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The Importance of Vocabulary at Tertiary Level

Abstract

This study investigated first-year students' vocabulary knowledge using a test of 'controlled productive ability' used by Laufer and Nation (1995) in their study of lexical richness in writing. This test, and its later versions, is based on the view that vocabulary consists of various levels according to frequency of occurrence (Laufer and Nation, 1999: 35). The study explored the relationship between students' productive vocabulary knowledge and their course of study and gender, and the relationship between their productive vocabulary knowledge and their academic performance. Findings revealed that course of study and gender were indicators of vocabulary knowledge, with Literature students performing better on the Vocabulary Levels Test (VLT) than their Law counterparts, and women outperforming men at all levels. Correlations revealed a robust relationship between overall knowledge of vocabulary and academic performance. Multiple regressions showed that Level 3 (5000-word level) and Level 4 (University Word List [UWL]) were predictor variables for Literature and Law students respectively. These levels are significant in illuminating the link between vocabulary knowledge and academic performance, as measured by examination scores.

Keywords: Vocabulary size; Productive vocabulary knowledge; Measurement of vocabulary; Vocabulary Levels Test; South African university students; Gender; Course

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1. Introduction

Studies have revealed that in South Africa today, many students are arriving at universities with very low literacy levels (Machet & Tiemensma, 2009; Sondlo & Subotsky, 2010; Meier, 2011). Thus many students enter university already at a disadvantage because they lack language proficiency, finding it difficult, if not impossible, to catch up and close the gap, often falling by the wayside and becoming part of 'drop out' statistics.

A measure of vocabulary size can predict reading achievement, and by extension, the potential to succeed in higher education (Vermeer, 2001: Qian, 2002; Webb, 2008). Vermeer (2001) stresses the importance of vocabulary knowledge for language proficiency. Assessing entry-level vocabulary can indicate where students are placed in regard to this vital aspect of language proficiency, and where teachers can intervene.

This article stems from a larger study investigating breadth and depth of undergraduate students' productive vocabulary, and the relationship between this knowledge and their academic performance. The effects of course of study and gender on students' vocabulary size (as measured by a test of productive word knowledge) were also explored. Vocabulary size is generally accepted as being extremely important in language competence: '[v]ocabulary size is directly related to the ability to use English in various ways' (Schmitt, Schmitt and Clapham, 2001: 55). Various aspects of vocabulary knowledge, size (breadth) and depth, productive (active) and passive (receptive) knowledge have been the subject of a great deal of research over the last several decades (Laufer and Nation, 1999; Nizonkiza & van den Berg, 2014; Roche and Harrington, 2013; Vermeer, 2001). As assessment in an academic context usually tests the written form of the language it was deemed appropriate to measure the productive word knowledge of entry-level students in this study by using an active, or productive, version of the VLT. These students, both native speakers (NSs) and non-native speakers of English (NNSs) were observed to have fewer words at their disposal than they needed to function in an academic environment, having difficulty articulating their thoughts idiomatically in their academic writing, suggesting inadequate knowledge of both high-frequency and academic words.

2. The importance of vocabulary size

The investigation of students' vocabulary size, or the breadth of their word knowledge, was approached from the perspective of discrete item knowledge. Such measurement is important, particularly as it was linked to an investigation of students' depth of vocabulary knowledge: as Vermeer (2001) asserts, breadth and depth are closely related and the greater one's vocabulary, the deeper one's vocabulary knowledge, and vice versa. Significantly for this study, she observes that 'knowledge of words is now considered the most important factor in language proficiency and school success – in part due to its close ties with text comprehension' (Vermeer, 2001: 217). Qian (2002) believes that it is important that both aspects, breadth and depth, are kept in mind as both are important

for reading comprehension. He is referring to university students, but Vermeer's study, conducted as it was with Dutch L1 and L2 children between the ages of four and seven, reminds us that the foundations of vocabulary knowledge must be laid in pre-school and primary education. If students lack such a foundation at school, their difficulties with vocabulary and reading are frequently compounded at university level.

Nation (1993: 131) believes that 'vocabulary size is the essential prerequisite for the development of skill in language use'. As it grows, this skill allows for a growth in knowledge of the world [academic ability] through the competent use of the language. If this knowledge is to increase, vocabulary must also increase. Thus, skill in language use, which includes reading comprehension and writing skills, is vital to success at university and is dependent on vocabulary size (Nation, 1993: 120).

In a more recent study, Roche and Harrington (2013: 3/13) found that 'the greater the learner's vocabulary knowledge, the less cognitive demands are placed on the learner'. In other words, the more developed a learner's vocabulary knowledge the less effort s/he has to expend during reading. As Roche and Harrington (2013: 3/13) put it, 'the preponderance of evidence indicates that in order for an L2 learner to become a vehicle for learning, vocabulary knowledge must first be sufficiently developed'. The fact that vocabulary knowledge is a vital component of academic language ability is also reflected in instruments used in South Africa. Both the Test for Academic Literacy for Postgraduate Students (TALP) developed by ICELDA (Inter-institutional Centre for Language Development and Assessment) (see, for example, Pot & Weideman, 2015) and the NBT (National Benchmark Test), a 75-item, multiple-choice test developed by higher education subject matter experts under the auspices of the National Benchmark Tests Project (Cliff, 2015), include sections that test vocabulary knowledge.

3. Measuring vocabulary size

Vocabulary size can be measured in terms of its receptive or its productive nature.

3.1 Measuring receptive vocabulary

Research has long indicated a relationship between vocabulary size and the ability to use language in various ways (Cooper, 2000; Schmitt, Schmitt & Clapham, 2001; Akbarian, 2010: 399; Milton & Treffers-Daller, 2011, 2013). Size implies measurement, and a common measure in vocabulary studies is the word, or more specifically, the word family. In this article, 'word' refers to a word family, comprising a base word and all its inflected and derived forms (Bauer and Nation, 1993; Qian, 2002; Schmitt & Zimmerman, 2002; Read, 2004, 2007). As Bauer and Nation (1993: 253) note, 'the important principle' underlying the concept of a word family is that 'once the base word or even a derived word is known, the recognition of other members of the family requires little or no extra effort'.

The number of words that scholars believe a learner needs to be successful in academic study has varied widely and consensus has yet to be reached, partly because of the fluid nature of researchers' definitions of a word (Vermeer, 2001: 220). Milton and Treffers-Daller (2013: 154) warn against taking estimates of vocabulary at face value as methodologies differ. There are of course several degrees to 'knowing' a word: 'Knowing or not knowing words may seem like a dichotomous distinction, but there is, in fact, a continuum ranging from not knowing, to recognizing, to knowing roughly, to describing very accurately' (Vermeer, 2001: 221).

Since the 1980s, many scholars have tried to quantify the vocabulary needed to read competently and with ease: researchers such as Hazenberg and Hulstijn (1996), Schmitt et al. (2001), Schmitt and Zimmerman (2002), Morris and Cobb (2004), Nation (2006) and Milton and Treffers-Daller (2011, 2013) have all made suggestions about the size of vocabulary required for proficient reading, and by extension then, potential for success in academic studies. Schmitt et al. (2001: 55-6) observe that most scholars agree that basic interpersonal skills (BICS) (Cummins 1999) require knowledge of the most frequent 2000 words in English, that is the high-frequency words. Those words that Schmitt and Schmitt (2014) have recently suggested should become part of the high-frequency levels, the 3000-word level, are required for spoken discourse such as lectures. This level is vital if learners are to start learning words from context (Nation & Waring, 1997: 11), to develop cognitive academic language proficiency (CALP) (Cummins, 1999) and to transfer language skills learnt in their L1 to their L2 reading (Cooper, 2000; Schmitt et al., 2001: 56). Laufer (1997) confirms this in her findings that a vocabulary of 3000 word families, or about 5000 words, is necessary for general reading comprehension and should allow readers coverage of 90 to 95% of the running words, or tokens, in a text. This is confirmed by most research (Schmitt et al. 2001: 56).

As far as the number of words needed by students to succeed in university studies is concerned, researchers have over the years expressed differing opinions. Milton and Treffers-Daller (2011, 2013) note that Nation (2006) suggests that 8000 to 9000 words are necessary for general reading of newspapers and novels. Nation uses a figure of 98% coverage as the basis for this estimate. On the other hand, in their study of Dutch-speaking and English NS students, Hazenberg and Hulstijn (1996: 158) found that students who knew 'fewer than 10 000 base words run a serious risk of not attaining the reading comprehension level required for entering university studies'. In his study, Akbarian (2010) found that his Iranian students lacked both size and depth of vocabulary knowledge; even in the stronger group, only two students had mastered the 3000-word level. This 'low vocabulary proficiency level' of all the ESP/EAP learners at his institution was cause for grave concern (Akbarian, 2010: 399).

Schmitt et al. (2001: 56) believe that L2 learners with a knowledge of the most frequent 10 000 words in English can be considered to have a wide vocabulary, and agree that a learner may need a vocabulary of this size to cope with university study in a second language. More recent studies suggest that learners need knowledge of 8000 to 9000 word families for unassisted comprehension of written texts, and 6000 to 7000 for spoken texts (Nation, 2006; Roche & Harrington, 2013).

More recent research has opened further discussions on this topic. Schmitt and Schmitt (2014) have argued that the low-frequency band should in fact be bounded by the 9000-word level rather than the 10 000 level, and that there should be a new focus on those words between the 3000 and 9000-word levels, which they refer to as 'mid-frequency' vocabulary (2014: 494). These words are particularly important to reading for 'authentic purposes' (2014: 495), such as reading for university purposes. Schmitt and Schmitt (2014) cite Laufer and Ravenhorst-Kalovski (2010: 25) who suggest that there are two 'thresholds' for 'adequate' reading comprehension: 4000 to 5000 words if 'adequate' means that learners require some assistance (about 95% coverage of a text), or 6000 to 8000 words (about 98% coverage) if it means being able to read independently.

3.2 Measuring productive vocabulary

Not as much research has been conducted on estimating the size of productive vocabulary required to succeed at university. This may be partly because it has not been easy to define the nature of language knowledge (Laufer, 1998: 256) and as a result it has not been easy to design tests that are valid and reliable. In a study by Laufer and Nation (1995) in which they aimed to establish the reliability and validity of the Lexical Frequency Profile (LFP) 'as a measure of lexical richness' (1995: 313) they found that there were strong correlations with an independent measure of vocabulary knowledge, an active version of the VLT: learners who scored highly on the VLT used more words from the UWL and beyond in their writing. They also found a negative correlation between the VLT and the first 1000-word component of the LFP, indicating that the more words a student knew, the fewer high-frequency words they used in their writing (Laufer and Nation, 1995: 317).

As mentioned above, it is generally accepted that vocabulary knowledge involves 'degrees of knowledge' (Laufer, 1998: 256; Vermeer, 2010) with most researchers agreeing that word knowledge moves from passive (receptive) to active (productive) knowledge, that receptive knowledge precedes active knowledge (Laufer and Paribakht, 1998: 369) and that the former is generally larger than the latter. Laufer (1998) explored the development of passive, controlled active and free active vocabulary knowledge among EFL (English as a foreign language) learners over one year of teaching at school, and the relationships between these types of vocabulary knowledge at various stages of learning. She found that learners' passive vocabulary was the fastest to develop, followed by controlled and then free active vocabulary. An increase in passive vocabulary did lead to a growth in controlled active (productive) vocabulary, although this also widened the gap between the two; as passive vocabulary increases so less frequent words are learnt, and the learner can communicate well enough without them, so they are not practised and do not convert to productive vocabulary. The lack of growth in free active vocabulary suggested that learners had reached a 'plateau' and were not using the words in their productive vocabulary when they were not obliged to (Laufer, 1998: 266).

In a study of Danish high school learners of English by Staehr (2008: 148) to determine the relationship between vocabulary size and listening, reading and writing skills, most of the learners had not mastered the 2000-word level. He found that students who did know these words performed above the average on the writing test and a correlation of 0.73

indicated a fairly strong relationship between learners' writing skills and their vocabulary size as measured by a receptive version of the VLT. Although he used a test of receptive vocabulary Staehr (2008: 149) argues that these findings confirm that vocabulary size is important to the assessment of quality of writing, and underline the importance of a large receptive vocabulary, justifying the use of several different measures to assess vocabulary size. His study emphasises the need for more research into the importance of depth of vocabulary knowledge to language proficiency.

In their study to measure vocabulary size and growth (both receptive and productive knowledge) of a group of high school EFL students over a period of 10 weeks (50 hours), Zhong and Hirsch (2009) found that, as in other studies (Laufer, 1998), although controlled productive vocabulary size was smaller than receptive vocabulary at all levels (2000-, 3000-, 5000-word levels and the AWL [Academic Word List]) (Coxhead 2000), students' had made greater gains in productive vocabulary than in receptive vocabulary. Zhong and Hirsch's (2009) findings are similar to some of those of Laufer (1998) concerning the size of controlled vocabulary and receptive vocabulary. However, in Laufer's (1998) study, students made no progress in their productive vocabulary after 180 hours of teaching. Zhong and Hirsch (2009: 103) accounted for the difference in findings related to progress in productive vocabulary knowledge by focusing on the type of teaching conducted in the respective studies: in their study, productive tasks took precedence. This, they believe, might have explained the progress made in productive vocabulary after 50 hours of teaching in their study.

Recent research has seen a focus on collocations and their importance, especially in terms of production, for L2 learners. Researchers such as Nesselhauf (2005), Laufer and Waldman (2011) and Altenberg and Granger (2001) have highlighted the difficulty these combinations pose for learners. But, as Nizonkiza, Van Dyk and Louw (2013: 166) observe, there is no clear evidence as yet of how much productive knowledge of collocations students need to 'function independently at tertiary level'. In their study, they used a collocation test based on the productive versions of the VLT (Laufer and Nation, 1999). Students were asked to provide the collocate in a sentence, with only the first two letters of the target word provided. Taking 80% as mastery level for each word level, the authors found that only the 2000-word level had been mastered by all students, and that over 60% had not mastered the 3000-word level or the AWL, deemed by Nation (1990) to be the minimum level of productive vocabulary for success at university level (Nizonkiza et al., 2013).

It is clear from the above that estimating the size of productive vocabulary required by tertiary level students is an area that requires further investigation.

4. Vocabulary in the South African context

In South Africa, many students enter university with low reading levels and a vocabulary that is not adequate (in other words, little knowledge of words beyond the high-frequency

levels) for the tasks of academic reading and writing (Cliff, Ramaboa & Pearce, 2007; Weideman, 2013; Pot & Weideman, 2015). In her study, for example, Cooper (2000) found a relationship between the breadth (size) of the vocabulary knowledge of first-year students at a South African university and their academic performance. Many of the students in her study lacked both the high-frequency and the academic word knowledge to cope with reading academic texts (Cooper, 2000: 28), and this would have repercussions for students' writing abilities.

In a recent study in which they explored the importance of vocabulary size to academic literacy, Nizonkiza and Van Dyk (2015: 156) used the VLT (Schmitt et al., 2001) to measure vocabulary size, up to the 5000-word level, of a group of first-year students. They found that, on average, students had a vocabulary size of 4500 words (using the formula applied by Laufer and Ravenhorst-Kalovski (2010:21) to provide the missing 4000-word level), enough vocabulary to follow lectures delivered in English. Nizonkiza and Van Dyk (2015) then investigated the relationship between these students' vocabulary size and their academic literacy by comparing their scores on the TALL (Test of Academic Literacy Levels) to those on the VLT. Scores on the TALL place students at a particular risk level: 1 – extremely high risk; 2 – high risk; 3 – borderline case; 4 – low risk; 5 – low to no risk (Nizonkiza & Van Dyk, 2015:154). The results of this comparison suggested that the higher the risk category, the smaller the students' vocabulary size; and the converse, the closer students were to the low to no risk category, the larger their vocabulary. Pearson correlations revealed a strong relationship between vocabulary size and academic literacy: students who scored highly on the TALL had larger vocabularies. These authors concluded that if academic literacy is considered a strong predictor of academic success then students with larger vocabularies would be more likely to be successful academically (Nizonkiza & Van Dyk, 2015).

Although the relationship between vocabulary and reading comprehension and between vocabulary and academic literacy has been well established, there is less evidence for the relationship between vocabulary knowledge and academic performance or success at university in this country. This study hopes to make this relationship somewhat clearer by focusing on the relationship between productive vocabulary knowledge and academic performance.

5. The study

I set out to explore students' productive vocabulary knowledge by measuring their performance on the different bands of a productive version of the VLT and investigating the effects of course of study and gender on students' scores, and the relationship between the size of students' productive vocabulary and their academic performance. The use of this test was justified as it assesses both breadth and some depth of vocabulary knowledge. Another reason for using it was that in a pilot study (see Scheepers, 2014) the use of a receptive version of the VLT did not discriminate satisfactorily between students.

The research questions were:

1. *Are there significant differences in the size of productive vocabulary of students in two courses, Literature and Law?*

2. *Are there significant differences in the size of productive vocabulary of male and female students?*

3. *Is there a relationship between performance on a test of productive vocabulary and academic performance?*

5.1 Context of the study

The study was conducted at the University of South Africa (Unisa), an open and distance e-learning institution. The student population is multicultural and multilingual, but the medium of instruction is English and, in order to obtain a degree, students must be able to read and write in English at an advanced level. The sample was taken from a specific population (students in the College of Human Sciences).

5.2 Participants

Students at Unisa come from a range of language backgrounds, including the nine official indigenous African languages, and for many of them English is a second or even a third language. Although most complete their high school education through the medium of English, their exposure to English is in many cases limited, with the result that by the time they reach university they may have low reading levels, they may not have mastered the written idiom and may have only a developing knowledge of academic English in particular. Students are increasingly unwilling to read on their own, showing a reluctance to read even their prescribed books. Nel and Adams (2014: 58) observed similar attitudes among their students. They found that students, particularly weaker ones, actively avoided reading their course material, even paying their more proficient classmates to do the reading and to make summaries for them.

The study involved two groups of students, drawn from some 4000 students enrolled in three modules in the Department of English Studies. Two of the modules, comprising literature content and making up the first level of the major, were combined and are referred to in the study as *Literature* while the third was a communication for law module, designed as a service course for law students, referred to here as *Law.*

In the final sample of 298 students, 139 were in the Literature group and 159 in the Law group. Women outnumbered men, with the former making up almost three-fifths of the sample (59.3%): 175 women and 123 men. Of these students, 28 men and 111 women were in the Literature course, and 95 men and 64 women in the Law course: a split of approximately 20:80 between male and female students in the Literature course, and 60:40 in the Law course.

Table 1: Students' gender according to course of study

	Course of study		
	Literature (%)	**Law (%)**	**Total (%)**
Male	28 (20,1)	95 (59,7)	123 (41,2)
Female	111 (79,8)	64 (40,2)	175 (58,7)
Total	139	159	298

Almost three-fifths (57.9%) of the students indicated that their home language was not English. Of this 57.9%, 41.1% were mother tongue speakers of an African language. The sample, though small relative to the enrolment numbers at the university (approaching 400 000), can be reliably regarded as representative of students registered in the Human Sciences at any South African university. It includes 'the full range of variability in a population' (Biber, 1994, cited in Tognini-Bonelli, 2001: 59), representing speakers of all 11 languages that have official status in South Africa, and several foreign languages besides.

It was assumed that students in this sample would fall into the 'intermediate' or 'proficient learner' category (according to the research done in the National Benchmark Tests Project[1] [2009]), having had at least nine years of schooling, from Grade 4 to 12, in English as LoLT (language of learning and teaching). Student age ranged from 18 to 68, with 20% under the age of 20 at the time of the study and just under half (48.5%) below 40 years of age. The student body from which the sample was drawn was thus on average more mature and more diverse in age than would probably have been the case at a residential university.

1 'Proficient: Performance in domain areas suggests that academic performance will not be adversely affected. If admitted, students should be placed on regular programmes of study. Intermediate: Challenges in domain areas identified such that it is predicted that academic progress will be affected. If admitted, students' educational needs should be met in a way deemed appropriate by the institution (e.g. extended or augmented programmes, special skills provision)' (National Benchmark Test Project, 2009).

5.3 Instruments

An active version of the VLT (Laufer and Nation, 1995) was used to determine students' mastery of productive vocabulary. This is a word completion test used by Laufer and Nation (1995) when they were developing the Lexical Frequency Profile as a measure of lexical sophistication. This version of the VLT comprises five levels testing different bands of vocabulary: 2000-, 3000-, 5000-word levels, the UWL and the 10 000-word level. The University Word List (UWL) (Xue and Nation, 1984) is a list of academic words commonly found in academic discourse across disciplines, today largely replaced by the Academic Word List (AWL) (Coxhead, 2000). Students also completed a questionnaire from which biographical data such as age, course of study, gender and language background were elicited. Academic performance was operationalised in terms of students' scores in the end-of-semester examination in each of these courses. These examinations comprised two essay questions for the Literature students, and a multiple-choice comprehension test and an essay in the case of the Law students.

5.4 Procedures

All students registered for these modules at the time were sent a questionnaire and a copy of the VLT and asked to complete both and return them in the stamped envelope provided. Completing the test unsupervised might have compromised the validity of the data, but Chronbach's alpha on the total scores indicated a high level of internal consistency at .901. Of the initial sample of 346 students who returned the test and the questionnaires (an 8% response rate), 298 students also wrote the examination. The data comprised the scores on the VLT and the examination scores of these 298 students. The software SPSS (IBM SPSS Statistics Version 21) was used for all statistical analyses of the data in this part of the study. This is discussed in more detail in the following section.

6. Results

The results for each research question are reported in turn in this section.

6.1 Comparing productive vocabulary knowledge of Literature and Law students

Research Question 1: *Are there significant differences in the size of productive vocabulary of students in two courses, Literature and Law?*

The first research question was addressed by calculating the mean scores of students on each level of the VLT and their total mean score for the whole test, according to course. This indicated which levels of vocabulary had been mastered by students. Table 2 below reflects the Literature and Law students' mean scores (percentages), standard deviation (SD) and mean scores at percentiles on the VLT. Percentile scores were used in this study to indicate a student's relative position with respect to all the other students

in the particular group. In other words, students in the 75th percentile, for instance, scored higher than 75% of the students in that group (Richards & Schmidt, 2002: 391). This was merely used as a descriptive statistic.

Table 2: Scores on VLT according to course (RQ 1)

Course type		Level1% 2 000	Level2% 3 000	Level3% 5 000	Level4% (UWL)	Level5% 10 000	Total %
Literature	Mean	91.41	79.50	64.21	66.23	40.41	68.18
	Std dev.	19.32	15.85	24.15	19.48	30.45	18.08
	25thperc	82.35	72.22	50	50	11.11	52.87
	50th perc	94.12	83.33	68.75	66.67	33.33	70.11
	75th perc	100	94.44	81.25	83.33	66.67	83.91
Law	Mean	86.20	69.78	52.32	58.91	27.36	58.75
	Std dev.	12.76	20.48	25.83	20.56	24.35	18.54
	25thperc	82.35	55.56	31.25	44.44	5.56	44.83
	50th perc	88.24	72.22	50	61.11	22.22	58.62
	75th perc	94.12	88.89	75	72.22	44.44	73.56
Total	Mean	88.63	74.31	57.86	62.32	33.45	63.15
	Std dev.	16.34	19.05	25.71	20.36	28.09	18.89

At a glance, it is clear that many students in this group were some way from developing mastery (set in this study at 85%) of any but the most basic level of vocabulary, the 2000-word level, a worrying phenomenon considering that they were first-year university students. Other trends are also apparent in these results: overall, the Literature students outperformed the Law students at all levels of the test, with mastery at the 2000-word level. They achieved much better scores on higher frequency vocabulary (the first two levels), as well as, significantly, on Level 3, the crucial level for the development of academic vocabulary, although neither group had achieved mastery at this level. Literature students also knew more academic words (Level 4). When considering the percentile levels, this trend is as pronounced at the 75th percentile level, the more proficient students in the group, though less defined among weaker students (the 25th percentile level). This reflects the reality that many students who enter university at a disadvantage because of poor literacy levels, whatever course they follow, may struggle to catch up and develop their vocabulary to levels at which they can begin to master academic vocabulary.

In order to examine more closely the differences in scores on vocabulary levels according to academic course, a one-way analysis of variance (ANOVA) was applied. An ANOVA was used here as there were two groups with six levels in each and this test reflects whether there is an overall difference between groups.

The results showed some significant differences between course and vocabulary levels: these differences were highly significant at Level 2 ($F_{(1, 296)} = 20.545$, $p < 0.0005$), Level 5 ($F_{(1, 296)} = 16.867$, $p < 0.0005$), Level 3 ($F_{(1, 296)} = 16.694$, $p < 0.0005$) and very significant at Levels 4 and 1 ($F_{(1, 296)} = 9.865$, $p = 0.002$; $F_{(1, 296)} = 7.710$, $p = 0.006$ respectively). Thus while the Literature group performed significantly better than the Law group at every level of the VLT, neither group had reached mastery level (85%) at anything other than Level 1, the 2000-word level. The significant difference between the two groups' mean scores on Level 2 (3000-word level) and on Levels 3 (5000-word level) and 4 (academic words) was striking as these are particularly important levels in the context of university study.

6.2 Comparing productive vocabulary knowledge of male and female students

Research Question 2: *Are there significant differences in the size of productive vocabulary of male and female students?*

In order to address this question, vocabulary scores at each level were calculated according to students' gender. The results displayed in Table 3 reflect the descriptive results and the results of the ANOVA for vocabulary differences according to gender:

Table 3: Scores on VLT according to gender (RQ 2)

Gender		Level1	Level2	Level3	UWL	Level5	Total
Male N = 123	Mean	84.70	66.58	48.42	56.78	24.53	56.05
N = 123	Std dev	13.551	20.628	24.711	20.088	23.612	18.217
Female N = 175	Mean	91.39	79.75	64.50	66.22	39.71	68.14
N = 175	Std dev	17.554	15.815	24.354	19.686	29.319	17.777
F value							.027
df							1, 296
Sig		.000	.000	.000	.002	.000	.000

As can be seen from Table 3, these results indicate that female students outperformed males consistently across all levels of the VLT, in some cases by more than 10%. ANOVAs revealed that these differences were very significant ($p \leq 0.005$) at all levels. When means according to course and gender were compared, the results were as follows:

Table 4: Total vocabulary scores according to gender within courses

Course type	Gender	Mean	N	*Sd*
Literature	Male	64.12	28	19.326
	Female	69.20	111	17.694
Law	Male	53.67	95	17.272
	Female	66.29	64	17.909

Table 4 indicates that gender differences did emerge within courses, particularly in the case of the Law students, where differences between male and female students were greater than in the case of the Literature students. In order to test for significant differences, an independent t-test was included between male and female total vocabulary results within each course. These tests indicated that there were no significant differences between overall means in the case of the Literature students. However, the difference between male and female scores in the Law course was significant (F = .243, p = 0.000). These results were confirmed by running a one-way ANOVA on the split files, in which men and women per level per course group were compared: no significant differences were found among the Literature students, but in the case of the Law course significant differences were found at all levels.

6.3 The relationship between students' productive word knowledge and their academic performance

***Research Question 3**: Is there a relationship between performance on a test of productive vocabulary and academic performance?*

Academic performance was operationalised in this study by the percentage scores achieved by students in the end-of-semester examination. The percentiles are indicated merely as descriptive statistics to indicate dispersion among weak, average and strong performance bands per VLT level and per exam. The results are presented in Table 5.

Table 5: Scores on VLT and Examination according to course (RQ 3)

Course type		Level 1% 2000	Level 2% 3000	Level 3% 5000	Level 4% (UWL)	Level 5% 10,000	Total Vocab %	Exam %
Litera-ture	Mean	91.41	79.50	64.21	66.23	40.41	68.18	52.73
	Std dev.	19.32	15.85	24.15	19.48	30.45	18.08	12.22
	25th perc	82.35	72.22	50	50	11.11	52.87	45
	50th perc	94.12	83.33	68.75	66.67	33.33	70.11	53
	75th perc	100	94.44	81.25	83.33	66.67	83.91	62
Law	Mean	86.20	69.78	52.32	58.91	27.36	58.75	56.38
	Std dev.	12.76	20.48	25.83	20.56	24.35	18.54	13.21
	25th perc	82.35	55.56	31.25	44.44	5.56	44.83	47
	50th perc	88.24	72.22	50	61.11	22.22	58.62	57
	75th perc	94.12	88.89	75	72.22	44.44	73.56	66
Total	Mean	88.63	74.31	57.86	62.32	33.45	63.15	54.68
	Std dev.	16.34	19.05	25.71	20.36	28.09	18.89	12.87

The results indicate that neither of the two groups performed particularly strongly in the examination, with the Law students doing marginally better than those in the Literature group. The slightly better performance by the Law students, in contrast to the generally better performance by the Literature students in the VLT, could be the result of the fact that the Law examination paper included a multiple-choice component, counting 50% towards the final mark, as well as an essay, while the Literature papers required two answers of extended writing by way of essay-type responses. Thus the Law students' final exam marks may have been boosted by a mark from the multiple-choice component.

The relationship between productive vocabulary knowledge and academic performance was analysed further by performing Pearson correlations. A correlation matrix between the various word levels as well as total vocabulary scores and examination scores is provided in Table 6. The results reveal a robust relationship between overall productive vocabulary knowledge (Total Vocab) and performance in the examination (r = .63, p < 0.000). It is interesting to note that knowledge of words at the 5000-word level and the UWL also showed strong correlations with exam performance (.62 and .60 respectively).

Table 6: Correlations between VLT and examination scores

N = 298	Level1 2 000	Level2 3 000	Level3 5 000	Level4 UWL	Level5 10 000	Vocab Total
Level2 3000	.589**					
Level3 5000	.490**	.804**				
Level4 UWL	.427**	.766**	.802**			
Level5 10 000	.396**	.712**	.810**	.756**		
Exam	.342**	.570**	.623**	.605**	.551**	.637**

** Correlation is significant at the 0.01 level (2-tailed)

In order to determine which of these word levels best predicted examination scores, a multiple regression analysis was performed on the group as a whole. The relative contribution of each predictor variable, in this case the different vocabulary levels, can be assessed in several different ways. 'In the "simultaneous" method (which SPSS calls the Enter method), the researcher specifies the set of predictor variables that make up the model. The success of this model in predicting the criterion variable is then assessed' (Brace, Kemp & Snelgar, 2003: 214). Using this method, a significant model emerged: adjusted R^2 = .413 ($F_{5, 292}$ = 42.87, p < 0.0005). The predictor variables for academic performance were Level 3 (β = .276, p = 0.046) and the UWL (β = .219, p = 0.052).

When a multiple regression was done separately on each of the courses, using the stepwise[2] method, a significant model emerged in each case: for Literature the adjusted R^2 = .514 ($F_{5, 133}$ = 135.341 p < 0.0005) and for Law the adjusted R^2 = .498 ($F_{5, 153}$ = 150.121 p < 0.0005). In both groups the Total Vocabulary score was a predictor[3] for exam performance, but the vocabulary levels that were predictor variables for the two courses differed, with Level 3 (5000-word level) the strongest predictor variable for Literature and Level 4 (UWL) the strongest predictor variable for Law. This is reflected in Table 7:

2 'Each variable is entered in sequence and its value assessed. If adding the variable contributes to the model then it is retained, but all other variables in the model are then re-tested to see if they are still contributing to the success of the model. If they no longer contribute significantly they are removed. Thus, this method should ensure that you end up with the smallest possible set of predictor variables included in your model' (Brace et al., 2003: 214).

3 The beta value (β) is a measure of how strongly each predictor variable influences the criterion variable. The beta is measured in units of standard deviation […]. The higher the beta value the greater the impact of the predictor variable on the criterion variable' (Brace et al., 2003: 212).

Table 7: Predictor variables: stepwise method

	Predictor variable	beta value (β)	Sig.
Literature	Level 3	.355	0.01
	Total vocab	**.386**	**0.005**
Law	Level 4	.300	0.027
	Total vocab	**.426**	**0.002**

These results underline the particular importance of the 5000-word level and academic words when it comes to explaining the link between academic performance and vocabulary size. This is discussed in more detail below.

7. Discussion

The findings are discussed according to the research questions. In answer to the effect of course of study on scores on the VLT (Research Question 1), it is clear that while the Literature group outperformed the Law group at every level of the VLT, these results also reflected that neither group as a whole had reached mastery level (85%) at anything beyond Level 1, the 2000-word level. The gap between the two groups' mean scores on Level 2 (3000-word level) and on Levels 3 (5000-word level) and 4 (academic words) was also particularly striking as these are important levels in the context of university study: students need to have mastered at least the 3000-word level and should also be approaching mastery of the 5000-word level if they are to cope with the demands of academic reading (Laufer, 1997; Schmitt et al., 2001; Nation, 2006; Laufer and Ravenhorst-Kalovski, 2010). In fact, Laufer and Ravenhorst-Kalovski (2010:25) found that to be 'independent' readers, learners could need as many as 6000 to 8000 words. As for productive estimates, most students in this study had not mastered the 3000-word level, set by Nation (1990) as the size required for university study. This finding points to the need for intervention if students are to increase their vocabulary size and depth of knowledge to the levels they need to succeed in a learning environment that demands the reading of academic texts and that favours written assessment. These findings are similar to those of Nizonkiza et al. (2013), who found that while the 2000-word level had been mastered by their whole sample, over 60% had not mastered the 3000-word level or the AWL.

The fact that students in the two courses in this study were assessed somewhat differently, the Literature group by means of two written assignments and a written examination while Law students' assessment included reading cases and answering multiple-choice questions, suggests that Literature students did more writing and also read more widely, which might partly explain their greater vocabulary knowledge.

In answer to Research Question 2, women performed more strongly on all levels of the VLT and in the examination than their male counterparts. This finding may be related to the fact that Literature students outperformed Law students at all levels: there were more women students in the Literature course, and more men in the Law course. When means according to course and gender were compared, no significant differences were found between means in the case of the Literature students; however, the difference between male and female means in the Law course was significant.

The fact that differences between male and female students in the Literature course were not significant suggests that reading and writing about literature does help male students to build their vocabulary and convert receptive into productive knowledge. The significant difference between men and women in the Law course follows the general trend in the study of women having larger vocabularies than men, regardless of course, and suggests that this course offered fewer opportunities for building vocabulary knowledge.

As far as the whole group of students was concerned, mastery had been achieved only at Level 1, but the percentile levels indicate that those in the 25th percentile and below had not even mastered this level: this suggests that many students may actually have been in the lowest category of the NBT, the basic level – that is, students in need of 'extensive and long-term support' (NBT, 2009) on entering university. If students do not have this vocabulary knowledge they are likely to find university study particularly challenging, particularly in a distance education context. Such students may have difficulty in developing their vocabulary to levels at which they can begin to master academic vocabulary and thrive in academic study. On the other hand, only students in the top percentile had mastered the minimum threshold of the 3000-word level (Nation, 2006), a finding similar to that of Nizonkiza et al. (2013), and one that does not bode well for their chances of success at university.

Research Question 3 investigated the relationship between size of students' productive vocabulary (indicated by their scores on the VLT) and their academic performance. Examination scores, for better or worse, are what allow students access to university in the first place and then to advance to graduation. In a sense, in this study the examination was the great leveller – all students, regardless of course or gender, fared rather poorly, with the Law group outperforming the Literature group in mean exam performance, and the ANOVA reflecting a significant difference in scores. However, this may be the result of the nature of the examination paper. Literature students may have been at a disadvantage, assessed as they were purely on a subjective written test with no objective component (such as a multiple-choice test, as in the Law exam) to boost their scores, and also by having to write two extended texts under pressure. If students' productive vocabulary was small, as indicated by the test scores, it is likely that this would have had an effect on their writing ability and the quality of their essays (see Laufer & Nation, 1995).

As far as the relationship between productive vocabulary knowledge and academic performance is concerned, there was certainly a link. Correlations revealed a robust relationship between productive vocabulary knowledge and performance in the examination. Unlike most studies that rely only on correlations between vocabulary size and academic performance, this study used a more powerful statistical tool to determine the effect of vocabulary knowledge on academic performance, namely multiple regression analysis. Focusing on students' scores according to course, multiple regressions revealed that the 5000-word level and academic words (Level 4) were the predictor variables for Literature and Law students respectively. In other words, students' scores at these levels best predicted their chances of academic success. These findings are in keeping with those of other studies which have shown that a good knowledge of the first 5000 words of English and some knowledge of academic vocabulary are vital to successful reading at university level (Laufer, 1997; Nation, 1990; Nation and Waring, 1997; Paquot, 2010; Schmitt et al., 2001:56; Nation, 2006; Laufer & Ravenhorst-Kalovski, 2010) and that students need a productive vocabulary of at least 3000 words. Nizonkiza et al. (2015: 162) also found these levels to be predictive of academic literacy, together with the 3000-word level.

Literature students who were approaching mastery of the 5000-word level could be expected to do better at university: these are the words that scholars such as Nation (1990) believe to be vital for academic study and also for a platform from which to move to academic words, and which Nation (2006) and Laufer and Ravenhorst-Kalovski (2010: 26) found provided only 95%, the 'minimally acceptable coverage'. The fact that overall, Literature students were not close to mastering the 5000-word level, with only the students in the top percentile approaching mastery is another indication that these students might be in need of support if they are to succeed in academic study.

As for the Law course, performance on the academic word level was even more concerning, with a mean of 58.9% and even the highest percentile not nearing mastery. The more words one knows at the academic word level, the better one's academic performance is likely to be: in this study, however, no students had approximated mastery at this level. The fact that the academic word-level was the predictor variable for the Law students may suggest something about the Law course itself: the texts they were required to read were couched in legal terms, and were often jargon heavy. Nor did the nature of the Law course encourage the conversion of receptive vocabulary into productive vocabulary: most of the reading material comprised cases and shorter passages. There was no reading of extended texts such as novels, and little opportunity to practise their writing skills. These students were thus unlikely to grow their productive vocabulary skills at the same rate as Literature students who were reading extended texts and writing more and longer texts.

That many students in this study were *not* approaching mastery level at the 5000-word level is particular cause for concern. One can pick up words through oral discourse (that is, BICS) up to the 3000-word level – but knowledge of words at the 5000-word level is essential if CALP skills are to develop (Cummins, 1999). These are words not

typically encountered in everyday conversation but in written texts, and these findings suggest that students who knew these words had had a fairly extensive exposure to written language, that is, through reading, and reading for pleasure beyond the confines of the classroom, and that this had led to the conversion of receptive vocabulary into productive vocabulary (Laufer, 1998; Laufer and Paribahkt, 1998).

There were significant differences between the two course groups at this level and highly significant differences at the UWL level, suggesting that the Literature students would be likely to outperform the Law students in academic writing. The more words one knows, the better one can be expected to perform in a written examination. The predictor variables identified in this study are thus significant in explaining the link between vocabulary knowledge and academic performance.

8. Implications

These finding have implications for teaching. If, as this study has shown, there is a relationship between vocabulary knowledge and the likelihood of success in tertiary studies, then information about students' vocabulary knowledge will allow teachers to focus on areas that need more attention. This study revealed that for many of these students, their vocabulary was inadequate for university studies, and that interventions to improve this were called for. If the 5000-word level and academic words are predictor variables for academic success, then it is troubling that so few students had achieved scores close to mastery at these levels. What is even more disturbing is the fact that, as in the case of students in Nizonkiza et al.'s (2013: 174) study, these students were very far from meeting Nation's (1990) 'minimum threshold' of 3000 words of productive vocabulary, and given the type of university they were attending, it is unlikely that they would achieve this without some form of focused teaching of vocabulary. In this case, students would require instruction not only in mid-range vocabulary identified by Schmitt et al. (2014), that is the 3000-word to 5000-word level, but also, vitally, in the 2000-level.

These findings also suggest that learners were not getting enough opportunities to convert their receptive vocabulary knowledge into productive vocabulary (Laufer, 1998; and Laufer and Paribahkt, 1998). Distance education requires considerable reliance on self-study and motivation and may be fairly isolated, giving students little opportunity to practise their vocabulary and convert receptive to productive knowledge. Research such as the study by Nel et al. (2014) has shown that South African students can be reluctant readers; the only way to convert receptive to productive vocabulary knowledge is by reading extensively and practising one's word knowledge in productive tasks (Staehr, 2008). Further research is required to investigate strategies to develop students' vocabulary and methods of implementing these strategies in a distance education setting.

9 Conclusion

This study investigated students' productive vocabulary knowledge by means of a vocabulary levels test, and the link between this knowledge and academic performance. Among this group of South African undergraduate students, course of study and gender were found to be indicators of vocabulary knowledge, with Literature students performing better at all levels of the VLT than their Law counterparts, and women outperforming men at all levels of the test. Correlations indicated a relationship between productive vocabulary knowledge and academic performance and multiple regressions revealed that the 5000-word level and the UWL were particularly significant as they were identified as the predictor variables for Literature and Law students respectively. That neither group had achieved mastery at these levels raises concerns about their chances of success at university and underlines the need for interventions to help students to develop their vocabulary knowledge.

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Jenale ya Thuto ya Dipuo - Ijenali Yekufundzisa Lulwimi
- Jena?a ya u Gudisa Nyambo - Jenala yo Dyondzisa
Ririmi - Tydskrif vir Taalonderrig - Journal for Language
Teaching - Ijenali yokuFundisa iLimi - IJenali yokuFundisa
iiLwimi - Ibhuku Lokufundisa Ulimi - Tšenale ya tša Go ruta
Polelo - Buka ya Thuto ya Puo - Jenale ya Thuto ya Dipuo -
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- Jenala yo Dyondzisa Ririmi - Tydskrif vir Taalonderrig -
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