for our students especially in the 3rd and 4th year. Hence, a decision was taken to introduce direct vocabulary study. This paper reports on the material used and the results achieved over 39 weeks from April 2013 to January 2014 in Miyagi Gakuin's English department.

Resource: theory behind

The material chosen was an online vocabulary learning programme called Word Engine[1]. Word Engine contains approximately 13000 words and offers students six courses to choose from: TOEIC, TOEFL, IELTS, Eiken, Entrance Exams, Business English and General English. Each course contains a pre-selected subset from the total 13000 vocabulary items. Our students were instructed to select the course named "TOEIC". This course contains 6480 vocabulary items which cover

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1 a programme created by Lexxica company - see www.wordengine.jp

Fig. 1
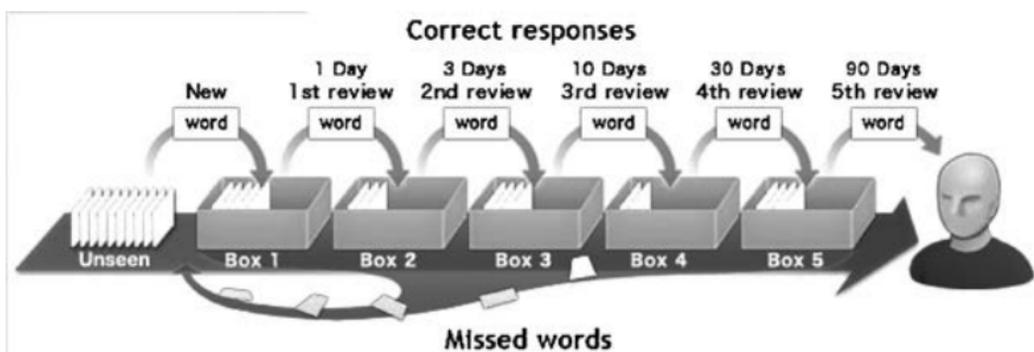
99% of the words occurring in the TOEIC test[2].

Learning using Word Engine is based on the theory of spaced repetition. Words are presented online and students click the meaning of the word they think is correct. If they are right the word will be re-presented the following day, then three days later, ten days later, one month later and finally three months later.

If, on the last presentation of the word, the student chooses the correct meaning that word is said to have been acquired and will no longer be presented. If, at any time during the five reviews, a student makes a mistake the word returns to the starting pile of unknown words and the learning starts over again. This process is illustrated in Fig.1 above.[3]

The theory of spaced repetition dates back to 1895 and the research on human memory carried out by Dr. Hermann Ebbinghaus[4] who first identified 'The forgetting curve'[5] illustrated in Fig.2.
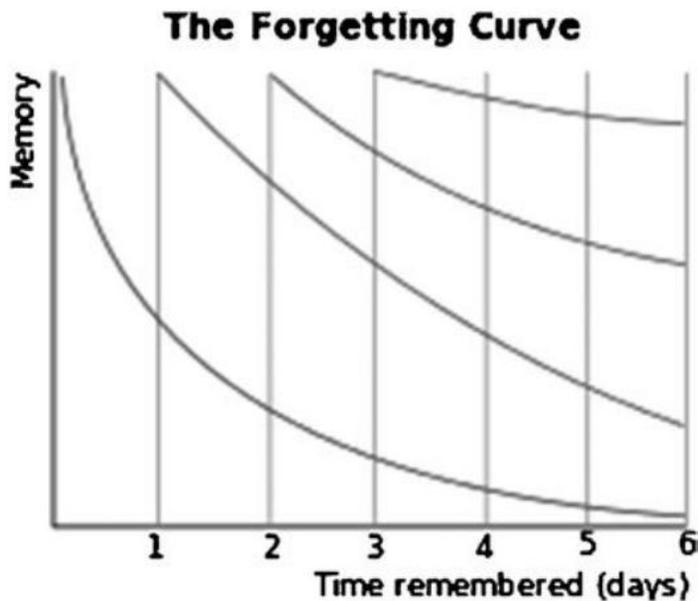
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2 based on analysis of 1250 TOEIC tests: http://www.wordengine.jp/landing/toeic-v2

3 http://www.wordengine.jp/

4 see Baddeley (1982) chapter 2

5 http://en.wikipedia.org/wiki/Forgetting_curve

Fig. 2

The Forgetting Curve

Many learning methods have been developed based on Dr. Ebbinghaus' findings. Among the most notable are the methods developed by: Mace, Pimsleur and Leitner[6]. Word Engine is based on Leitner's method for learning vocabulary using a series of boxes and word cards, similar to that displayed in Fig.1.

However, by digitizing and automating everything online the need for physical boxes and thousands of word cards is removed. In addition, it is portable and can be used by students on laptops, iPads and cell phones allowing them freedom to access it wherever and whenever they have access to the internet.

So although the ideas behind Word Engine are not new, it uses modern technology to provide a seemingly easy-to-use interface for vocabulary learning. But how effective is it in practice?

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6 http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Spaced_repetition.html

Resource: rationale based on evidence

In order to check how effective Word Engine is in practice and to be able to produce a rationale for its introduction to all 1st and 2nd year students, a pilot study was carried out at Miyagi Gakuin in 2012 and a report on its use at four other universities[7] was considered.

Miyagi Gakuin Pilot Study: In April 2012 a pilot study was set up with one class of 22 second year students. These students had the highest TOEIC scores in their year. The students studied the General English course and were set the goal of learning 200 words a month studying 10 minutes each day. Over 10 months this amounted to learning a total of 2000 new words. 30% of the class grade was assigned to Word Engine: the exact grade depending on the number of words learnt. At the beginning of each week's listening class the teacher commented on student performance. The pilot study finished in February 2013 with 20 out of the 22 students increasing their known vocabulary by 2000 words or more[8]. The remaining two students showed increases of 1382 and1372 words. Participation of all students remained high throughout the year.

Case study 1: This national university enrolled 2nd year reading students in the General Course and the TOEIC course. The goal set was 150 correct clicks per week. The teacher said he would monitor and evaluate, but actually didn't. 80% of students had stopped using Word Engine by the middle of the first semester.

Case study 2: This private university enrolls all students from 1st year at no charge

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7 reported by Guy Cihi, JALT International Conference Kobe, Japan. November 2013.

8 This figure is the increase in learnt words; for a definition of learnt see page 95.

to the individual student. They reported approximately 5% of students regularly use the programme.

Case Study 3: This small private university in the north of Japan uses Word Engine's TOEFL + General English courses with all 1st and 2nd year students. The first 10 minutes of each class is used for Word Engine practice and a weekly goal of 200 correct clicks is set. Word Engine results account for 30% of the class grade. The university reports continuing very high participation levels.

Case study 4: This private university uses Word Engine with 2nd year conversation class students and administration staff. Students are set the goal of 150 correct clicks a week. Evaluation is based on weekly goals being hit and the results of six vocabulary quizzes per semester. This accounts for 45% of the overall class grade (15% hit weekly goals, 30% quiz scores).

The varying results from these case studies I believe can be explained by considering what is necessary for human-beings to be highly motivated. Walker and Symons (1997)[9] identified five themes that emerge from the leading theories on human motivation. Human motivation is at its highest when people:

• are competent

• have sufficient autonomy

• set worthwhile goals

• get feedback

• are affirmed by others

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9 reported in Dornyei (2001) chapter 2

Competence: means able to succeed at a certain task. In order to use the Word Engine programme students need to be able to read Japanese or English and to be able to operate a mouse or touch screen. As all students in the case studies were teenage or older and were in Japanese educational institutions one can presume they had such abilities. In order to succeed they needed to be able to remember the new words when they learnt them. The spaced repetition built into the programme is designed to re-present words before students forget the meaning to aid optimal learning.

Sufficient Autonomy: the programme contains a variety of ways in which words are presented. The students could choose from these and they could choose to get definitions in English or Japanese or a mixture of both languages. To this extent the students had choice and this was the same across all case studies. What differed were the choices made on behalf of the students by the institution or the teacher.

Goals: these were either set or not set and could be short-term sub-goals or long-term goals. Short-term goals were set in terms of the number of correct clicks or number of minutes required each week. Long-term goals could also have been set on a time basis or by the number of words *acquired* over a set time period, for example a semester or academic year.

Feedback: Word Engine provides this online in a visual form on "My Page" showing the number of words in each box and how many have been *acquired*. The teacher in some cases provided feedback individually or to the class about, for example the number of students who hit the weekly target.

Affirmation from others: this would have occurred when students chat together about their progress and/or the teacher made positive comments about the effort being made.

When using Word Engine the goal-setting capability remains constant wherever it is used as does the feedback it provides from the online tutor and the progress reports available on each student's My Page. What varies are the goals set and feedback given by the teacher and whether or not the use of Word Engine is integrated into the curriculum. It is these three factors (summarized in Table 1. below) which I believe account for the different participation levels.

Table 1. A summary of motivational features in each case study

Case study	Weekly Goals?	Integrated into curriculum?	Teacher Feedback?	Participation Level?
1	150 clicks	?	No	LOW (Only 20%)
2	No	No	No	VERY LOW (Only 5%)
3	200 clicks	Yes 2% a week	Yes	HIGH
4	150 clicks	Yes 3% a week	Yes	HIGH
Pilot	Time based[10]	Yes 30% a term	Yes	HIGH

Method

Lexxica's Word Engine was introduced to all 1st and 2nd year students from April 2013. Each student took the V-check placement test provided free online. This estimated the size of each student's vocabulary and automatically selected the words it estimated students did not yet know. These were titled '*unseen*' as in the diagram above. Naturally each 'unseen stack' was peculiar to each student. Students bought an Access Card from the university COOP and used the code on this card to set up their account. Each account cost 2000 yen and lasts for one

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10 originally Word Engine used *time* not correct clicks to set weekly goals

year.

Students were told to select the TOIEC course and used the program for 10 minutes at the beginning of each listening class. All students had one listening class a week. On the other days of the week students were expected to study for 10 minutes each day. They could access the program from any device in or outside the university that had an internet connection. This included smartphones.

Each week the students were expected to make at least 300 correct clicks of the mouse. The number of correct clicks was tracked and the results were sent by email on Monday morning from Lexxica to the teacher's email inbox. In addition to email notification the teacher could log-on anytime and see detailed information on each student's progress over any chosen time frame.

During listening class time the teacher gave feedback to the class. The feedback included data about how many students achieved 300 correct clicks for the week and the highest number of correct clicks in the class and across all 1st and 2nd year students.

The course ran for 15 weeks. For each week the goal of 300 clicks was achieved, a student received 2% towards the final grade for the listening class. Students could see how many times they hit the weekly target by looking at their 'My Page' on the Word engine web site. In addition to the 'My Page' feedback, an online tutor provided by the web site sent regular emails to students about their study.

Results

Results were obtained by analyzing tracking data and responses to a questionnaire given to all 1st and 2nd year students.

Word Engine uses the term learnt to mean that a word has been seen and

correctly defined by a student on at least one occasion, i.e. the word got at least as far as box one. If a word goes through six reviews and is correctly defined after a three month interval Word Engine refers to this as an *acquired* word.

Table 2. below shows the estimated average vocabulary size in April 2013[11] compared to the size in January 2014. The difference being the number of words *learnt*. The columns on the right show the average number of words in Box 5 and the average number of words *acquired*. I have included data for Box 5 as words remain in this box for three months waiting to be presented to students for the sixth and final time. Consequently there are often a large number of words in this box. The results are for a 39 week period starting from April 8th 2013.

Table 2. How much vocabulary was learnt or acquired?

How much Vocabulary was learnt?				and acquired or nearly acquired?	
	start date	end date	vocabulary items learnt	nearly acquired (Box 5 total)	acquired
1st & 2nd years	2494	3822	1328	160	880
1st year only	2439	3872	1433	165	979
2nd year only	2566	3758	1192	154	751
1st yr A class	2742	4462	1720	210	1150
1st yr B class	2250	3503	1253	137	872
2nd yr A class	2741	4216	1476	177	972
2nd yr B class	2427	3394	967	137	576

Table 3. below shows the average time each student spent online studying over the 39 week period, together with the percentage of correct clicks made. The percentage of correct clicks is an indication of how efficiently students worked and reflects their level of competency i.e. were they able to use the programme successfully.

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11 estimates automatically calculated by the online Word Engine V-check placement test.

Table 3. How many hours did students study and what % of responses were correct?

	Hours	CR Ratio %
1st & 2nd years	27	79
1st year only	29	79
2nd year only	24	79
1st year A class	31	81
1st year B class	28	77
2nd year A class	26	83
2nd year B class	23	77

The next table (Table 4.) shows data relating to how able students were at attaining the goals that had been set by the teacher. The time period was again 39 weeks. If a student made 300 or more correct clicks in any one week, they would score one hit, so the 'hits' column is out of a maximum of 39 if summer and winter holiday weeks are included and is out of 29 if they are not. The 'maximum' hits displayed of 38 or 39 show that some students in each class continued to study throughout the year irrespective of whether or not they were on holiday. The far right column shows how many students hit the target more than 36 times in the 39 week period. This is included to show how many students continued the programme throughout the holiday period. The SD column is the standard deviation of the group and is noticeably higher for the 1st year group, especially the lower ability Class B.

Interestingly, although the goal was set at 300 correct clicks per week usually the highest score among all students was more than 1000 and on two occasions was over 3000 which represents ten hours of study over the week. Scores of this magnitude were limited to three or four students. One student was a special case, regularly averaging over 1000 correct clicks a week. This student *acquired* all

Table 4. Did students attain the weekly goals?

	GOALS				
	Hits	SD	Minimum	Maximum	#Ss>36hits
1st & 2nd yrs	26	7.25	4	39	21
1st year only	28	7.72	4	39	19
2nd year only	24	5.80	8	38	2
1st yr A class	30	6.58	15	39	7
1st yr B class	27	8.28	4	39	12
2nd yr A class	25	4.70	17	38	1
2nd yr B class	23	6.45	8	38	1

6480 words contained in the TOEIC course by November. Her starting vocabulary was higher than average at 4506 and her accuracy was over 90% making 10.8 clicks on average every minute.

The percentage of students hitting the weekly goal in each of the four classes over the 39 week period can be seen in Fig.3. below. As might be expected participation rates are highest in term time when each week counts for 2% of the overall class grade. Interestingly, between 40 to 50% of 1st year students continued to use the programme through the summer holidays even though the university had not set this as a requirement and did not reward it in anyway.

In addition to tracking data which tells us about what the students actually did the questionnaire responses tell us about where, when and how students felt about using the programme. 95% of students answered "yes" or "yes a lot" when asked if they felt that using Word Engine was increasing their known vocabulary. When asked "Would you study if there were no weekly goals?" 15% replied they would study "More or a lot more". 37% thought they would study the same amount but a majority 48% stated they would study "Less or a lot less" if there weren't any weekly goals. Also when asked what goal was appropriate, an overwhelming 82% chose 300 correct clicks. In relation to how often students studied only 4% studied

Fig.3. What % of students hit the weekly target for each of the four classes?
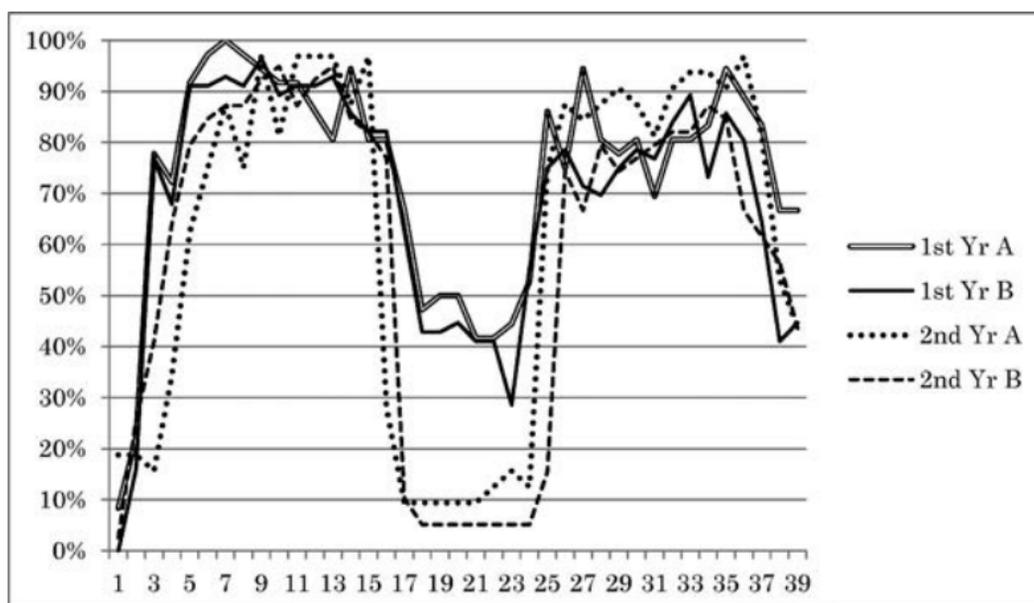
in the ideal way i.e. 10 minutes a day. 14% studied five or six times a week and the majority 53% studied three or four times a week. 29% only studied once or twice a week. Regarding where and what devices students used to access the online programme, home computer (73%) and university computers (63%) were the most popular. However, mobile phones were also widely used (43%) whilst Tablet PCs were used by just 3%.

Discussion

This study confirms the importance of setting specific and challenging goals as reported by Locke & Latham (1990) and integrating them into the overall grade for the class. The target of 300 correct clicks was appropriate as confirmed by the questionnaire responses where, if given a choice, 82% would choose between 250~350 as their desired weekly goal for the 2nd semester.

I also feel through teaching the class that *affirming student achievement* each

week either as a group or individually was a contributing factor in maintaining motivation. On numerous occasions, I simply had a quiet word with a student who had not hit target and invariably performance improved the next week. One perhaps significant point which may have had an affect on student performance was a change of teacher in both B classes from September. The % of students in all classes hitting target fell in the second term, but falls were steeper in the two B classes. The new teacher was part-time and so was not seeing the students on a daily basis nor did they have access to all the Word Engine data making precise comments on student progress difficult. With new teachers next year it will be interesting to analyse motivation levels by continuing to chart the percentage of 2nd year students hitting weekly goals and comparing it to their first year level.

Although ideally students are asked to study 10 minutes each day the majority use the programme three or four times a week rather than every day. In my opinion three times a week or more is satisfactory and is enough to acquire new words. Students who use the program less than three times a week and try to cram on Sunday night should be advised on how to make better use of the programme.

Choice or autonomy is often cited as a positive factor in creating motivation[12]. In this year-long study students could choose when, where and to some extent how[13] to study, so there was an element of student choice. However, the significant choices in this case study were made by the teacher i.e. what resource to use, how to integrate it into the curriculum and what goals to set. This is, I believe, how it should be. In our context, it is; *importance, utility* and *interest* rather than choice per se that I believe are the significant factors in maintaining

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12 see Dornyei pp. 42 and 82, Pintrich & Schunk pp. 13, 65-66

13 three ways to study using Word Engine are offered to students

motivation. A teacher with sufficient experience and knowledge of their students should have the confidence to judge such factors and be able to make good choices on behalf of their students. Subsequent data collection and analysis should show the teacher made effective choices on behalf of their students, probably better choices than the students themselves would have made had they been given complete autonomy to choose.

One decision some students made was to continue to study through the vacation period. This suggests that the students intrinsically felt it was useful to their study of English. This was supported by the questionnaire data that emphatically underlined the fact that students believe Word Engine is effective at increasing their English vocabulary.

The aim of introducing direct study of vocabulary was to increase each student's vocabulary by 1500 words by studying 10 minutes a day online. The average increase is 1328 words after 39 weeks. With 3 weeks of term time left and then another 10 weeks of the year remaining it can be tentatively stated that the aim will be achieved. However, this is just a first step, albeit a very important one. In order to know a word it needs to be met in a variety of contexts and needs to become part of a student's active as well as receptive vocabulary. This can be achieved through recycling of the newly *learnt* items through extensive/intensive reading, listening, speaking and writing classes as well as study in specialist areas.

As knowing what words mean is necessary to improving overall English ability, any measure of such ability, such as a TOEIC score, should reflect this improvement. From 2014 April this study will be continued providing a second year's worth of data including a comparison to TOEIC scores.

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