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**Breadth and Depth of Academic Vocabulary Knowledge: Assessing their roles
in Academic Reading and Writing of English Language Learners**
by 1.Chew-Wei, Lee & 2.SoubaRethinasamy

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by

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Abstract

The study investigated the relationship between English language learner's (ELL) academic vocabulary and their performance in academic reading and writing. The specific objectives were to determine the relationship between breadth and depth of academic vocabulary knowledge and the academic reading comprehension and writing of ELL and to find out the extent to which scores on breadth and depth of academic vocabulary knowledge contribute to ELL's performance in academic reading and writing. Quantitative research design was employed in the study where language tests which were Vocabulary Levels Test (VLT), the Productive Vocabulary Levels Test (PVLVT), the Depth of Vocabulary Knowledge (DVK) Test, a Reading Comprehension (RC) test and a Writing Composition were administered to 90 UniversitiMalaysia Sarawak (UNIMAS) undergraduates. For the analysis, Pearson correlation and multiple linear regression were used. Pearson correlation analysis showed that there was a positive correlation between breadth and depth of academic vocabulary with both academic reading comprehension and writing performance of ELL in UNIMAS. Vocabulary depth had a stronger correlation with academic reading comprehension while vocabulary breadth had a stronger correlation with academic writing. Both dimensions of vocabulary knowledge were positively correlated with each other. The analysis of multiple linear regression revealed that both dimensions of academic vocabulary knowledge contributed a moderate proportion to the variance of academic reading comprehension and writing although vocabulary depth predicted more to the overall variance of academic reading comprehension while vocabulary breadth was a more powerful predictor of ELL's performance in academic writing. Both breadth and depth of academic vocabulary knowledge were powerful predictors of reading comprehension and writing performance of learners and therefore a combination of these two dimensions will aid in better performance rather than just one alone. Thus, the teaching and learning of the English language should emphasize in vocabulary building in terms of enriching learners' vocabulary storage as well as improving the usage of vocabulary in context by understanding the meaning.

Keywords: Vocabulary knowledge, breadth of vocabulary knowledge, depth of vocabulary knowledge, academic reading, academic writing



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Introduction

The English language is a global language spoken across the world and also an important second language (L2) which is widely used and spoken in previous British colonies such as Malaysia (Graddol, 1997). In Malaysia, a bilingual education policy is employed in which the national language is the Malay language while English, on the other hand is the additional language or L2 (Darmi & Albion, 2013). This enhances the existence of English side by side with the indigenous languages in Malaysia, recognizing its functions as the international language used in the domains of politics, economy, media, jurisdiction, higher education and so on (Roche & Harrington, 2013). English is also viewed as a vital element to achieve development and acquire knowledge (Thirusanku & Yunus, 2014). Therefore, being competent in the English language is considered important especially in the education domain since competency in this language can serve as a pathway to better academic achievement (Bellingham as cited in Rethinasamy & Chuah, 2011). The unsatisfactory competence in English among Malaysia learners is a concern among the educators, especially for those in the tertiary institutions since the vital role of English in tertiary institutions has long been recognised (Darmi & Albion, 2013; Rethinasamy & Chuah, 2011). In particular, English is considered very important in university academic reading and writing as these two skills are two of the most important skills in academic-bound context and majority of assignments which university students need to complete are reading assignments, written assignments and coursework in English (Folse, 2004). Therefore, this study intends to look at university students' reading and writing performance with relation to their vocabulary knowledge.

Vocabulary has undeniably been considered as one of the most crucial aspects in language learning. Learners often detect that their problem in receiving language and producing language is due to insufficient vocabulary (Nation as cited in Nebbe, 1999). In other words, a language learner has to know words to receive information in a language by reading texts and listening to others and also need to have knowledge of words in order to produce intended message and communicate effectively through writing and speaking (Bintz, 2011). Therefore, a learner's



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vocabulary knowledge will affect one's overall performance and proficiency in that language and in turn affect one's academic skills and educational success at schools and general intelligence as well (Anderson &Freebody, 1981;Santos, 2010; Vermeer, 2001).

In general, there are two basicdimensions of vocabulary knowledge which can be measured which are the breadth of vocabulary knowledge or vocabulary size and the depth of vocabulary knowledge (Anderson &Freebody, 1981; Qian, 1998, 1999). Breadth of vocabulary knowledge is defined as “the number of words for which a learner has at least some minimum knowledge of meaning” (Qian, 1998, p. 13) or how many words a learners know while depth of vocabulary knowledge or quality of vocabulary knowledge is about “how well the learner knows the word” (Shen, 2008, p. 136) which is one's knowledge of the various aspects associated with a word such as pronunciation, spelling, multiple meanings, register, frequency, connotations, morphology, syntaxor grammar, stylistic possibilities, appropriate uses, collocations, semantic associations and idioms containing the target words (Nation as cited in Vermeer, 2001; Qian, 1998; Shen, 2008).

Literature review

Vocabulary knowledge and reading comprehension

Vocabulary knowledge had been found to be an important component in reading comprehension (Anderson &Freebody, 1981; Mezynski, 1983; Qian, 1998, 1999) because if one does not know words, it is impossible for one to understand the whole text (Mezynski, 1983; Vermeer, 2001). This is proved by the many researchers who had attempted to study the relationship between vocabulary knowledge and reading comprehension. For example, Mezynski (1983) found that a considerable amount of variance in the factor analyses of reading comprehension tests was accounted by vocabulary knowledge. From those researches, contradictive findings were obvious as some researchers concluded that breadth of vocabulary knowledge is a more powerful predictor to reading comprehension such as the research of Farvadin and Koosha (2011). They reported that breadth of vocabulary knowledge has stronger relationship with reading



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comprehension of 78 freshmen majoring in Teaching English as a Foreign Language (TEFL) at a university in Iran. Similarly, Elmasry's (2012) study also concluded that breadth of vocabulary knowledge is more significant in predicting reading comprehension performance of 93 high school grade 12 students from five secondary schools in the United Arab Emirates.

On the contrary, several researches reported that the relationship between depth of vocabulary knowledge and scores on reading comprehension is stronger than that between breadth of vocabulary knowledge and reading comprehension. For example, Qian (1998) explored the relationships between vocabulary breadth, vocabulary depth and reading comprehension of 74 adult English as a Second Language (ESL) learners from China and South Korea studying in two universities in Ontario, Canada and he concluded that the prediction by depth of vocabulary knowledge to the scores in reading comprehension was the highest. Also, Rashidi and Khosravi (2010) examined the extent to which scores on depth and breadth of vocabulary knowledge add to the prediction of English as a Foreign Language (EFL) learners' performance in reading and depth of vocabulary knowledge is proved to have a stronger relationship to reading comprehension.

Vocabulary knowledge and writing

Laflamme (as cited in Brynildssen, 2000) who stated that both the process of reading and writing are similar processes that involve the production and organization of ideas. Hence, if vocabulary is important to reading then vocabulary is important to writing too (Brynildssen, 2000). Nadarajan (2011) also stated that L2 learners always face hardships in their writings due to their inadequate knowledge on vocabulary. Studies by past researchers also found that the lack of vocabulary increases the difficulties students faced in their process of writing in a second or foreign language (Leki & Carson, 1994; Raimes, 1985) and vocabulary proficiency is the main factor in indicating the quality of a written composition (Astika, 1993; Santos, 1988). Yet, not much research has been done devoted to the relationship between academic vocabulary knowledge and writing performance of L2 learners. Stæhr (2008) studied the relationship between breadth of vocabulary knowledge and the writing abilities along with other skills which



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are listening and reading of 88 Denmark EFL students from lower secondary schools. His results showed that students' receptive vocabulary size was significantly connected with their writing and reading skills but only averagely associated with their abilities in listening. However, there is limited study that examines the role depth of vocabulary knowledge play in writing performance of learners.

The study

On the whole, this present study thereby attempted to investigate the relationship between English language learners' academic vocabulary and their performance in academic reading and writing to answer the following research questions:

1. How do scores on breadth of academic vocabulary knowledge, depth of academic vocabulary knowledge and the academic reading comprehension of ELL correlate with each other?
2. How do scores on breadth of academic vocabulary knowledge, depth of academic vocabulary knowledge and the academic writing of ELL correlate with each other?
3. To what extent can breadth and depth of academic vocabulary knowledge predict ELL's scores in academic reading comprehension?
4. To what extent can breadth and depth of academic vocabulary knowledge predict ELL's scores in academic writing?

Methodology

Research design

This study employed quantitative method which included language tests and the data were analysed by conducting statistical analysis using the Statistical Package for Social Science (SPSS) Version 20. The language tests used in this study were the Vocabulary Levels Test (VLT), the Productive Vocabulary Levels Test (PVLTL), the Depth of Vocabulary Knowledge (DVK) Test, a Reading Comprehension (RC) test and a Writing Composition.



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Participants

For the current research, the sample chosen was 90 UNIMAS undergraduates taking academic English programme offered by the Faculty of Language and Communication Studies of UNIMAS which is Academic Reading and Writing (ARW). This course was chosen since it was a course that aimed to develop students' ability in both reading and writing for academic purposes. For students who wish to enroll in this course, they need to have Band 4 in the Malaysian University English Test (MUET) or successfully pass Preparatory English 2 offered by the same faculty. In this study, all participants selected were Malaysian students learning ESL as English is the official second language in Malaysian context.

Instruments

The Vocabulary Levels Test (VLT)

According to Nation (2008), the Vocabulary Levels Test (VLT) is a diagnostic vocabulary test developed to identify which frequency level of vocabulary the learners know well and what they do not know and need more attention, giving researchers a profile of learners' vocabulary rather than just an overall estimation of vocabulary size (Schmitt, Schmitt, & Clapham, 2001). A total of five levels of vocabulary is sampled in this test which includes the 2nd 1000-word level, (2,000 word level), the 3rd 1000-word level (3,000 word level), the 5th 1000-word level (5,000 word level), the 10th-word level (10,000 word level) and the AWL. There are a total of 30 items in each level in this current version of VLT compared to the 18-item old version VLT which Nation (2008) considered better. Below is an example from the 2,000 word level test:

1. copy
2. event _____ end or highest point
3. motor _____ this moves a car
4. pity _____ thing made to be like another
5. profit
6. tip



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Every word level contains six sections with six words as shown in the example above. Three definitions are provided and learners are required to match the words with their respective definitions and only three words out of six have their definitions. This makes the total items of this test 150 (30 items each for five levels). Learners are required to answer the test like this:

1. copy
2. event 6 end or highest point
3. motor 3 this moves a car
4. pity 1 thing made to be like another
5. profit
6. tip

In the present study, the only level of vocabulary knowledge that were used to test participants' academic knowledge is the academic vocabulary level based on the AWL since the type of vocabulary knowledge the researcher intended to investigate was the specialized vocabulary or academic vocabulary. This instrument was therefore used to measure participants' receptive academic vocabulary size related to their reading comprehension as it is the "closest thing we have to an accepted measure" (Schmitt, Schmitt, & Clapham, 2001, p. 60).

The Productive Vocabulary Levels Test (PVLТ)

The Productive Vocabulary Levels Test (PVLТ) is a paper and pencil version and it is based on the original versions of VLT (Nation, 2008). It used the same words from the 2,000, 3,000, 5,000, 10,000 and the old University Word List with 18 items at each level making it a total of 90 items.

The examples from the test are as below:

1. I'm glad we had this opp_____ to talk.
2. There are a doz_____ eggs in the basket.
3. Every working person must pay income t_____.
4. The pirates buried the trea_____ on a desert island.



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In this test, learners need to complete the incomplete words by using the few letters provided as a clue and other contextual clues. The initial letters provided only allow a correct answer but minor spelling errors and incorrect inflectional form of the word are acceptable (Nation, 2008). This test is known as a productive test as learners have to produce a word form and it tests on how learners could use the word in writing (Nation, 2008). Therefore, this reliable, valid and practical test serves to measure participants' controlled productive vocabulary related to their writing performance to see whether participants have the ability to use a word according to the contexts (Nation, 2008). In this study, only the academic section of the PVLТ based on the AWL were used as the researcher only aimed to look at the academic vocabulary knowledge of participants.

The Depth of Vocabulary Knowledge test (DVK)

DVK was employed in this study to measure learners' depth of vocabulary knowledge. The test consists of 40 items with each item containing an adjective as the stimulus word. There are two boxes with four words in each box. In the left box, there will be one to three words which share the same or similar meanings with the stimulus word. Of all the four words in the right box, there will be one to three words that collocate or usually appear together with the target word. Every item has four correct answers and any combination is allowed so there may be one answer in the left box and three answers in the other side, or vice versa; or two answers from each box. Every correct answer will be given one point so the maximum mark is 160 for 40 items. An example of the format is as below:

Sound

Synonym	Collocation
A) logical	E) snow
B) healthy	F) temperature
C) bold	G) sleep
D) solid	H) dance



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Reading Comprehension test (RC)

A Reading Comprehension test (RC) was administered to measure the participants' reading comprehension. The RC test used in this study was an adapted International English Language Testing System (IELTS) reading test which originally consisted of 40 questions. The IELTS academic test included three long texts taken from books, journals, magazines and newspapers which range from the genre of descriptive and factual to the genre of discursive and analytical. In the present study, a sample IELTS academic reading test was taken from the British Council website. The types of tasks participants needed to do include true or false questions, multiple choice questions (MCQ), matching features, and sentence-completion based on the texts given. As for scoring, one point was given to every correct answer and thus the maximum score was 25 marks.

Writing composition

One of the components in the final examination of the ARW course was a writing composition in which the students were asked to write a discussion essay of not less than 300 words and 30 marks were allocated for this task. The marking scheme of the discussion essay had been stabilised for many years and this ensured its reliability.

Data collection procedures

In the procedure of collecting data, all ethical considerations were carried out in which the researcher first asked the willingness of students to participate in this study. If the students agreed to cooperate in the study, consent forms were given to them and the students were required to sign the consent forms that mark their willingness to participate in the study. The participants then completed a questionnaire survey that tells their demographic background such as their language background, their faculty and year of study. After that they were given an hour to answer all the tests given properly.



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Data analysis procedures

The data collected was analysed statistically using SPSS Version 20. In this study, descriptive statistics was used to describe the demographic information of the participants. Next, the analysis of data was continued with the scoring of the language tests. The scores of participants in the tests were used to calculate the correlations among all the tests given and also to find out whether breadth of depth of vocabulary knowledge was a stronger predictor of participants' reading comprehension and writing performance. Pearson correlation and multiple linear regression were the methods which were used to analyse the data in this study. To achieve the first two objectives, Pearson correlation analysis was carried out. The variables here are the scores of VLT, PVL, DVK, RC and writing composition. To achieve the third and fourth objectives, a multiple linear regression analysis was carried out. The dependent variable in the present study was the scores on RC and also the scores on writing. The independent variables were the scores on the three vocabulary tests in this study (VLT, PVL and DVK).

Results

Descriptive statistics of participants' performance on the language tests

Descriptive statistics on the results of the participants' performance on the five language tests, namely VLT, PVL, DVK, RC and Writing Composition were computed. The results are tabulated in Table 5.1 which includes the summary of mean, standard deviations, minimum scores, maximum scores as well as maximum possible scores.



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Table 5.1.

Descriptive statistics of key variables (N=90)

Test	Min	Max	MPS	Mean	Standard Deviation
VLT	0	30	30	26.1444	4.41031
PVLT	0	17	18	10.4444	2.91879
DVK	34	136	160	98.8889	21.18057
RC	4	22	25	12.6556	4.75267
Writing	9.5	28.5	30	20.5889	4.99751

Note: MPS, Maximum Possible Score

In Table 5.1 above, the mean of VLT is 26.14 which is relatively high given the maximum possible score was 30. The mean of PVLT, on the other hand, is 10.44 which is only average given the maximum possible score is 18. Next, the mean of DVK is 98.89 while the maximum possible score is 160. RC has an average mean of 12.66 with maximum possible score of 25 marks. Lastly, the mean of Writing Composition is 20.59 with the maximum possible score 30 marks.

Correlation between breadth and depth of vocabulary knowledge with academic reading comprehension

This section discusses the results of the Pearson two-tailed correlation analysis. The results obtained from the analysis had answered the first research question which was to identify the correlation between breadth and depth of academic vocabulary knowledge with academic reading comprehension.

Research Question 1: How do scores on breadth of academic vocabulary knowledge, depth of academic vocabulary knowledge and the academic reading comprehension of ELL correlate with each other?

Table 5.2 shows the results of the Pearson two-tailed correlation analysis for all variables which are RC, VLT and DVK. The results show that there are significant positive correlations between



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the scores of RC, VLT and DVK. The correlation coefficient between VLT and RC is .440 ($p < .01$) which is moderate, while the correlation between VLT and DVK is .388 ($p < .01$) which is weak. The correlation between DVK and RC ($r = .496$, $p < .01$) which is also moderate. All of these results showed that there is significant relationship between the three variables although the correlations among these three tests range between weak to moderately positive. This answers the first research question.

Table 5.2.

Two-tailed Pearson correlations between scores on RC, VLT and DVK (N=90)

Test		RC	VLT
RC	Pearson Correlation	1	.440**
	Sig. (2-tailed)		.000
VLT	Pearson Correlation	.440**	1
	Sig. (2-tailed)	.000	
DVK	Pearson Correlation	.496**	.388**
	Sig. (2-tailed)	.000	.000

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

Correlation between breadth and depth of vocabulary knowledge with academic writing

This section presented the results of the Pearson two-tailed correlation analysis in order to investigate the correlation between breadth and depth of vocabulary knowledge with academic writing to answer the second research question.

Research Question 2: How do scores on breadth of academic vocabulary knowledge, depth of academic vocabulary knowledge and the academic writing of ELL correlate with each other?

Table 5.3 tabulates the results for the analysis of the variables for the second research question which are scores on Writing Composition, PVLTV and DVK. The results revealed that there are significant positive correlations between the scores of Writing Composition, PVLTV and DVK. The correlation between Writing Composition and PVLTV is moderate with the correlation coefficient of $r = .405$ ($p < .01$) whereas the correlation between Writing Composition and DVK is



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weak at $r=.342$ ($p<.01$). Moderate correlation is found between PVLТ and DVK, which is at $r=.440$ ($p<.01$). The correlation analysis between these three variables revealed a significant correlation ranged from weak to moderate among them.

Table 5.3.

Two-tailed Pearson correlations between scores on Writing Composition, PVLТ and DVK (N=90)

Test		Writing Composition	PVLТ
Writing Composition	Pearson Correlation	1	.405**
	Sig. (2-tailed)		.000
PVLТ	Pearson Correlation	.405**	1
	Sig. (2-tailed)	.000	
DVK	Pearson Correlation	.342**	.440**
	Sig. (2-tailed)	.001	.000

** . Correlation is significant at the 0.01 level

VLT and DVK as predictors of RC

In this section, the results of multiple linear regression analysis were presented in order to answer the third research question which was to find out the extent to which scores on breadth and depth of academic vocabulary knowledge predict the scores of academic reading comprehension. The regression models can measure the magnitude of overall variance of the scores of Reading Comprehension that the measures which are VLT and DVK account for together, as well as assess the relative contribution of each measure (Roche & Harrington, 2013).

Research Question 3: To what extent can breadth and depth of academic vocabulary knowledge predict ELL's scores in academic reading comprehension?

The dependent variable for the statistical analysis for this research question would be the scores of RC and the independent variables (or predictor variables) would be scores of VLT and DVK. Since the independent variable DVK had a stronger correlation with the dependent variable RC with correlation coefficient of $r=.496$, $p<.01$ than the independent variable VLT ($r=.440$, $p<.01$) as indicated in Table 5.2, therefore DVK was chosen to be entered into regression equation first,



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followed by VLT. Table 5.4 shows the results when both the predictor variables DVK and VLT were entered into the regression equation where DVK was entered first then VLT the second variable to be entered.

Table 5.4.

Multiple linear regression analyses using score on RC as dependent variable and scores on VLT and DVK as independent variables (N=90)

Step	Predictor variable(s)	R ²	Adjusted R ²	R ² change
A)				
1	DVK	.246	.237	-
2	DVK, VLT	.318	.302	.072
B)				
1	VLT	.194	.185	-
2	VLT, DVK	.318	.302	.124

Table 5.5

Parameter estimates of multiple linear regression analysis using VLT and DVK as independent variables

Model	Coefficients ^a					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
	(Constant)	-4.051	2.750		-1.473	.144
1	VLT	.292	.104	.284	3.037	.003
	DVK	.382	.022	.314	3.980	.000

a. Dependent Variable: Reading

From the analysis of multiple linear regression, a significant regression equation is found which meant that the linear combination between the independent variables VLT and DVK is significant related to the dependent variable RC ($F(2, 87) = 20.290, p < .000$). In other words, it is found that VLT and DVK explained a significant amount of variance of RC. As shown in the first section in Table 5.4 (Labelled "A"), the coefficient of determination or R² value when DVK was first entered into the equation is .246 while the adjusted R² value is .237. The R² value in the



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third column indicates the contribution to the proportion of the variance in the dependent variable explained by the independent variables (Elmasry, 2012) while the adjusted R^2 value provides an unbiased figure by taking account of the number of various variables in the equation (Morris, 2008). Therefore, the R^2 value of .246 for DVK indicates that DVK alone explained 24.6% of the variance in the dependent variable RC while the adjusted R^2 shows that 23.7% of variance is explained by DVK by taking account of other variables. With DVK remained in the equation, the second predictor variable VLT was then added into the equation. From here, the R^2 value becomes .318 with a change of .072. The value of R^2 change represents the extent to which each independent variable contribute at the point of its entry (Choi, 2013). In other words, it is the magnitude of contribution added by the newly entered independent variable to the explained variance of the dependent variable over and above the other existing independent variable in the equation (Elmasry, 2012). Therefore, the R^2 change value here indicates that the contribution of VLT over and above the contribution by DVK is 7.2% and it is moderate. The value of adjusted R^2 later becomes .302. Together they account for 31.8% of the variance of RC.

The second section in Table 5.4 (Labelled “B”) shows the results of another regression analysis by reversing the order of the entry of the independent variables into the equation. This was to identify the prediction added by VLT. Therefore, in this case, VLT was entered first while DVK was added in the second step. When VLT was added in the first step, the R^2 and adjusted R^2 values are .194 and .185 respectively. This shows that VLT alone accounts for 19.4% of the variance of RC. After adding DVK into the equation in the second step, the R^2 value becomes .318 and the adjusted R^2 value becomes .302. The R^2 change is .124 which indicates that DVK adds 12.4% into the variance of RC already accounted for by VLT which is moderate. By comparing these two analyses with a reversed order, it is found that DVK (12.4%) contributes more on the explanation of the variance of RC than VLT does (7.2%). This shows that DVK is a more powerful predictor of RC than VLT although the two of them together predicts 31.8% of variance of RC which is moderate. This answers the third research question.



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Then, Table 5.5 tabulates the partial regression coefficient which shows the value of coefficient “B” that indicates how much the dependent variable which is the score of RC is expected to increase when a particular independent variable which are the scores of VLT and DVK increase by one unit. From the table, the independent variable VLT has a coefficient of .292. Thus, one unit increase in VLT will in turn, leads to a .292 unit increase in the scores of RC while all other variables are held constant. Furthermore, DVK has a coefficient of .382 which means that if all the variables are constant, a unit increase in VLT will lead to an increase of .382 unit in the scores of RC.

PVLT and DVK as predictors of writing composition

For the fourth research question which was to determine the extent to which scores on breadth and depth of vocabulary knowledge can predict the scores of academic writing, multiple linear regression analysis was also carried out. The results are displayed in Table 5.5.

Research Question 4: To what extent can breadth and depth of academic vocabulary knowledge predict ELL's scores in academic writing?

For the statistical analysis for this section, scores on Writing Composition would be the dependent variable while scores on PVLT and DVK would be the independent variables or predictor variables. The independent variable PVLT was chosen to be the first to be entered into the regression equation since the correlation between PVLT and dependent variable which is the scores of Writing Composition is higher at $r=.405$ ($p<.01$) as shown in Table 5.3. DVK was entered next as it has a lower correlation with the dependent variable ($r=.342$, $p<.01$). Table 5.6 displays the results when both the predictor variables PVLT and DVK were entered into the regression equation.



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Table 5.6.

Multiple linear regression analyses using scores on PVLТ and DVK as independent variables (N=90)

Step	Predictor variable(s)	R ²	Adjusted R ²	R ² change
A)				
1	PVLТ	.164	.155	-
2	PVLТ, DVK	.197	.179	.033
B)				
1	DVK	.117	.107	-
2	DVK, PVLТ	.197	.179	.080

Table 5.7

Parameter estimates of multiple linear regression analysis using PVLТ and DVK as independent variables

Model	Coefficients ^a					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
	(Constant)	10.208	2.460		4.150	.000
1	PVLТ	.316	.185	.273	2.070	.041
	DVK	.203	.026	.224	2.525	.013

a. Dependent Variable: Writing

The analysis of multiple linear regression shows that a significant regression equation is found between the independent variables PVLТ and DVK with the dependent variable Writing Composition ($F(2,87)=9.467$, $p<.000$). This indicated that PVLТ and DVK both account for a significant amount of the variability of Writing Composition with a total R² value of .197 which is 19.7%.

In the first section in Table 5.6 (Marked "A"), when the first independent variable PVLТ was entered into the equation, the R² value and the adjusted R² value are .164 and .155 respectively. Therefore, PVLТ accounts for 16.4% (R²=.164) of the variance in the dependent variable which is the scores of Writing Composition. The second step which was adding in the second predictor



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variable (DVK) was carried out with PVLТ remained in the equation. After adding DVK into the equation, the R^2 value increases by .033 to .197. The adjusted R^2 value then becomes .179. The R^2 change is .033 which means that DVK explains an additional 3.3% of the variance of Writing Composition not explained by PVLТ.

Then, a second model was built with DVK added first into the equation and PVLТ added at the second step. The results are shown in the section labelled “B” in Table 5.6. This is to identify the prediction added by DVK. When DVK was added in the first step, the R^2 is .117 and the adjusted R^2 value is .107. This indicates that DVK alone accounts for 11.7% of the variance of Writing Composition. After PVLТ was added into the equation in the second step, the R^2 value becomes .197 and the adjusted R^2 value becomes .179. The R^2 change is .080 which shows that PVLТ adds 8% into the variance of Writing Composition which was already accounted for by DVK which is moderate. Through the comparison between these two analyses with a reversed order, PVLТ (8%) is revealed to be the independent variable which contributes more on the explanation of the variance of Writing Composition than DVK does (3.3%).

Furthermore, Table 5.7 shows the partial regression coefficient of the independent variables which demonstrates how much the dependent variable (the scores of Writing Composition) is expected to increase when a certain independent variable (either the scores of PVLТ or DVK) increases by one unit. From the table, PVLТ has a coefficient of .316. This means that one unit increase in PVLТ will lead to a .316 unit increase in Writing Composition in the condition that all other variables are constant. Moreover, DVK has a coefficient of .203 which indicates that a .203 unit increase in Writing Composition will happen with the increase in one unit in DVK where other variables in the model remain constant.

Discussions

The study intended to investigate the relationship between breadth and depth of academic vocabulary knowledge with academic reading comprehension and writing as well as to determine the extent to which breadth and depth of academic vocabulary knowledge can predict the scores



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of academic reading comprehension and writing. Based on the results from sections 5.1 and 5.2, the objectives of the study had been achieved. First, to investigate the relationship or the correlation between breadth and depth of academic vocabulary knowledge with academic reading comprehension, Pearson correlation analysis was carried out. The scores of VLT represents breadth of vocabulary knowledge while the scores of DVK represents depth of vocabulary knowledge. The performance of participants in academic reading comprehension is represented by the scores of RC.

As shown in Table 5.2, all the variables which are VLT, DVK and RC have a significant relationship among each other. Both VLT and DVK have a significant and positive correlation with RC which indicated that both dimensions of vocabulary knowledge are closely related to learners' performance in academic reading comprehension and the more vocabulary knowledge a learner has, the better performance in academic reading comprehension he or she will achieve. The results have some similarities with other studies in both ESL and EFL contexts such as those by Anjomshoa and Zamanian (2014) and Qian (1998, 1999, 2002). The significant relationship between vocabulary knowledge and reading comprehension also supports the instrumentalist hypothesis proposed by Anderson and Freebody (1981) which suggested that vocabulary knowledge is important in determining reading ability.

From the results, it was observed that the correlation between VLT with RC is positively moderate that is consistent with the findings of Şen and Kuleli (2015) which found a moderate relationship between VLT and RC. In contrast, from the review of other studies such as those from Qian (1998, 1999, 2002), it was observed that a strong relationship existed between VLT and RC. At the same time, the current results also show a positive moderate relationship between DVK and RC which is align with the results of Elmasry's (2002) study in ESL context which also found a positive moderate relationship between DVK and RC. The results contradict with the results from some other reported studies such as those from Qian (1998, 1999) which showed a very strong relationship between DVK and RC. The inconsistency in findings may be due to the differences in context and participants' background. For example, Qian's (1998, 1999)



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studies were done in Canada context. Since English is one of the two official languages in Canada alongside with the French language, it might be inferred that the participants in his studies already had good command in English. Therefore, the researcher reported strong relationship between vocabulary knowledge and reading. In short, the findings indicate that there is a moderate yet significant relationship between breadth of academic vocabulary knowledge with reading comprehension as well as between depth of academic vocabulary knowledge with reading comprehension.

Besides, it was found that the relationship between DVK and RC is slightly higher ($r=.496$, $p<.01$) than that between VLT and RC ($r=.440$, $p<.01$). This meant that depth of vocabulary knowledge has a stronger relationship with academic reading comprehension compared to breadth of vocabulary knowledge. Therefore, the deeper a learner knows a word, the better his or her performance in reading comprehension. This aligned with the results from previous studies in different contexts such as those by Mehrpour, Razmjoo, and Kian (2011), Qian (1998), Rashidi and Khosravi (2010), as well as Şen and Kuleli (2015) which also reported stronger correlation between vocabulary depth and reading comprehension. This means that while both knowing many words and knowing the meaning of words contribute significantly to ELL's performance in reading comprehension, the latter has more influence on reading comprehension.

The next objective was to identify the relationship between breadth and depth of academic vocabulary knowledge with ELL's performance in academic writing. The results of Pearson correlation analysis are tabulated in Table 5.3. Here, the scores of PVLТ represents breadth of vocabulary knowledge in terms of productive skills. From the results, it was observed that there is a positive correlation between all variables which are PVLТ, DVK and Writing Composition. The variable PVLТ has a positive moderate relationship with Writing Composition. This means that vocabulary breadth has a moderate relationship with writing where in the past study of Stæhr (2008), it was found that the relationship between vocabulary size and writing was strong. DVK, on the contrary, has a positive weak correlation with Writing Composition. Still, the significant



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positive relationship between PVLТ, DVK with Writing Composition indicates that vocabulary knowledge is significantly related to writing which was confirmed previously by scholars and researchers such as Laufer and Nation (1995) and Stæhr (2008).

The results also show that the correlation between PVLТ with Writing Composition ($r=.405$, $p<.01$) is higher than that between DVK and Writing Composition ($r=.342$, $p<.01$). This showed that out of the two dimensions of vocabulary knowledge, vocabulary breadth has stronger relationship with the performance in writing of learners compared to depth. In other words, the more knowledge about words a learner possesses, the better performance the learner will achieve in writing.

Next, another objective in this study was to find out the extent to which scores on breadth and depth of academic vocabulary knowledge can contribute to ELL's performance in academic reading comprehension. In order to achieve the objective, multiple linear regression was performed with VLT and DVK as independent variables and RC as dependent variable. The results are tabulated in Table 5.4. From the results, both of the dimensions of vocabulary knowledge together contribute a total of 31.8% of the variance in RC. This showed that both dimensions of vocabulary knowledge were relatively unique and distinctive predictors of learners' scores in reading comprehension. This also supports the instrumentalist hypothesis by Anderson and Freebody (1981). In short, vocabulary knowledge will influence learners' performance in reading comprehension. From the findings, the DVK measure alone accounts for 24.6% of the variance in RC while VLT alone contributes 19.4% of the variance in RC. DVK also adds an additional 12.4% of variance on top of the contribution accomplished by VLT scores. Therefore, the results suggest that depth of vocabulary knowledge is a more powerful predictor of the performance in reading comprehension of ELL compared to breadth. The results obtained here are in accordance with the results obtained from some previous studies such as those from Qian (1998, 1999) and Şen and Kuleli (2015). Nevertheless, the results are different with some other researchers' results such as Elmasry (2002) who concluded that vocabulary



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breadth was a stronger predictor of performance in reading comprehension compared to vocabulary depth.

However, through the analysis, it was observed that although VLT and DVK which are vocabulary breadth and vocabulary depth play a role in contributing to the prediction of the variance of Reading Comprehension, the prediction is moderate. The results contradicted with the results from some previous studies which concluded that the prediction by breadth and depth of vocabulary knowledge was strong such as those by Elmasry, (2012) and Qian (1998, 1999, 2002). From here, it seems to suggest that there are other variables or factors that may contribute to a good reading comprehension alongside having a good command of vocabulary. For example, the study of van Staden and Bosker (2014) identified the factors which would predict reading literacy achievement among students in South Africa. Their results showed that there was a statistical significance of engaged reading and developing motivation for reading among students since an early age especially through the involvement of parents in introducing early reading activities as a foundation of reading literacy. Other than that, they also concluded that it was important to read across the curriculum and not only limited to formal reading classes. Besides that, having strategies and skills of reading comprehension also significantly predicted reading literacy achievement. Another study by Galgao (2016) who studied three factors that would affect the reading performance of university students in Thailand, found that there was a significant correlation ($r=.28$, $p=.02$) between students' personal background and their performance in reading. In short, the reason why there is moderate prediction of vocabulary breadth and depth to reading comprehension in this study may be due to the existence of other contributing factors. However, it is still undeniable that vocabulary knowledge plays an important role in predicting learners' reading comprehension performance.

Lastly, the study also intended to find out the extent to which scores on breadth and depth of academic vocabulary knowledge can contribute to ELL's performance in academic writing. Multiple linear regression was also carried out for this purpose with PVL and DVK as the independent variables and Writing Composition as the dependent variable. Table 5.6 tabulates



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the results from the statistical analyses. The results show that both of the dimensions contribute 19.7% of the variance of Writing Composition. The prediction by DVK alone is 11.7% which was lesser than the prediction by PVLТ which is 16.4%. PVLТ also contributes an additional 8% on top of the variance of Writing Composition already accounted by DVK rather than 3.3% added by DVK. This means that vocabulary breadth was a more powerful predictor to the performance of ELL in academic writing compared to vocabulary depth.

Although the results show that vocabulary breadth and depth do predict the writing performance of participants, the proportion of variance contributed by both variables is moderate. Therefore, it is possible that there are also other variables which may affect learners' performance in writing. For instance, Nacira (2010) conducted a study to identify some factors that affected Batna University students' writing ability. The researcher reported that the lack of a suitable approach to teach writing, lack of teachers' feedback to students' works and lastly lack of motivation of a teacher, lack of reading, motivation and practice among students were some factors contributing to students' poor performance in writing. Moreover, Sahla's (2015) study which analysed some linguistic factors that might affect the written paragraphs of English language students found that the factors involved were the negative interference of students' own native language, the intralingual errors and the lack of practice in the English language. On the other hand, Nik, Hamzah, and Rafidee (2010) conducted a research in Malaysian setting where they investigated the writing performance of Malaysian undergraduates and also the problems that hindered their writing. They concluded that other than vocabulary, other aspects of language use such as grammar, syntactic structure, rhetorical structure and idioms were some factors that affect the undergraduates' proficiency in writing. In summary, the existence of other variables may be the reason why the prediction by vocabulary breadth and depth to the performance of learners in writing is moderate. Nevertheless, it is indisputable that the role of vocabulary knowledge in predicting learners' performance in writing is still crucial.



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Conclusion and implications of findings

The aim of the study was to investigate the relationship between ELL's academic vocabulary and their performance in academic reading and writing. The empirical evidence from the results further confirmed the undeniable truth that vocabulary knowledge is essential in learners' performance in academic reading and writing where significant correlation is found between them. Meanwhile, vocabulary depth is found to have a stronger relationship with academic reading than vocabulary breadth and therefore it contributes more to the prediction of the scores of academic reading comprehension. On the other hand, it is found out that the correlation between vocabulary breadth and academic writing is stronger than that between vocabulary depth and academic writing although the correlation between all of them is significant. Vocabulary breadth also predicts more on the scores of academic writing than vocabulary depth. All of the above results imply that ELL will achieve better proficiency and perform better in reading comprehension and writing if they possess a large size of vocabulary and also a deep knowledge of vocabulary.

However, since the statistical analysis yielded moderate results, a suggested area of future research is to investigate the influence of other factors such as the pedagogical aspects, learners' individual differences such as their motivation and attitude on their performance in academic reading and writing. The current findings had also provided some pedagogical and educational implications that will benefit English language teaching and learning in Malaysia. In Malaysia, students generally will receive around fifteen years of English education which consists of six years in primary level, five years in secondary schools and approximately another four years in tertiary level of education. However, despite all these years of studying English, their English proficiency level are still either low or average. This was proven through the statistics from Malaysian University English Test (MUET). In the examination reports of MUET in November 2015, out of 74,846 candidates who took the test, only 59.19% or 43,411 candidates were awarded Band 3 or above (Malaysian Examinations Council, 2017). For the reading paper, 40.81% or 30,545 students had Band 2 and below while for the writing paper, 40.96% or 30,657



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students were awarded Band 2 and below. The relatively low proficiency of Malaysian students in the English language especially in reading and writing had raised concern among scholars and researchers to identify the reasons contributing to the phenomenon and undeniably, the role of vocabulary knowledge is unneglectable. Therefore, the present findings may help to provide implications to uncover the ways to improve the proficiency of English among Malaysian students especially through the improvement of vocabulary knowledge.

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