The Relationship between Depth and Breadth of Vocabulary Knowledge and Reading Comprehension among Iranian EFL Learners By:

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Abstract

   The current study is an attempt to investigate the particular role learners' vocabulary knowledge plays in their reading comprehension performance. It intends to determine whether breadth and depth of vocabulary knowledge are related to EFL learners' reading comprehension, and to investigate which one of these variables, that is, depth or breadth of vocabulary knowledge, makes a more important contribution to L2 reading comprehension. It also attempts to investigate whether there is a relationship between these two vocabulary knowledge dimensions, that is, depth and breadth. Finally, the study tries to find out whether gender has any effect on learners' reading comprehension and vocabulary knowledge. The participants of the study were sixty (30 male and 30 female) EFL learners who were chosen from among five language teaching institutes in Shiraz based on available sampling. To collect the relevant data, two tests measuring breadth and depth of vocabulary knowledge were administered to all participants. They also received a reading comprehension test in which they were asked to read the passages and answer some multiple choice questions. The results obtained from the analysis of the data indicated that while both depth and breadth of vocabulary knowledge play an important role in EFL learners' reading comprehension performance, depth of vocabulary knowledge makes a more important contribution. The results further revealed that depth and breadth of vocabulary knowledge are positively correlated, that is, those learners who had large vocabulary size had a deeper knowledge of the words, too. It was also found that gender had no significant impact on learners' reading comprehension performance and vocabulary knowledge.

   KeyWords: Vocabulary Depth; Vocabulary Breadth; Reading Comprehension; Vocabulary.

1. Introduction

English as an International language is used by people throughout the world for different purposes such as communicating to other people from different countries and providing a means for exchanging knowledge. From among the three major components of language, namely, sounds, grammar, and vocabulary, knowledge of the words, as the building blocks of language has a very crucial role. In fact, without the recognition of the meaning of the words, it would be impossible to either produce or perceive the language. Although students may successfully decode and read fluently, knowing the meanings of words contained in a text is critical to reading comprehension.

The significant role of vocabulary knowledge in reading comprehension has been well recognized in first language (L1) studies and this has appeared to be the case in second language (L2) settings as well. Researchers have suggested several models to describe the relationship between vocabulary knowledge and reading comprehension. According to Hu and Nation (2000), the factors involved in these models include language knowledge (of which vocabulary knowledge is a part), knowledge of the world (sometimes called background knowledge) and skill in language use (of which reading comprehension is one result).

Anderson and Freebody (1981) presented a model for initial understanding of the strong relationship between vocabulary knowledge and comprehension in the form of three hypotheses: the instrumentalist hypothesis, the aptitude hypothesis and the knowledge hypothesis.

The instrumentalist hypothesis is the commonsense model of the vocabulary–reading comprehension connection. This model suggests that knowing more words makes one a better reader; therefore, to improve comprehension, vocabulary words should be taught. Some findings support the instrumentalist model, but we cannot conclude that vocabulary instruction will lead to full comprehension. Although the relationship between vocabulary and comprehension of a text is clear, the instrumentalist hypotheses can not stand alone; it is only one aspect of the vocabulary–reading comprehension relationship.

The second hypothesis is the knowledge hypothesis which emphasizes the influence of the readers' background knowledge on comprehension. It is not only the knowledge of the meaning of words that causes a reader to comprehend a text, but also the knowledge of the concepts that the words represent. The knowledge hypothesis proposes a link between knowledge and comprehension, but

vocabulary knowledge is only part of the knowledge structure that plays a role in reading comprehension.

The aptitude hypothesis is the third theory presented in the Anderson and Freebody's (1981) framework. This theory suggests that the relationship between vocabulary and comprehension is affected by a third factor; a general underlying verbal aptitude. According to this model, individuals who have higher verbal abilities will learn new words more easily, possess larger vocabularies and will be better at understanding written texts than those who have lower verbal abilities.

Mezynski (1983) suggests a fourth view, which is the access view of the relationship between vocabulary knowledge and language use. In this model like the instrumentalist view, vocabulary is seen as having a causal relationship with comprehension provided that the reader accesses new words quickly and efficiently. Access can be improved through practice.

A number of studies in both L1 and L2 have demonstrated that vocabulary knowledge is one of the best predictors of reading ability and the ability to acquire new information from texts (Anderson, 2000; Nation, 2001; Qian, 2002; Read, 2000). Grabe and Stroller (2001) emphasize the role of large vocabulary knowledge in reading comprehension. Similarly, Stahl (2003) says that the relationship between vocabulary and reading comprehension is a "robust" one and that vocabulary knowledge has consistently been the "foremost predictor of a text's difficulty" (p.241).

But what do we mean by the word "knowledge"? As a matter of fact, it is difficult to reach a consensus on what is involved in word knowledge and how to measure vocabulary knowledge because of the complexity of this construct. Nation (1990) offered eight aspects of word knowledge: (1) the spoken form of a word, (2) the written form of the word, (3) the grammatical behavior of the word, (4) the collocation behavior of the word, (5) the frequency of the word, (6) the stylistic register constraints of the word, (7) the conceptual meaning of the word, and (8) the associations the word has with other related words.

Richards (1976) made several assumptions on word knowledge which included knowledge of word meanings, semantic, usage, constraints, its morphology, associations, and contextual meaning. Chappelle (1998) argues that a trait definition of vocabulary should contain four dimensions: (1) vocabulary size; (2) knowledge of word characteristics; (3) lexicon organization; and (4) process of lexical access. Henriksen (1999) suggests that lexical competence should contain three dimensions: (1) precision of knowledge; (2) depth of

knowledge; and (3) receptive and productive knowledge. Qian's (2002) recent framework proposes that vocabulary knowledge comprises four intrinsically connected dimensions: (1) vocabulary size, which refers to the number of words of which a learner has at least some superficial knowledge of meaning; (2) depth of vocabulary knowledge, which includes all lexical characteristics, such as phonemic, graphemic, morphemic, syntactic, semantic, collocational, and phraseological properties, as well as frequency and register; (3) lexical organization, which refers to the storage, connection, and representation of words in the mental lexicon of a learner; and (4) automaticity of receptive-productive knowledge, which refers to all the fundamental processes to access the word knowledge for both receptive and productive purposes, including phonological and orthographic encoding and decoding, access to structural and semantic features from the mental lexicon, lexical-semantic integration and representation, and morphological parsing and composing.

There are still researchers who have a more similar view about vocabulary knowledge. For instance, Read (2000), Qian (2002) and Vermeer (2001) considere vocabulary knowledge as consisting of two dimensions of breadth and depth of vocabulary knowledge. Although these constructs have been defined in different ways (e.g., Nassaji, 2004; Qian, 2002; Zareva, 2005), here *breadth* of vocabulary knowledge indicates a person's vocabulary size, or approximately how many words one knows. In contrast, the *depth* of vocabulary knowledge refers to the quality of a person's knowledge of a word – how well someone knows a specific word or set of words.

The present study is motivated by the study of Qian and Schedl (2004), who found that depth of vocabulary knowledge and TOEFL vocabulary had the same difficulty level and both had similar relationships with reading comprehension tests. Thus, of particular interest is finding out whether the predictive power of Depth of Vocabulary Knowledge Test (DVKT) and the size of vocabulary knowledge test in reading comprehension is the same in other EFL and ESL contexts. Furthermore, this study aims to investigate the relationship between these two aspects of vocabulary knowledge, namely depth and breadth, with gender.

1.1. Statement of the problem
Over the last ten to fifteen years, vocabulary has been considered as a component of language proficiency, both in L1 and L2 language acquisition. Knowledge of words is now considered the most important factor in language proficiency and school success, partly

because of its close relation with text comprehension (Bernhardt, 2005). Without knowledge of words, understanding sentences or texts is not possible. Based on several researches, it has been realized that knowledge of words is multidimensional and includes various types of knowledge. Thus, researchers such as Greidanus and Nienhuis (2001), Read (2000), Vermmer (2001) and Wolter (2001) have tended to view vocabulary knowledge as consisting of two dimensions of breadth (how many words are known) and depth (how well is a word known).

The breadth of a learner's word knowledge (also referred to as vocabulary size) is the number of words with which the individual is familiar to some extent. Depth of vocabulary refers to how much learners know about the meanings of the words they are familiar with, along with the connections that exist among the word meanings they know.

Some researchers (Schmitt & Meara, 1997; Wesche & Paribakht, 1996) considered measuring breadth to have a limited value because it ignores the fact that words can be known to a greater or lesser extent. However, too little is known about the relationship between these various aspects of word knowledge to justify such a qualification. In the above mentioned researchers' view, there is much overlap between breadth and depth of word knowledge, and thus there should be a strong relationship between breadth and depth measures. Both are strongly related because vocabulary growth shows a strong developmental stability, as it is related to text comprehension.

Therefore, the present study attempts to explore the relationship between these two aspects of vocabulary knowledge and reading comprehension of Iranian EFL learners. Furthermore, it tries to find out whether gender, as a variable has any relationship with students' vocabulary knowledge.

2. Literature Review

2.1. Vocabulary Knowledge and Reading Comprehension

With regard to the relationship between vocabulary knowledge and reading comprehension, Koda's (1989) study on 24 college students learning Japanese as a foreign language found equally strong correlations between vocabulary knowledge and reading comprehension.

Gelderen *et al.* (2004) administered tests of English vocabulary knowledge and reading comprehension to 397 Dutch students from Grade 8 to Grade 10 in secondary education and found a correlation of .63.

Snow (2002) found that the strength of the relationship between a kindergarten vocabulary measure and reading comprehension increased substantially as the children advanced in grade level. The correlations for first graders, fourth graders, and seventh graders were .45, .62, and .69, respectively.

Recently, several researchers, educators, and teachers have been eager to know the extent to which reading comprehension depends on vocabulary knowledge. Huang (1999) measured the vocabulary size of university students and their reading comprehension ability by considering the effects of vocabulary knowledge and content knowledge on reading comprehension. The subjects were 246 university juniors who were non-English majors. They took Nation's (1990) Vocabulary Levels Test, an English passage, a recall protocol, and the Inventory of Content Knowledge and Interest Questionnaire. The results show that university students' comprehension of any English text depends on vocabulary knowledge and content knowledge, but their comprehension depends more on vocabulary knowledge than on content knowledge. He also found that in Taiwanese students' reading comprehension scores 69% of the variance was explained by their vocabulary knowledge. Clearly, L2 reading comprehension depends strongly on vocabulary knowledge.

Early factor analytic studies considered vocabulary knowledge as one of the major factors in reading comprehension (Davis, 1944; Spearritt, 1972). For example, Davis factor analyzed tests of nine skills underlying reading comprehension and found two major factors: word knowledge and reasoning. These two factors accounted for 89% of the variance in reading comprehension. Spearritt (1972) reanalyzed Davis's (1944) data and found four main factors: word knowledge, drawing inferences from the content, following the structure of the passage, and recognizing a writer's intent and tone. Word knowledge was the best differentiated of these four skills.

Guo (2006) examined the relationship among vocabulary knowledge, syntactic awareness and reading comprehension of 155 English speaking undergraduate and graduate students. Factor analysis show that syntactic awareness is highly correlated with reading comprehension; there is strong positive correlation between vocabulary knowledge and syntactic awareness; and the same high correlation holds for the relationship between syntactic awareness and reading comprehension. Structural equation modeling indicates that syntactic awareness directly affects reading comprehension, and indirectly influences reading comprehension via vocabulary knowledge.

Shiotsu and Weir (2007) examined the relative contribution of knowledge of syntax and knowledge of vocabulary to L2 reading. Their pilot study took place in two different contexts: a heterogeneous population studying at the tertiary level in the UK and a homogenous undergraduate group in Japan. These two studies were followed by a larger main study, again involving a homogeneous Japanese undergraduate population. In contrast with previous findings in the literature, all three studies support the relative superiority of syntactic knowledge over vocabulary knowledge in predicting performance on a reading comprehension test.

2.2. Vocabulary Size and Reading Comprehension

Stahl (2003) emphasizes that studies from readability formulae have "found that the most important factor in determining the difficulty of a text is the difficulty of the words' (p. 246). Vocabulary size is thus a reliable predictor of reading comprehension.

Grabe (1991) asserts that one of the most important areas of research for reading comprehension is research in vocabulary development. Grabe and Stroller (2001) emphasize the role of large vocabulary knowledge in reading comprehension. They stress that students need to recognize a large number of words to become fluent readers. They advised teachers to help students better understand the texts by explicitly teaching the key words of the text to be read in class.

In L2 research, a number of studies have investigated the relationship between vocabulary size and academic reading comprehension. Laufer's (1992) study was done on 92 first-year university students whose native language was either Hebrew or Arabic. He used two tests of vocabulary, namely, the *Vocabulary Levels Test* (Nation, 1983) and *Eurocentric Vocabulary Test* (Meara & Jones,1989) which required the testees to say 'yes' or 'no' to indicate whether they knew the meaning of a target word. Reading comprehension was measured by two standardized reading tests: the reading comprehension section of *Examen Hoger Algermeen Vortgzet Onderwijs*, consisting of two texts with 20 multiple-choice comprehension items, and an English sub-test of the Israel university psychometric entrance test, comprising 40 multiple-choice questions. The correlation between the scores on the *Vocabulary Levels Test* and the reading comprehension test was .50 (*P*<.0001) and that between the scores on a *Eurocentres Vocabulary Test* on reading comprehension was .75 (*p*< .0001).

In another study done by Laufer (1996), he investigated the relationship between the vocabulary knowledge and reading comprehension of 80 first-year university students of similar L1 backgrounds in Israel. He reported the correlation of .71 (*p*< .0001) between students' scores on reading comprehension and on the Vocabulary Levels Test.

Qian (1999) found stronger correlations in his study of 44 Korean speakers and 33 Chinese speakers using version A of the VLT and the Reading Comprehension section from the TOEFL. The correlation between the two tests was .78. Beglar (1999) conducted an almost identical study to find the relationship between vocabulary size and reading comprehension. He used four versions of the 2,000 word level from the VLT for 496 Japanese high school students and four versions of the UWL from the same test for another 464 students. He found that scores on the Reading Comprehension subsection of the TOEFL test correlated with scores on versions A and B of the 2,000 word level at .66 and .62, respectively, and with scores on versions A and B of the UWL section at .67 and .71, respectively.

Zhang and Annual (2008) explored the role of vocabulary in reading comprehension. Thirty-seven secondary students of a school in Singapore participated in this study. The Vocabulary Levels Tests were used to measure students' vocabulary knowledge and some different measures were used to test their reading comprehension and summary abilities. Results suggest that students' vocabulary knowledge at the 2,000-word (r= .423, p<.01) and at the 3,000-word levels (r= .848, p<.01) correlated with their reading comprehension.

Hu-Hsueh-Chao and Nation (2000) tried to see what percentage coverage of text is needed in reading for pleasure. The study examined the effect of three densities of unknown vocabulary on two measures of reading comprehension: a multiple-choice test and a cued written recall test. In the case that 80% of the running words in the text were familiar to the readers, no adequate comprehension on either of the measures was obtained. Where 90% and 95% of the tokens in the text were familiar to the readers, some gained adequate comprehension but most did not. A simple regression analysis of the data showed a predictable relationship between the density of unknown words and degree of comprehension. It seems that for learners to gain unassisted comprehension of a fiction text, around 98% coverage of vocabulary is needed.

Zimmerman (2004) investigated the role of vocabulary size in assessing learners from various L1 backgrounds and for institutional placement. First, the vocabulary size of students from each language

group was compared. Then, students' vocabulary size scores were correlated with their placement scores that evaluated reading, writing, speaking, listening, and grammar. Finally, the vocabulary size of new students was compared to those of students within the same institutional placement level. The results showed that within the same institutional placement levels, speakers of Spanish and Korean had larger English vocabularies than speakers of Japanese and Chinese. The correlation analysis revealed that vocabulary size correlated most with speaking, and listening, followed by grammar, then reading and writing. Finally, the cross-sectional analysis indicated that the vocabulary size of newly placed students was generally larger than that of continuing students.

In the behavioral sciences, a correlation of .50 is generally regarded as an indication of a 'large co-relational effect size' (Cohen, 1988, p.80), or at least a 'moderate positive relationship' (Hamilton, 1990, p. 481) between any two variables considered. Following this general rule, the above reports appear to indicate that there probably exists a strong association between the learner's breadth of vocabulary knowledge and their reading comprehension levels. As a result, scores on vocabulary size are capable of predicting performance on reading tasks.

2.3. Vocabulary Depth and Reading Comprehension

Qian's (2002) study was designed to examine the role of depth and breadth of vocabulary knowledge in reading for basic comprehension in university-level academic settings and also to evaluate the utility value of the Depth of Vocabulary Knowledge (DVK) test. This study was done in the context of TOEFL research with a sample of 217 international students speaking 19 different native languages. Results from this study supported Qian's earlier findings that (1) scores on depth of vocabulary knowledge were highly correlated with those of basic reading comprehension ($r = .77$, $p < .01$) and (2) the DVK was a reliable measure, which has contributed uniquely and significantly to the assessment of reading performance. According to Qian (2002), scores obtained from this instrument explained close to 60% of the variance in the reading scores.

In a more recent study, Qian and Schedle (2004) empirically evaluated an in-depth vocabulary knowledge measure to find out whether it could be used as a basis to design appropriate and useful item types for assessing test takers' reading comprehension. The study was done on 207 international students attending an ESL program in a major Canadian University. The results showed that depth of

vocabulary knowledge and TOEFL had the same difficulty level and both had similar relationships with reading comprehension tests. It was also found that the new measure had a similar difficulty level compared to existing TOEFL vocabulary measures, and also provided a similar amount of prediction of ESL test takers' reading performance.

2.4. The relationship between Depth and Breadth of Vocabulary Knowledge

Schmitt and Meara (1997) conducted a study to investigate the relationship between depth and breadth of vocabulary knowledge of 88 Japanese young adults. They reported that while the learners' knowledge of suffix and word association were interrelated with their vocabulary sizes at various levels, the correlations between word association and vocabulary size were fairly high (r= .62, $p<$ .50) for productive knowledge and (r= .61, p<.05) for receptive knowledge. It thus supports the hypothesis that breadth and depth are two interconnected dimensions of vocabulary knowledge.

The division between vocabulary breadth and depth, however, is not as distinct as it may seem on the surface. Qian (1999) came to a similar conclusion after he administered the Vocabulary Levels Test (VLT) and the Word Associates Format to 44 Korean speakers and 33 Chinese speakers. He found that the scores of the two tests were closely and significantly correlated at .78 for the Korean speakers and .82 for the Chinese speakers.

Qian's (2002) study was conducted in the context of Test of English as a Foreign Language (TOEFL) research to examine the roles of breadth and depth of vocabulary knowledge in reading comprehension and also to empirically evaluate a test which measures three elements of the depth of vocabulary knowledge, namely, synonymy, polysemy, and collocation. The results show that depth of vocabulary knowledge is as important as that of vocabulary size in predicting academic reading performance. The study also found that scores on the three vocabulary measures are similarly useful in predicting performance on the reading comprehension measure. The research findings confirm the importance of the vocabulary factor in reading assessment.

Vermeer (2001) indicates that it is not reasonable to suppose that vocabulary size tests are less valuable than vocabulary depth tests, because growth in both vocabulary breadth and depth are dependent on frequency of input. She administered a breadth test and a depth test

to 1,600 Dutch monolingual and bilingual 4- and 7-year olds and found that the scores on the three different measures were significantly correlated (r= .73, .83, and .93, p< .01). She explained that "a deeper knowledge of words is the consequence of knowing more words, or that, conversely, the more words someone knows, the finer the networks and the deeper the word knowledge (p.230)."

Researchers usually distinguish between two aspects of an individual's word knowledge: breadth and depth. In addition to these two factors, Tannenbaum et al. (2006) consider fluency in the study of word knowledge. He aimed at finding out the relationships between three dimensions of word knowledge and reading comprehension. The study was carried out with a sample of 203 third-grade students. Confirmatory factor analyses, structural equation modeling, and hierarchical regression analyses show that a 2-factor model of breadth and depth/fluency provides the best fit to the data. Breadth has a stronger relationship to reading comprehension than depth/fluency does; however, the two dimensions of word knowledge have significant overlapping variance that contributes to the prediction of reading comprehension.

2.5. Gender and Reading Comprehension

There are a few studies conducted to investigate the relationship between gender and reading comprehension. Sallabas's (2008) study aimed to determine the effect of student gender in the process of reading comprehension and developing attitude towards reading. The results of the study reveal that there is a big difference between the two genders over reading comprehension. In fact, girls are better at reading comprehension than boys. Also it is found that gender affects attitude towards reading.

Al-Shumaimeri (2005) investigated the differences between Saudi tertiary level male and female students of English as a foreign language in the comprehension performance of gender-neutral texts. One hundred and thirty two male and female university students participated in this study. They were given two reading comprehension tests on two different types of gender-neutral text (familiar and unfamiliar). Findings reveal that content familiarity has a facilitating effect on reading comprehension. Male students significantly outperformed their female counterparts in both tests.

Pae's (2004) study examined the effect of gender on English reading comprehension for Korean EFL (English as a Foreign Language) learners. The gender effect was measured using a DIF (Differential Item Functioning) methodology. Specifically, gender

DIF was investigated for a random sample of 14,000 Korean examinees (7,000 males and 7,000 females) who took the English subtest of the 1998 Korean National Entrance Exam for Colleges and Universities. The results of the study indicate that items classified as Mood/Impression/Tone tended to be easier for females, whereas items classified as Logical Inference were more likely to favor males regardless of item content. Further content analysis reveals that passage content is not a reliable factor that predicts interaction between gender and performance in reading comprehension, hence suggesting that future studies about gender effect on second language reading comprehension should consider item type as well as item content.

Wei-Wei (2009) investigated the relationship between gender differences and reading comprehension at secondary level in China. He suggests females are more global and prefer guessing meaning from context while males are more analytic and attend more to words. In other words, women utilize more top-down strategies and men more bottom-up strategies when reading a text. Females in the study were better in practicing from top to bottom and from bottom to top in their interaction with the reading passages. This involves the reader in a text and his/her background knowledge at the same time.

Young and Oxford (1997) conducted a study with native English speaking men and women (n = 23 males and 26 females) to examine comprehension and strategies involved in reading two Spanish texts and one English text. The reading passages were taken from the textbooks used at the course levels of the participants. Text topics were economics, the presence of foreign cultures in work, leisure, and history. No significant differences by gender were reported with recall scores for all text topics, and there were no self-reported differences by gender in the familiarity ratings with passage topics or background knowledge of any of the passages.

Brantmeier (2002) utilized the same passages used in Young and Oxford's (1997) study along with comprehension assessment tasks with two groups of students from advanced university grammar and literature courses (23 males and 53 females for grammar courses and 9 males and 47 females for literature courses). Across both levels, male participants reported being more familiar with the topic of boxing than the females did, and female participants indicated being more familiar with the topic of a frustrated housewife than the males did. Furthermore, results showed no significant gender differences in comprehension of the gender-oriented passages at the more advanced stages of acquisition. These results indicate that while significant

differences in topic familiarity are maintained across instruction levels, the effects of passage content on L2 reading comprehension by gender are not maintained when the intermediate level text is read by more advanced learners.

2.6. Studies Conducted in Iran

As far as the studies related to the topic of investigation conducted in Iran are concerned, one can refer to a few researches.

Golkar and Yamini's study (2007) was conducted to empirically determine the reliability and validity of the passive and active versions of the Vocabulary Levels Tests. It tried to investigate the nature of the students' vocabulary knowledge with regard to their passive and active knowledge of the L2 words as a whole and at different word frequency levels. It also studied the relationships between these two types of vocabulary knowledge and the learners' proficiency level and reading comprehension ability. The participants were 76 Iranian undergraduate students majoring in engineering and English Language and Literature. Three tests of the Vocabulary Levels Test, the Productive Version of the Vocabulary Levels Test, and a TOEFL test were administered to students to find out the relationship between the two vocabulary tests and their relationship to their proficiency level and reading comprehension. The results proved the reliability and validity of Vocabulary Levels Tests as the tests of vocabulary size. The learners' passive and active vocabularies were also highly correlated as a whole and at each separate word-frequency level. Passive vocabulary was always larger than active vocabulary at all levels. In addition, there was a high correlation between the learners' vocabulary knowledge on the one hand and proficiency and reading comprehension ability on the other hand.

Kaivanpanah and Zandi (2009) attempted to investigate the role of depth of vocabulary knowledge in reading comprehension. A TOEFL test and a measure of depth of vocabulary knowledge was administered to 57 EFL learners (17 males and 40 females). The analysis of the results showed that although depth of vocabulary knowledge is significantly related to reading, grammatical knowledge explains the greatest amount of variance in tests takers` performance on reading comprehension tests.

2.7. Objectives of the study

With regard to the fact that breadth and depth are regarded as two interconnected dimensions of vocabulary knowledge, knowing a large vocabulary can not help learners a lot if their knowledge is shallow and superficial. Therefore, while the size of vocabulary knowledge is an important factor in predicting success in reading comprehension, depth of vocabulary plays an important role as well. Some studies have been conducted on the depth and breadth of vocabulary knowledge and their relationship to reading comprehension. But as far as the review of related literature is concerned, no study has been done on the relationship between the depth and breadth of vocabulary knowledge and reading comprehension in Iran. Therefore, the present study attempts to find the effectiveness of the two aspects of vocabulary knowledge on Iranian EFL learners' reading comprehension. It also tries to find out whether gender will have any effect on learners' reading performance.

2.8. Research questions

Considering the objectives of the study, one can formulate the following research questions.

1) How do scores on vocabulary size, depth of vocabulary knowledge, and reading comprehension correlate with one another?

2) What is the relationship between the size of vocabulary knowledge and depth of vocabulary knowledge?

3) Which one of these two aspects of vocabulary knowledge is a better predictor of reading comprehension performance?

4) Does gender have any effect on learners' reading performance and vocabulary knowledge?

2.9. Significance of the study

Reading comprehension and vocabulary development seem to be the most important and useful activities in any language class, especially for the students of English as a foreign language (EFL) in Iran. In fact, most students learning English in poor-input contexts compensate their lack of exposure to spoken English by engaging in reading comprehension activities. Studies on these two aspects can be of great value for Education administration and even for universities. As recommended by several researchers (Cameron 2002; Nation, 2001), measuring students' vocabulary knowledge allows teachers to set the language goals for the course within communicative language teaching. It is also helpful because of the insights it offers for the cognitive processes involved in reading and vocabulary acquisition.

Therefore, any research in line with these points may broaden our understanding of the nature of vocabulary knowledge and its relation to reading comprehension. With regard to the crucial role of vocabulary knowledge, little is known about how and what aspect of vocabulary knowledge can affect reading comprehension more effectively in Iran as an EFL context.

3. Methodology
3.1. Participants
The participants of this study were 60 (30 male and 30 female) advanced learners of English as a foreign language who were chosen from among five language teaching institutes in Shiraz. They had studied English as a part of the national curriculum. However, they enrolled in language classes in order to compensate for the deficiency of English education at high school or university. They ranged in age from 17- 32.

3.2. Instruments
The data collection instruments used in this study were as follows: (1) Vocabulary Level Test (VLT), (2) Word Associate Test (WAT), and (3) Reading Comprehension Test.

3.2.1. Vocabulary Levels Test (VLT)
The Vocabulary Levels Test used in this study was the second version of the vocabulary levels test revised by Schmitt et al. (2001). It was originally produced by Nation in 1983 and was later revised by him in 1990. It is a paper-and-pencil test that provides an estimate of vocabulary size at 2000, 3000, 5000, and 10000 frequency levels and also provides an estimate of the size of the examinee's academic vocabulary. The 2000 and 3000 word-family levels test include only high frequency words in English; the 5000 word-family level is a boundary level between the high frequency and low frequency levels; and the 10000 word –family level includes low frequency words. The university word list level contains specialized vocabulary needed for academic studies.

In this version, there are 10 clusters at each level and each cluster has six words and three definitions. So the test has 150 items. The testees are supposed to match the definitions on the right in each cluster with the corresponding words on the left. The items are not contextualized so that no clues to the meaning are provided. An item of the test is provided below as an example.

a. business

b. clock 1. _____ part of a house

c. horse 2. _____ animal with four legs

d. pencil 3. _____ something used for writing

e. shoe

f. wall

In scoring, Nation (1983) states that a score of 12 or less out of 18 (66.67%) at a vocabulary size level is an indication that this level has not been mastered. Based on Nation's scoring, the researchers assumed that a score of 20 out of 30 at each level could be an indication of that level's mastery. Since the VLT in this study included five levels, the highest possible score is 150 (1 point x 30 items x 5 levels).

Schmitt (2001) reported that reliability coefficients ranged from .92 to .96 for different sections of the test. However, to further ensure the reliability of the test, after the data collection, it was administered to participants randomly selected from among the ones who had participated in the study, with a time interval of two weeks. The acquired reliability index was .93 which is an acceptable reliability index.

3.2.2 Word Associate Test (WAT)

To measure the depth of vocabulary knowledge, Word-Associate Test (WAT) developed by Read (1993) was used. As mentioned above, the WAT attempts to measure the learner's depth of vocabulary knowledge through word associations, that is, the various semantic and collocational relationships that a word has with other words in the language. The test is composed of 40 target words. Each item consists of one stimulus word, which is an adjective and two boxes, each containing four words which are mainly nouns. Among the four words in the left box, one to three words can be synonymous to one aspect of, or the whole meaning of the stimulus word, whereas among the four words in the right box, there can be one to three words that collocate with the stimulus word. The instruction sheet for the test taken explains that there are always four correct answers in each item. However, these answers are not evenly spread. Three situations are

possible: a) the left and right boxes both contain two correct answers; b) the left box contains one correct answer and the right box contains three correct answers; c) the left box contains three correct answers and the right box contains only one correct answer.

For example, for the word *Sound*, the following options are given:

Sound: A) logical, B) healthy, C) bold, D) solid, E) snow, F) temperature, G) sleep, H) dance.

In this item, sound is synonymous with logical, healthy and solid. Moreover, it collocates with sleep, so, the correct choices are A, B, D, and G.

Participants received a point for each correctly answered item: in scoring DVKT, each word correctly chosen was given one point. Test takers were not penalized for providing incorrect answers. The maximum possible score was 160 for the total test.

The reliability of the test was further tested through test-retest method of estimating reliability. After the test was administered to all the participants of the study, it was once more randomly administered to students who had already completed the test with a time interval of two weeks. The reliability index for the test obtained through this method was .91.

3.2.3. Reading Comprehension Test

In order to investigate the learners' comprehension ability, a reading comprehension test was employed. This test was a standardized multiple-choice reading comprehension test taken from one version of a TOEFL test. It was composed of six passages with different topics of science, art, history and sociology. Each passage was accompanied by five multiple choice questions. In scoring, one point was allocated to each correct answer given to a comprehension question. The maximum possible score was 30.

 In order to estimate the reliability of the instrument, as for the first two tests, it was given to the same participants who had taken it before, after a lapse of two weeks. The test-retest reliability index obtained was .87.

3.3. Data Collection Procedure

The tests were administered during a class period. Before learners took the test, they were informed of the general purpose of the study and were told that their performance on the test would not affect their course outcome. The data collection procedure was carried out in two sessions during a class period. In the first session, the two vocabulary knowledge tests, namely, vocabulary level test and word associate test were given to the students. For the WAT test, they were instructed to read each of the target words and then circle the four words closely related to the target word. The time allocated to the test was 30 minutes. For the VLT test, the testees were asked to match the definitions on the right in each cluster with the corresponding words on the left. The total score for this test was 150.

In the next session, the reading comprehension test was administered. The participants were told to mark the answers on the answer sheet and they were not penalized for the wrong answers. The time allocated for the reading comprehension test was 45 minutes.

3.4. Data Analysis

The SPSS (Statistical Package for Social Sciences) was used to conduct the analysis of the data. One-tailed Pearson product-moment correlations and multiple regression were used as the dominant techniques for the statistical analyses. One-tailed product-moment correlations were computed for scores from the reading comprehension (RC), vocabulary size test (VS) and depth of vocabulary knowledge (DVK) to find any possible relationship among the three variables. In the regression analysis, the scores on the RC were used as the dependant variable and those of VS, and DVK as independent variables. Three independent t-tests were also run to determine whether the differences between the size of vocabulary knowledge, depth of vocabulary knowledge and reading comprehension of the two genders were statistically significant or not.

4. Results and Discussion

4.1. Descriptive Statistics of Participants' Performance on the Instruments

After the collection of the data through the three instruments described above, the calculated data were analyzed. Table 4.1 presents the descriptive statistics of the participants' performance on the instruments.

Table 4.1: Descriptive statistics of vocabulary depth, vocabulary breadth and reading comprehension

Variables	N	Mean	Std. Deviation	Minimum	Maximum
Breadth	60	79.78	8.52	65.00	99.00
Depth	60	82.46	7.02	70.00	98.00
Reading	60	24.01	3.73	17.00	30.00

As the table shows, the mean score of breadth of vocabulary knowledge, vocabulary depth and reading comprehension are 79.78, 82.46, and 24.01, respectively.

4.2. Determining the Relationship among the Three Variables

In order to determine the relationship between the two independent variables of depth of vocabulary knowledge (DVK) and vocabulary size (VS) and the dependant variable of reading comprehension (RC) and also the relationship between the two independent variables, their correlation coefficient were calculated at .05 level of significance. The results obtained from these computations are presented in the following matrix of correlations.

Table 4.2: Pearson correlations between the vocabulary breadth, depth and reading comprehension

Variables	breadth	depth	Reading
Breadth	1	.837**	.717**
Depth	.837**	1	.740**
Reading	.717**	.740**	1

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

Table 4.2 shows the correlations between the vocabulary breadth, depth and reading comprehension scores to elucidate the strength of association between the dependent and independent variables. Going

through the table, one can see that the learners' reading comprehension performance was significantly correlated with their breadth of vocabulary ($r = .71$, $p < .01$), implying that a larger vocabulary enabled students to recall more information from the text they read. With regard to depth of vocabulary knowledge as another independent variable of the study, as far as the results of the above statistical analysis reveals, there was a high and significant correlation between this variable and reading comprehension ($r = .74$, $p < .01$) which suggests that deeper knowledge of words help learners comprehend the text better. Considering the relationship between the two independent variables of depth and breadth of vocabulary knowledge, one can see a positive and statistically significant correlation ($r= .83$, $p<.01$) which indicates that these two aspects of vocabulary knowledge are interrelated, that is, those learners who had a large vocabulary size had a deeper knowledge of the words, too.

4.3. The Prediction of Reading Comprehension Performance by Independent Variables

In order to find out to what extent the EFL learners' knowledge of reading comprehension was accounted for by the combination of the three factors of depth, breadth and gender and to know the weight of any one of the independent variables on the variance in the dependent variable, that is, to indicate which factor is a better predictor, multiple regression analyses were used. Table 4.3 indicates the results.

Table 4.3: Multiple regression for the relationship between reading comprehension and independent variables

Model	R²	F	Sig.
1	.58	39.29	.000

P< 0.05

As illustrated in the table, the relationship between reading comprehension and the independent variables –the regressors-, depth and breadth of vocabulary knowledge, is significant at $p<.05$. As the table shows, the R² index is .58, a relatively good fit, indicating that 58% of the variation in reading comprehension was accounted for by the independent variables. Nonetheless, this significant value does not mean that all the variables, one by one, predict the reading comprehension. Table 4.4 shows the partial regression coefficients,

pointing out the degree to which each independent variable was related to the dependent variable, i.e., reading comprehension.

Table 4.4: Partial regression coefficients for the degree of prediction of independent variables on reading comprehension

Variables	Beta	t- value	Sig.
Breadth Depth	.32 .46	2.09 2.96	.040 .004

P< 0.05

Table 4.4 indicates that both variables, namely, depth and breadth of vocabulary knowledge significantly predicted the reading comprehension performance at p<0.05. A look at Beta indices reveals that depth of vocabulary knowledge was a stronger predictor of reading comprehension and had a stronger effect on reading comprehension scores (0. 46). This means, all the variables held constant, for every unit increase in the level of depth of vocabulary knowledge, the reading comprehension score increased by .46 unit. Another strong predictor of reading comprehension performance was breadth of vocabulary knowledge with Beta= .32. This, again, means that there was an increase in reading comprehension scores by .32 for every extra point in the level of vocabulary breadth.

With respect to the above results, one can say that vocabulary depth is a better predictor of reading comprehension scores than vocabulary breadth.

4.4. Identifying the Possible Effect of Gender on the Dependant and Independent Variables

In order to determine whether the variable gender can have an effect on the dependent variable of the study, reading comprehension, and on the other independent variables, namely, depth and breadth of vocabulary knowledge, some further analyses of the data were performed.

To make sure whether the variable gender can have an effect on the other independent variables of the study and on the dependant variable, three independent t-tests were performed. The results obtained from these analyses are depicted in the following tables. Table 4.5 presents the results of the t-test for the reading comprehension scores.

Table 4.5: Independent sample t-test on gender and reading comprehension

Variable	N	Mean	SD	t	df	Sig
Reading comprehension male	30	22.93	3.68	-2.33	58	.61
female	30	25.10	3.51			

The results reported in Table 4.5 reveal no significant difference between males and females' reading comprehension scores (t=2.33, p> 0.05). This means that males and females have performed similarly on the reading comprehension test. Table 4.6 summarizes the results of the t-test for the males and females' scores on the vocabulary size test.

Table 4.6: Independent sample t-test on gender and vocabulary breadth

Variable	N	Mean	SD	t	df	Sig
Vocabulary breadth male	30	76.60	7.83	-3.09	58	.94
female	30	82.96	8.08			

As the table shows, there is no statistically significant difference between male and female's performance on vocabulary size test either (t= 3.09, p>0.05). In other words, gender had no effect on learners' vocabulary breadth.

Table 4.7 shows the results of the t-test for males and females' scores on the vocabulary depth test.

Table 4.7: Independent sample t-test on gender and vocabulary depth

Variable	N	Mean	SD	t	df	Sig
Vocabulary depth male	30	80.06	6.67	-2.76	58	.53
female	30	84.86	6.61			

As the results of the above analysis shows, there is no statistically significant difference between the males and females' scores on vocabulary depth test. In other words, both male and female learners performed similarly in their vocabulary depth test.

With regard to the results of the above analyses, the variable gender does not have any statistically significant effect on the performance of the participants either on the two independent variables of the study or on the dependant variable. Such being the case, it can be claimed that the variable gender has no effect on participants' performance on reading comprehension or on the two aspects of vocabulary knowledge.

4.5. Discussion

As seen above, the results obtained from the analysis of the data revealed that there is a relationship between vocabulary depth and breadth and reading comprehension, and that these variables predict the learners' L2 reading comprehension performance. The results also showed a positive correlation between the two independent variables of vocabulary depth and breadth. With regard to the variable gender, as the results indicates, it has no effect either on the dependent variable or on the independent variables of the study. In what follows, the results obtained from the analysis of the data are discussed in the light of the relationships which exist between and among the variables of the study based on the related literature review.

The Pearson correlation coefficients obtained for the variable pairs of RC, VS, and DVK were all higher than .60 (p<.05). In other words, high and positive intercorrelations existed among the scores on the three tests. The results of the present study, as far as the relationship between the vocabulary knowledge and reading comprehension scores are concerned, are directly in line with those of studies conducted by Koda (1989), Gelderen (2004), and Snow (2002) who showed that there is a positive relationship between vocabulary knowledge and reading comprehension performance.

In connection to the relationship between vocabulary size and reading comprehension, the results of the present study indicated that there is a positive and high interrelation between these two variables. These results support the results of studies carried out by Grabe and Stroller (2001), Laufer (1996), and Zhang and Annual (2008).

With regard to the relationship between depth of vocabulary knowledge and reading comprehension, the correlations among DVK, VS, and RC were especially high, indicating that, for this given sample and among the three tests under discussion, the scores on the

DVK, representing the meaning and collocation components of depth of vocabulary knowledge, were highly and positively intercorrelated with the learners' general academic reading comprehension levels. These results are in line with the studies done by Qian and Schedle (2004) and Qian (2002).

With respect to the interrelatedness of vocabulary depth and breadth, the scores on the DVK and VS dimensions of vocabulary knowledge are also closely and positively correlated, which make us believe that the development of the two dimensions is indeed interconnected and interdependent. On the other hand, the high correlation between DVK and VS scores may be attributed to the partial construct overlap of the two measures. The VS measures the primary meaning of words, while the DVK measures knowledge of synonymy, polysemy, and collocation. Although the DVK tests more and deeper aspects of vocabulary knowledge than the VS, primary meaning is, in certain cases, part of knowledge of synonymy and polysemy, and knowledge of word meaning sometimes has an impact on knowledge of collocation.

The results obtained from this section of data analysis lend support to some studies conducted by Schmitt and Meara (1997), Qian (2002), and Vermeer (2001).

In the multiple regression analysis, the results showed that both VS and DVK contributed significantly to the prediction of RC and that vocabulary depth was a better predictor of reading comprehension than vocabulary breadth. In other words, DVK, which represented scores on two components of depth of vocabulary knowledge (lexical meaning and collocation), made a significant and unique contribution to the prediction of scores on academic reading comprehension beyond the prediction provided by scores on vocabulary size. The results of the present study corroborate Qian's (2002) findings which revealed that depth of vocabulary knowledge contributes significantly to test-takers' performance in the assessment of reading comprehension and predicts learners' reading comprehension performance better than vocabulary breadth does. But these results are in contrast with Tannenbaum's (2006) study. He reported that although the two dimensions of word knowledge had significant overlapping variance that contributed to the prediction of reading comprehension, breadth had a stronger relationship to reading comprehension than depth/fluency did.

In connection with the effect of gender on participants' reading comprehension performance, although the results of the present study indicated that there is no significant difference between the males' and

females' reading comprehension performance, a number of studies such as those carried out by Sallabas (2008), Al-Shumaimeri (2005), and Wei-Wei (2009) showed that there is a positive relationship between gender and reading comprehension, Sallabas (2008) reported that there is a big difference between two genders over reading comprehension and that females are better at reading comprehension than males. Conversely, Al-Shumaimeri's (2005) findings reveal that male students significantly outperformed their female counterparts in both reading comprehension tests used in the study.

5. Conclusions

The findings of the present study can be summarized as follows:
With respect to the relationship between vocabulary size and reading comprehension, a high and positive correlation was obtained which shows that the more words the learners know; the more easily they comprehend the texts. As for the relationship between depth of vocabulary knowledge and reading comprehension, the results of the study indicated that they are interrelated positively and significantly which shows that a deep knowledge of vocabulary helps students to become better readers.

In connection with the relationship between the two dimensions of vocabulary knowledge, that is, depth and breadth, the results showed a high and positive correlation between these two variables. In other words, the interrelatedness of vocabulary depth and breadth makes us claim that there is much overlap between these two aspects and learners need to develop them side by side.

With regard to the prediction power of depth of vocabulary knowledge and vocabulary breadth, the results revealed that although both can be considered as predictors of reading comprehension performance, vocabulary depth is a stronger predictor of reading comprehension performance than vocabulary breadth is. In other words, learners who have a deeper knowledge of words (meaning and collocation) outperform those who know more words.

As for the effect of gender on the learners' reading comprehension performance and vocabulary knowledge tests, the results revealed no significant difference between males and females. Therefore, according to the results of the present study, gender differences do not play a role in the learners' vocabulary knowledge and reading comprehension performance.

5.1. Implications of the Study

In this part, pedagogical implications of the study with respect to EFL learners and teachers and material developers are discussed.

The results of the present study may provide EFL teachers with some invaluable information. Understanding students' average vocabulary knowledge and reading ability enables test developers to develop more appropriate English tests that can actually assess students' reading comprehension.

English teachers should plan to help their students reach the vocabulary threshold as soon as possible by recommending them to read storybooks, magazines, and newspapers in English. According to Hwang and Nation (1989), stories, magazines and newspapers constantly repeat some frequent words and technological terms related to a topic. Multiple repetitions reduce readers' lexical burden and help them to better extract information from the text they read.

EFL teachers should consider vocabulary depth and breadth as two important components of EFL syllabus to improve students' reading comprehension. They should introduce synonymy and polysemy of words besides their primary meaning. They should also pay attention to the collocational relations of words with each other since they play important roles in comprehension of English texts.

The results of the present study also help students who plan to increase their vocabulary knowledge and improve their reading comprehension. They must know that achieving their goals depends on their own efforts. Consequently, students must develop the habit of independent reading as a source of entertainment, information, and self-improvement.

The results also provide textbooks writers with much precious information for developing and promoting English texts. Based on students' vocabulary knowledge and reading ability, textbooks developers can select or compose more suitable texts. They must design some activities after reading comprehension passages to help readers develop the depth and breadth of their knowledge of vocabulary.

References

Alderson, J.C.(2000). *Assessing reading*. Cambridge: Cambridge University Press.

Al-shumaimeri, A.N.Y.(2005). Gender differences in reading comprehension performance in relation to content familiarity of gender-neutral texts. Retrieved from:http://www.faculty.ksu.edu. sa/ Yousif/ Publications.

Anderson, R.C. & Freebody, P.(1981). Vocabulary Knowledge, In J. T.Guthrie (Ed.), *Comprehension and teaching: Research reviews* (pp. 77-81). Newark, IRA.

Beglar, D. & Hunt, A. (1999). Revising and validating the 2,000 word level and university word level vocabulary tests. *Language Testing, 16*, 131-162.

Bernhardt, E.(2005). Progress and procrastination in Second Language Reading. *Annual Review of Applied Linguistics, 25,*133-50.

Brantmeier, C.(2002). The effects of passage content on second language reading comprehension by gender across instruction levels. In J. Hammadou Sullivan. (Ed.), *Research in second language learning*. Greenwich, CT: Information Age Publishing.

Cameron, L. (2002). Measuring vocabulary size in English as an additional language. *Language Teaching Research*, *6*, 145-73.

Chapelle, C. (1998). Construct definition and validity inquiry in SLA research. In L.F. Bachman, & A.D. Cohen (Eds.), *Interfaces between second language acquisition and language testing research (pp.32-70)*. Cambridge: Cambridge University Press.

Davis, F.B.(1944). Fundamental factors of comprehension in reading. *Psychometrika, 9,* 185–197.

Gelderen, A.V., Schoonen, R., Glooper, K.D., Hulstijn, J., Simis, A., Snellings, P., & Steven, M.(2004). Linguistic knowledge, processing speed, and metacognitive knowledge in first and second language reading comprehension:A componential analysis. *Journal of Educational Psychology*, 1, 19-30.

Golkar, M., & Yamini, M.(2007). Vocabulary and reading comprehension. *The Reading Matrix*, 7(3), 88-112.

Grabe,W., & Stoller, F.L. (2002): *Teaching and researching reading.* Harlow: Longman.

Grabe, W. (1991). Current developments in second language reading research. *TESOL Quarterly, 25*, 375-406.

Greidanus, T., & Nienhuis, L. (2001). Testing the quality of word knowledge in a second language by means of word associations: Types of distracters and types of associations. *Modern Language Journal, 85*, 567-577.

Guo,Y.(2006). The relationship among vocabulary knowledge, syntactic awareness and reading comprehension. (MA thesis, The Florida State University).

Henriksen, B(1999). Three dimensions of vocabulary development.. *Studies in Second Language Acquisition, 21*, 303-317.

Hu, M. H., & Nation, P. (2000). Unknown vocabulary density and reading comprehension. *Reading in a Foreign Language, 13*(1), 403-430.

Hu-Hsueh-Chao, M., & Nation, I. S. P. (2000). Vocabulary density and reading comprehension. *Reading in a Foreign Language*, *13*(1), 403-430.

Huang, C. (1999). *The effects of vocabulary knowledge and prior knowledge on reading comprehension of EFL students in Taiwan.* Retrieved February 5, 2008, from hhtp:// *contentdm.lib.byu.edu/ETD/image/etd2508.pdf.*

Kaivanpanah, S., & Zandi, H. (2009). The role of depth of vocabulary knowledge in reading comprehension in EFL context. *Journal of Applied Sciences*, 9(4), 698-706.

Koda, K. (1989). The effects of transferred vocabulary knowledge on the development of L2 reading proficiency. *Foreign Language Annals*, 22, 529-540.

Laufer, B., & Paribakht, T.S. (1998). The relationship between passive and active vocabularies: Effects of language learning context. *Language Learning, 48*(3). 365-391.

Laufer, B. (1998). The development of passive and active vocabulary in a second language: same or different. *Applied Linguistics, 19*(2), 255-271.

Laufer, B. 1996: The lexical threshold of second language reading comprehension: what it is and how it relates to L1 reading ability. In Sajavaara, K. and Fairweather, C. (Editors) *Approaches to*

second language acquisition. Jyväskylä: University of Jyväskylä , 55-62.

Laufer, B. (1992). How much lexis is necessary for reading comprehension? In H. Béjoint & P. Arnaud (Eds.), *Vocabulary and applied linguistics* (pp.126-132). London: MacMillan.

Meara, P., & Jones, G. (1990). *The Eurocentres Vocabulary Size Tests 10KA*. Zurich: Eurocentres.

Mezynski, K.(1983). Issues concerning the acquisition of knowledge: Effects of vocabulary training on reading comprehension. *Review of Educational Research, 53,* 253–279.

Nassaji, H.(2004). The Relationship between depth of vocabulary knowledge and L2 learners' lexical inferencing strategy use and success. *The Canadian Modern Language Review, 61*(1), 107-134.

Nation, I. S. P. (1990). *Teaching & learning vocabulary.* New York: Newbury House.

Nation, I. S. P. (2001). *Learning vocabulary in another language.* Cambridge, UK: Cambridge University Press.

Pae, T.(2004). Gender effect on reading comprehension with Korean EFL learners. *System*, 32(3), 265-281.

Qian, D.D. & Schedle, M.(2004). Evaluation of an in-depth vocabulary knowledge for assessing reading performance. *Language Testing*, 21, 28-52.

Qian, D.(1999). Assessing the roles of depth and breadth of vocabulary knowledge in reading comprehension. *The Canadian Modern Language Review, 56*, 282-308.

Qian, D. (2002). Investigating the relationship between vocabulary knowledge and academic reading performance: An assessment perspective. *Language Learning, 52*, 513-536.

Read, J.(1989). Measuring the vocabulary knowledge of second language learners. *RELC Journal*, 19(1), 12-25.

Read, J. (1993). The Development of a new measure of L2 vocabulary knowledge. *Language Testing* 10(3), 355-71.

Read, J. (2000). *Assessing vocabulary*. Cambridge: Cambridge University Press.

Richards, J. (1976). The role of vocabulary teaching. *TESOL Quarterly, 10*(1), 77-90.

Sallabas, M.E.(2008). Relationship between 8th grade secondary school students' reading attitudes and reading comprehension skills. *Journal of the Faculty of Education*, 9(16), 141-155.

Schmitt, N. & Meara, P.(1997). Researching vocabulary through word knowledge framework: Word associations and verbal suffixes. *Studies in Second Language Acquisition, 19*, 17-36.

Shiotsu, T. , & Weir, C.(2007). The relative significance of syntactic knowledge and vocabulary breadth in the prediction of reading comprehension test performance. *Language Testing*, 24, 99-128.

Snow, C.(2002). *Oral language development and demographic change*.Presentation at the Institute for Statewide Literacy Initiatives, Harvard Graduate School of Education, Cambridge, MA.

Spearritt, D.(1972). Identification of sub-skills of reading comprehension by maximum likelihood factor analysis. *Reading Research Quarterly, 8,* 92–111.

Stahl, S.(2003). Vocabulary and readability: how knowing word meanings affects comprehension. *Topics in Language Disorders, 23*(3), 241-247.

Tannenbaum, K.R., Torgesen, J.K., & Wagner, R.K. (2006). Relationship between word knowledge and reading comprehension in third-grade children. *Scientific Studies of Reading*,10(4),381-398.

Vermeer, A.(2001). Breadth and depth of vocabulary in relation to L1/L2 acquisition and frequency of input. *Applied Psycholinguistics, 22*, 217-254.

Wei Wei, V.(2009). Gender differences in reading comprehension for Chinese secondary school students (MA thesis, University of Wisconsin-Platteville).

Wesche, M. , & Paribakht, T.S.(1996). Assessing second language vocabulary knowledge: depth versus breadth. *Canadian Modern Language Review, 53*, 13-40.

Wolter, B. (2001) Comparing the L1 and L2 mental lexicon. *Studies in Second Language Acquisition, 23*, 41-69.

Young, D. ., & Oxford, R.(1997). A gender-related analysis of strategies used to process input in the native language and a foreign language. *Applied Language Learning*, 8, 43-73.

Zareva, A.(2005). Models of lexical knowledge assessment of second language learners of English at higher levels of language proficiency. *System, 33*, 547-562.

Zhang, L.J. & Annual, S.B. (2008). The role of vocabulary in reading comprehension. *RELC*, 39, 51-76.

Zimmerman, C.B.(1997). Historical trends in second language vocabulary instruction. In J.Coady, & T.Huckin(Eds.), *Second Language Vocabulary Acquisition* (pp.5-19). Cambridge: Cambridge University Press.

Zimmerman, K. J.(2004). *Role of vocabulary size in assessing second language proficiency*. Unpublished M.A. thesis. Brigham Young University (BYU). America.