Relationship of Breadth and Depth of Vocabulary Knowledge and Reading Comprehension in Learning English

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Abstract

This study aimed to investigate the relationship between breadth and depth of vocabulary knowledge and reading comprehension of public secondary schools of Islamabad. The sample was based on 124 students; 72 male and 52 female from 12 public sector secondary schools. The students were selected conveniently from 10th grade with age range from 13 to 18 years, (M=15.10, SD = .998). They were taught English as a compulsory subject included in the school curriculum. The assessment of vocabulary knowledge and reading comprehension of students was measured through four research instruments; Vocabulary Level Test, Word Associate Test, Morphological Knowledge Test and Reading Comprehension Test. Results showed that a high correlation occurred between depth of vocabulary knowledge and reading comprehension, but a moderate correlation was observed between breadth of vocabulary knowledge and reading comprehension. Regression analysis showed that vocabulary depth has high predictive power than vocabulary breadth. The study advocated to mount students' depth of vocabulary knowledge to increase their reading comprehension abilities.

Keywords: Vocabulary depth, vocabulary breadth, reading comprehension

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Introduction

English plays a major role in our Pakistani educational system and taught as a second language in Pakistani schools (Nawaz, Amin, & Tatlah, 2016). English is the official language of Pakistan used in schools, courts, and government offices (Coleman, 2010, Khushi & Talaat, 2011). English is also called "the language of the curriculum" (Nippold, 2017). Many textbooks on science and technology are written in this language (Timurie & Siddiqi, 1999). However, students in Pakistan show unsatisfactory performance and their failure rate in English is high (Abbas, Ashiq, & Haq, 2018). Poor English vocabulary and spelling are considered reasons for student failures in academics (Solangi, 2015; Farooq, Hassan & Wahid, 2012).

A number of national and international organizations indicated that there are gaps in learning of English at different grades. South Asian Forum for Educational Development (ASER-2015) reported that 49% of 5th grade students can comprehend a single sentence in English in Islamabad. Similarly, United States Agency for International Development, confirmed in its baseline report (EGRA, 2014-15) that majority of students of early grades (Grade 1 to Grade 3) were found weak in comprehending written texts in English in different provinces of Pakistan. The reading comprehension at secondary grade level is also unsatisfactory in Pakistan (Khan, 2011).

Knowing words or developing vocabulary in a school environment has many challenges (Stahl, 2005), it is known fact that vocabulary knowledge is a prerequisite for learning of a language, especially second language (Beglar & Hunt, 1995; Read, 2000; Nation; 2011). Vocabulary determines the ability of learner to understand written text (Geva & Garrison, 2013; Lervåg & Lervåg, 2014 Ma & Lin, 2015), however, it is unclear how much vocabulary needed to be proficient in comprehending a language, experts generally suggest that an average student should add 2000 to 3000 new words a year to have effective vocabulary (McKeown & Kucan, 2002).

Early in the field of linguistics, Richard (1976) suggested a framework of vocabulary knowledge and proposed several dimensions of words, which contained their meanings, their association with other words, syntactic and semantic values and underlying forms. Nation (1990) on the other hand proposed words function, meaning and form constituted vocabulary. Chappelle (1998) framework proposed four dimensions of vocabulary, i.e. word knowledge, vocabulary size, lexical access and organization, and likewise, Qian (2002) proposed another set of four dimensions of vocabulary knowledge focused on breadth, depth, lexical knowledge and automaticity, and receptive productive Knowledge. Breadth and depth of vocabulary play central role in learning of a language. Breadth of vocabulary knowledge refers to the quantity or number of words learners know at a particular level of language proficiency (Li, 2015) and "depth of vocabulary

knowledge refers to learner's level of knowledge of various aspects of a word" (Moinzadeh & Moslehpour, 2012, p. 1015). This view of vocabulary knowledge is relatively new with little research available to support this area (Adam & Sadegi, 2014).

Reading comprehension is to make meaning of what we read and is "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Reading Study Group, 2002, p. 2). Two cognitive processes are utilized in understanding texts of a particular language; reader's construction of ideas out of pre-existing concepts and reader's interaction with the ideas of writer, represented by the text. Apparently, a reader engages in reading words written on page and decodes its meaning in mind. In other words, reading comprehension involves two basic components, having the capacity to read words and simultaneously comprehend the content being read (Nayton, 2013).

Anderson and Freebody (1981) proposed three hypotheses to examine relationship between vocabulary knowledge and reading comprehension. *Instrumentalist hypothesis* suggests that high scoring individuals in a vocabulary test knows more words they encounter in texts than low scoring individuals. Their abilities to know more words enables them to comprehend texts better. The *aptitude hypothesis*, suggests that people with large vocabularies possess higher mental abilities therefore they can comprehend better than individual with small vocabularies. Third hypothesis, the *knowledge hypothesis*, proposes that word knowledge is critical to understand text; background knowledge is reflected in performance on vocabulary tests. In literature, two views standout on relationships between reading comprehension and vocabulary. The first view believes that a strong association exists between reading comprehension and vocabulary (Anjomshoa & Zamanian, 2014; Negari, 2013; Kameli & Baki, 2013). The other view argues that reading comprehension results from vocabulary depth at different levels of development (Guo, 2008; Ma & Lin, 2015).This last view sets the theme of the present study, where the first prediction states that reading comprehension increases with vocabulary *depth*; and the second, that reading comprehension would increase with vocabulary *breadth*. These two hypotheses have not been tested at secondary school level in Islamabad.

On the basis of findings of previous studies, two assumptions were made for this study. First assumption entailed that student's performance improves due to their increase in size of vocabulary knowledge. Secondly, it was assumed that reading comprehension performance increases as their depth of vocabulary knowledge increased.

Research Objectives

The present study was conducted to find the relationship of student's vocabulary knowledge (i.e. vocabulary breadth and vocabulary depth) and their reading comprehension performance in English subject at secondary level in Islamabad. Following objectives were framed to conduct this study:

1. To find the degree to which student's knowledge about quantitative aspect of vocabulary links with their performance in comprehending text of English subject.
2. To measure the extent to which student's knowledge about qualitative aspect of vocabulary relates with their performance in comprehending text of English subject.

Research Questions

Following research questions were devised to address the objectives of the study:

1. Does student's vocabulary breadth help in increasing their reading comprehension of English language?
2. Does student's vocabulary depth help in increasing their reading comprehension of English language?
3. How much do vocabulary breadth and vocabulary depth predict reading comprehension of English language?

Methodology

Research Design

The study was based on correlational research design in which Pearson Correlation coefficient was used to find relationship among the measurements of vocabulary knowledge and reading comprehension. The design used was suitable to assess both variables as extensively reflected in the literature (Li & Kirby, 2015; Ma & Lin, 2015; Roehrig & Williams, 2011; Rashidi & Khusravi, 2010).

Sample of the study

Seventy-two male and 52 female 10th grade students from 12 public sector secondary schools (six each from rural and urban) from Islamabad were selected conveniently. Participants' age ranged from 13-18 years *(M =15.10, SD=.998)*. Initial sample was based on 144 students; however, 20 students did not complete all the tests thus their data was excluded from the study. A sample size of 30 participants for correlational study design is acceptable (Gay, Mills, & Airasian, 2012). The detail of sample is given in table 1.

Table 1
Detail of Sample of the Study

Sample	Urban			Rural			Total
	Boys	Girl	Total	Boys	Girls	Total	
School	3	3	6	3	3	6	12
Student	36	36	72	36	36	72	144

Research Instruments

Four instruments were used to collect information for this study.

Vocabulary Level Test

Vocabulary Level Test was used to assess student's knowledge in five frequency levels. Initially, Nation (1990) developed this test and used for diagnostic purpose. Later, Schmitt, N., Schmitt, D., & Clapham, C., (2001) revised this test that contains 150 items of five frequency levels, each level contains thirty (30) items that represent 100 words of any particular frequency band. Researchers adapted and modified this test to make it context specific. Thirty (30) items of academic vocabulary level were omitted and 42 items of graded vocabulary level were added. These items were selected from the textbook of English of 9th Grade and 10th Grade being taught in public secondary schools. The instrument was pilot tested and calculated Cronbach's alpha reliability value which was reasonably high 0.91.

Word Associates Test

Word Associate Test (originally developed and modified by Read, 1998) determines student's vocabulary depth and assess how well an individual know about qualitative aspects of vocabulary knowledge. It consisted of 40 items containing a stimulus word followed by 8 words in two boxes. The test-takers were asked to choose the synonyms of the stimulus word (which was an adjective in this test) from the left box if there was any. The possible collocations of the stimulus adjective were chosen from the 4 words in the right box. For the present study, researchers developed Word Associate Test after extensive literature review. Thirty (30) items were selected from English text books taught in secondary classes (9th & 10th) in schools of Islamabad. The instrument was pilot tested and calculated value of Cronbach's alpha reliability of was 0.89.

Morphological knowledge test

Morphological knowledge test is used to assess student's ability to recognize grammatical structure of sentences of English language. Qian (1998) initially developed Morphological Knowledge Test to determine student's ability to recognize parts of sentences. Researchers developed morphological knowledge Test from English Text books taught to the students in 10th grade in Islamabad. A list of 20 words was given and students were assigned task to mention which part of sentence they represent. The instrument was pilot tested and calculated value of Cronbach's alpha reliability was 0.92.

Reading Comprehension Test

Reading Comprehension Test was used to measure student's ability to comprehend written texts in English language. Bader Reading Inventory (9th Ed.) was used to assess the ability of students to read and answer 7 to 10 adapted questions from oral and written responses given in three 9th grade passages; voter drive, modern chemistry and failure to communicate. Scores were the number of correct responses out of the total number of questions. The instrument was pilot tested and calculated value of Cronbach's alpha reliability was .76.

Procedure of data collection

Before administration of tests, formal permission was taken from competent authority of the federal schools to carry out this study. The students and their parents were formally informed about the nature of the study and their permissions were taken. The researchers personally visited schools and tests were group administered to measure vocabulary knowledge and reading comprehension of the students. The students were given reasonable time as prescribed by the subject experts to complete the tests.

Results

Pearson correlation co-efficient was applied to compare breadth and depth of vocabulary knowledge and reading comprehension.

Table 2

Associations between Vocabulary Breadth and Reading Comprehension

		Vocabulary 2000 Word	Vocabulary 3000 Word	Vocabulary 5000 Word	Graded Vocabulary Level
Reading Comprehension	Pearson Correlation	.59[**]	.26[**]	.05	.09
	Sig. (2-tailed)	.001	.003	.58	.34
	N	124	124	124	124

Table 2 shows Pearson product-moment correlations among vocabulary levels and reading comprehension. A strong positive correlation was revealed between Vocabulary 2000 Word level and reading comprehension ($r = .59$, $< .001$)**,** whereas a smaller positive correlation also existed between Vocabulary 3000 Word level and reading comprehension ($r = .26$, $p < .001$). Table 2 further shows, relationship between Vocabulary 5000 Word level and reading comprehension was not significant *($r = .05$, $p > .05$)*, and the relationship between Graded Vocabulary Level and reading comprehension was also not significant *($r = .09 p > .05$)*.

Table 3

Associations between Vocabulary Depth and Reading Comprehension

		Word Associates	Collocation Knowledge	Morphological Knowledge
Reading Comprehension	Pearson Correlation	.62**	.22*	.07
	Sig. (2-tailed)	.001	.01	.46
	N	124	124	124

Table 3 shows correlations between components of vocabulary depth (word associates, collocation associates and morphological knowledge) and reading comprehension. There was a strong positive correlation between word associates and reading comprehension ($r = .62$, $p < .001$), and a smaller positive correlation between collocation associates and reading comprehension (r = .22, $p < .05$). However, the relationship between morphological knowledge and reading comprehension was not significant (r = .07, $p > .05$).

Table 4

Components of Vocabulary Knowledge and Reading Comprehension

		Vocabulary Depth	Vocabulary Breadth
Reading Comprehension	Pearson Correlation	.50**	.29**
	Sig. (1-tailed)	.001	.001
	N	124	124

Table 4 shows a strong positive correlation between vocabulary depth and reading comprehension ($r = .50$, $p < .001$) and a smaller positive correlation between vocabulary breadth and reading comprehension ($r = .29$, $p < .001$).

Table 5

Coefficient of Variability among Vocabulary knowledge Variables

Model	Unstandardized Coefficients		Standardized Coefficients		
	β	SE	β	*t*	*p*
Vocabulary Depth	.13	.02	.46	5.65	.001
Vocabulary Breadth	.03	.02	.16	1.92	.06

β = beta; SE = Standard Error

Table 5 shows standardized regression coefficients (β) for depth of vocabulary contributes significantly more to reading comprehension than breadth of vocabulary. Vocabulary depth accounted for 46% (β = .46) of variance in reading comprehension and vocabulary breadth accounted for 16 % (β = .16) of variance in reading comprehension.

Discussion

Relationships between components of vocabulary and reading comprehension have been explored at different academic level in different contexts (Koda, 1989**;** Nation 2001; Proctor, C. P., Carlo, M., August, D., & Snow, C., 2005) and found that vocabulary increases reading comprehension; and that vocabulary depth significantly correlated with student's reading comprehension (Ouellette, 2006; Rashidi & Khosravi, 2010**;** Zhang, Pan, & Xu, 2014; Kim & Cho, 2015). In addition, other researchers found a significant relationship between vocabulary breadth and reading comprehension (Djuarsa, 2017; Ouellete, 2006; Tannenbaum, 2006). This study also revealed significant correlations between vocabulary components (depth and breadth) and reading comprehension; and regression analysis further revealed that impact of vocabulary depth was more and significant than vocabulary breadth.

Components of vocabulary depth (i.e. word and collocation associates) were positively associated with reading comprehension. Students who possessed good word and collocation knowledge performed better on reading comprehension. However, the study did not find a correlation between morphological knowledge and reading comprehension.

Present study further explored sub-component of vocabulary breadth correlated reading comprehension performance. Vocabulary 2000 and 3000 word levels significantly associated with reading comprehension, but vocabulary 5000 word and graded vocabulary levels were not significantly associated with reading comprehension. This result indicated that student's vocabulary levels did not pass beyond average 3000 level, and when the comprehension test became more difficult, the vocabulary levels fell short to understand the material.

Conclusion and Recommendations

Present study suggests vocabulary depth and breadth is associated with reading comprehension in secondary school students in urban and rural schools of Islamabad, much like results of other studies worldwide. We think that word and collocation knowledge are strong components to strengthen reading comprehension for English. Teachers should focus on vocabulary of depth to enable students to perform better in understanding and comprehending texts of English.

Present study has various restrictions that limit the generalizability of the results on whole population. This study was administered on a small proportion of population, therefore, the population and sample may increase to generalize the results of future study. Present study focussed on instrument's validation and more research is need to be conducted using these research instruments.

Researchers developed graded vocabulary level to assess student's knowledge of vocabulary given in written textbooks available only for secondary school certificate examination of Federal Board of Intermediate and Secondary Education. More researches should be conducted to assess student's knowledge in other English textbooks being taught to students in other grade levels and examination systems.

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