THE RELATIONSHIP BETWEEN VOCABULARY KNOWLEDGE AND ACADEMIC ACHIEVEMENT

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ABSTRACT

This study reports on a research study conducted in an Indonesian national plus high school to estimate the breadth and depth of their students' vocabulary knowledge and the relationship between the breadth and depth with their academic achievements. The Vocabulary Levels Test-Version 2 constructed by Schmitt, Schmitt, and Clapham (2001) was used to measure the vocabulary breadth or size, and the Word Associates Test constructed by Nurwani and Read (1999) was used to measure the vocabulary depth. The VLT showed that the 81 subjects, who were grade 10 students, had an average vocabulary size of about 5,000 words. With this size they were able to read unsimplified texts required for their study in an English medium secondary school. The WAT showed that these students had the vocabulary depth of the 2,000 of high frequent words. The study also showed that there was a significant relationship between the size and depth of vocabulary knowledge. The subjects who had a larger vocabulary size also showed deeper vocabulary knowledge. As for the relationship between vocabulary knowledge and academic achievement, the result showed that those who had a larger vocabulary size and deeper vocabulary knowledge also had higher academic achievements.

Key words: vocabulary knowledge, academic achievements, relationship, unsimplified texts

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1 Based on her research for her Master thesis at Program Pascasarjana Universitas Atma Jaya, Jakarta
Background

In Indonesian schools English is taught as a foreign language, which is given two to three times per week. The medium of instruction in the schools, including English classes is Indonesian. However, in the past fifteen years there has been a growing number of different types of school, which is popularly known as a national-plus school. The word plus here usually refers to the medium of instruction other than Indonesian in the teaching and learning process and an international curriculum. Most of these national-plus schools use English as the medium of instruction for almost all subjects. As for the curriculum they adopt an international curriculum such as the International Baccalaureate (IB), Cambridge, Australia, Singapore, and others.

Since English is used in the teaching and learning process, the students in these schools have to manage all the learning tasks in English such as comprehending the textbooks, understanding the teachers’ explanations, writing reports, doing tests, carrying out conversations and discussions academically or socially. It is assumed that students who are to acquire knowledge through the medium of English in their schools should have a certain level of proficiency in the language. In terms of second language competence in schools where all content subjects are learned in the second language, Saville-Troike (1984:199) claims that vocabulary knowledge is the most important competence for academic needs compared to grammar and competence in social communication.

Since vocabulary knowledge is essential to determine the academic success, it is necessary to find out learners’ vocabulary knowledge. One obvious representation of vocabulary knowledge is the size. It is expected that native speakers of English have more vocabulary knowledge than non-native speakers of English. For a comparison, Goulden, Nation, and Read; Zechmeister, Chronis, Cull, D’Anna and Healy as cited in Nation (2001: 9) estimate the size of 20,000 word families for educated native speakers of English. A rough average is that every year of their lives native speakers of English add around 1,000 word families into their vocabulary. Whereas for foreign language learners, Nation (1990: 24) suggests productive knowledge of at least 3,000 high frequency words to cope with university tasks. Laufer (1992) claims that students with 5,000 words know a high enough proportion (95%) of the running words in a text and can read independently. Sutarsyah et al. (1994) estimates the range of 4,000 – 5,000 words in order to be able to read economics textbooks. Hazenberg and Hulstijn (1996) find out that 3,000-4,000 is not a realistic figure for the subjects of their study, non native speakers of Dutch entering the university in Holland. Based on this, they propose 10,000 base words as the more realistic vocabulary size for students to be able to cope
with university study in second language as opposed to 3,000 to 5,000 in the previous studies.

Next to the vocabulary size that represents the quantity of vocabulary knowledge, one may be curious to find out the depth or the quality of vocabulary knowledge. In line with Read (1989) and Wesche and Paribakht (1996), Qian (2004: 29) asserts that “vocabulary knowledge should at least comprise two dimensions, which are breadth, or size, and depth, or quality of vocabulary knowledge.” Moreover, Qian also proposes that among the many aspects of vocabulary knowledge, the depth of vocabulary knowledge is considered to be of prime importance. However, Laufer et al. (2004) indicate that both size and depth are related constructs. This means that the finding of the size of the learners’ vocabulary knowledge is related to their deep vocabulary knowledge.

Statement of the Problem

To find out whether vocabulary knowledge really plays a significant role in determining the academic success of second language learners, this study wants to answer the following questions:
1. What is the breadth of the subjects’ vocabulary knowledge?
2. What is the depth of the subjects’ vocabulary knowledge?
3. What is the extent of the relationship between the breadth and the depth of the subjects’ vocabulary knowledge?
4. What is the extent of the relationship between vocabulary breadth and depth and the subjects’ academic achievement?

Method

Subjects

The subjects of the study were Year 10 students of one national plus school in Tangerang. There were actually more than 90 students from 5 classes but some of them only took one of the tests or some were new students who did not have the school report for Term 3, the one used in this study. Finally only 81 students were taken as the subjects of this study.

Data Collection

This study used two kinds of data: major and minor data. The major data were taken from two vocabulary tests: the Vocabulary Levels Test (VLT) and the Word Associates
Test (WAT), and the subjects’ school reports as the representation of their academic achievement. The minor data was taken from questionnaires.

The Vocabulary Levels Test (VLT)

The VLT Version 2 constructed by Schmitt, Schmitt, and Clapham (2001) was used to measure the vocabulary breadth. The VLT consist of 5 sections: 2,000, 3,000, 5,000, and 10,000 word level and academic words. There were 10 clusters with 3 words in each cluster, so each word level had 30 words and totally 150 words. The words in the VLT were taken from the Thorndike and Lorge List, with reference to the frequency data from Kucera and the General Service List (Schmitt, and Schmitt, and Clapham, 2001). As for the academic word section, the words were taken from the Academic Word List by Coxhead (1998, 2000), which had better coverage of academic texts than the University Word List by Xue and Nation (1984). Since there was one cluster from the 2,000 word level that had a negative reliability coefficient, it was excluded from the test. Thus the total number of words in the VLT for this study was only 147.

The Word Associates Test (WAT)

The second instrument was the WAT devised by Nurweni and Read (1999) to measure the vocabulary depth of high frequency words. The WAT took the target words and their associates from the 2,000 most frequent words from the General Service List (West, 1953) and 800 academic words from the University Word List by Xue and Nation (1984). There were 50 target words divided into three sections: 20 target words in the 1,000 word level, 15 target words in the 2,000 word level, and another 15 in the academic word section. There were 8 associate words for each target word and the subjects were supposed to choose 4 associate words for each target word. The selection of the associate words should be based on three kinds of relationship with the target words: paradigmatic, syntagmatic, and analytic.

For example:

ORGAN
Body instrument member part shelter spade tailor weapon
WATCH
Baby clock game look at system trouble visit want

The correct word associates for WATCH were baby and game which could occur after WATCH (syntagmatic) and clock and look at which were part of the meaning of WATCH (analytic). As for ORGAN, the correct options were body, member, part, which
were part of the meaning of ORGAN (analytic) and instrument, which was the superordinate of ORGAN (paradigmatic).

Out of 50 target words there were 3 target words (2 words from the 1,000 word level and 1 word from the academic word) discarded because they had negative reliability coefficients. As for the correct options, 4 English native speakers (American) were asked to do the WAT. The answer was then used to score the subjects’ answer for the WAT. Since there were different answers among the native speakers for 3 target words, one from each of the three sections (1,000, 2,000, and academic), the correct options for these 3 target words were only 3 instead of 4. Thus the total number of the correct answer for the WAT with 47 target words was 185 instead of 200.

**Academic Achievement**

The school reports consist of 7 subjects: Language (English and Indonesian), Sciences, Humanities, Biblical Studies, Design Technology, Arts, Physical Education. For this study only the first five subjects (with only English grade for Language) were included as the representation of their academic achievement. As the tests were administered at the end of School Term 3 (there are 4 terms in one academic year), only Term 3 school reports were taken. The range of the grades is 1-7 which can be classified as very low, low, mediocre, satisfactory, high, very high, and excellent.

**Questionnaire**

The questionnaire consist of two parts. There were 7 questions in the first part and 8 questions in the second one. All questions were open ended type of questions. The first part of the questionnaire was meant to find out the following information:

- the previous schools the subjects went to before studying at the present school
- the subjects’ first language and the language they use at home
- whether they have lived in any English speaking countries

The second part of the questionnaire was more related to the tests. The questions tried to probe the perception of the subjects regarding the difficulty level of the tests. There were eight questions: four questions for the VLT and the other four for the WAT.

**Test Administration**

The tests were conducted in two groups on two separate days in the last week of the school Term 3 and supervised by the writer with the help of some of the teachers from the school. The WAT was tested on the first day, and the VLT was tested on the second day together with the questionnaire. The subjects needed 30-45 minutes to do
the WAT and the same length of time to do VLT and answer the questionnaire. To make sure the subjects understood what the tests and questionnaire were for, the writer explained the instruction and went over the test practice of the given examples. Moreover, the subjects were encouraged to ask questions if they did not understand what to do with the test and questionnaire.

Results

Since the total number of items of the two tests were different, the descriptive statistics of the result of the two tests were given in percentages instead of scores. The following is the descriptive statistics of the VLT and WAT scores.

<table>
<thead>
<tr>
<th>Test</th>
<th>No. of students</th>
<th>No. of Items</th>
<th>Mean</th>
<th>SD</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLT 2,000</td>
<td>81</td>
<td>27</td>
<td>95</td>
<td>7.1</td>
<td>.62</td>
</tr>
<tr>
<td>WAT 1,000</td>
<td>81</td>
<td>18</td>
<td>82.8</td>
<td>6.1</td>
<td>.71</td>
</tr>
<tr>
<td>WAT 2,000</td>
<td>81</td>
<td>15</td>
<td>83.7</td>
<td>8.5</td>
<td>.80</td>
</tr>
<tr>
<td>VLT 3,000</td>
<td>81</td>
<td>30</td>
<td>91.8</td>
<td>8.5</td>
<td>.66</td>
</tr>
<tr>
<td>VLT Academic</td>
<td>81</td>
<td>30</td>
<td>86.5</td>
<td>11.5</td>
<td>.66</td>
</tr>
<tr>
<td>WAT Academic</td>
<td>81</td>
<td>14</td>
<td>75.2</td>
<td>8.7</td>
<td>.65</td>
</tr>
<tr>
<td>VLT 5,000</td>
<td>81</td>
<td>30</td>
<td>78</td>
<td>16.9</td>
<td>.80</td>
</tr>
<tr>
<td>VLT 10,000</td>
<td>81</td>
<td>30</td>
<td>47.7</td>
<td>19.9</td>
<td>.81</td>
</tr>
<tr>
<td>VLT Total</td>
<td>81</td>
<td>147</td>
<td>79.5</td>
<td>11.2</td>
<td>.92</td>
</tr>
<tr>
<td>WAT Total</td>
<td>81</td>
<td>47</td>
<td>80.8</td>
<td>6.4</td>
<td>.86</td>
</tr>
</tbody>
</table>

Breadth of Vocabulary Knowledge

In measuring vocabulary size it is common to expect one overall figure of the estimation; however, there is another way of representing vocabulary size. This study used the VLT as the measure of vocabulary breadth. Instead of giving one overall figure, the VLT gives the profile of the test taker's vocabulary size according to the frequency levels. The description of a vocabulary size according to the frequency levels is both necessary and useful since many scholars claim the requirement of a certain vocabulary size for comprehending texts and other purposes in terms of frequency levels.

To interpret the result of the VLT, this study used the criterion of mastery of Guttman scalability analysis as used by Read (1988) and Schmitt, Schmitt, and Clapham (2001). The criterion mastery of 87% for each level was set as the standard of having acquired the words in the test (Schmitt, Schmitt, and Clapham, 2001: 67). From the result of the VLT scores (the mean of 95% for the 2,000 word level and 92% for the 3,000 word level)
it can be estimated that the subjects have totally acquired 3,000 of high frequent words necessary for minimal understanding of authentic texts (Laufer, 1992). With the mean score of 86% for academic words, the subjects can also be considered to have no problems in understanding sub-technical words in academic texts for their study. This is in line with most of their responses in the questionnaire that the 2,000, 3,000 word level and academic words were easy. With the mean score of 78%, most of the subjects can be considered to have acquired quite a number of words in this level. This is confirmed by the mean score of the 10,000 word level, which is only 48%. In terms of difficulty level, all subjects agreed that the 10,000 word level was the most difficult one. In their validation study of the VLT, Schmitt, Schmitt and Clapham (2001: 68) found that the four word levels (2,000-10,000 words) had a very high degree of scalability meaning that "if an examinee reaches the criterion at one level, the teacher or researcher can be reasonably confident that the higher frequency levels are known at least to criterion mastery as well." Therefore, when the subjects have acquired 48% of the 10,000 words, it can be assumed that they also have acquired the 2,000, 3,000 and most of the 5,000 words.

This means that the subjects’ vocabulary size is about 5,000 words. Compared to Nurweni and Read (1999), who investigated the vocabulary size of one Indonesian university students in Lampung, the vocabulary size of their subjects was much lower, 1,226 words. This finding is not different from Kweldju’s study (2001) who found her graduate students to have less than 10% of the native speaker’s vocabulary size (about 2,000 words). Comparing the result of the VLT with mostly undergraduate students from various countries learning English for general and academic purposes, Schmitt, Schmitt, and Clapham (2001) found their subjects only got the mean score of 31.17% for 10,000 word level. This shows that the estimated vocabulary size of the subjects in this study, who were year 10 students, is higher than the undergraduate students in Indonesia and in the other countries.

Another interesting finding in the result shows that as the word level is getting higher, the standard deviation is also getting higher (SD 7.1-19.9). This means that there are more variations of scores among the subjects in the higher word level. The information from the questionnaire on the subjects’ background may help explain this. The frequency counting of the questionnaire shows that the subjects who previously studied in non-English medium schools consistently showed lower scores on the VLT representing the vocabulary size than those who studied in English-medium schools (national plus schools, schools overseas). Moreover, the subjects who speak English at home and those who have lived in English speaking countries also scored higher in the VLT. This could indicate that the intensive exposure and use of English at schools and home may have some contribution in increasing vocabulary size.
Depth Vocabulary Knowledge

As reported by (1993) Nurweni and Read (1999) the result of the WAT was affected by guessing. However, Read (1998) acknowledged that to be able to guess the answer correctly, one has to have good vocabulary knowledge and the ability to look for the possible associates. For those who have good vocabulary knowledge, guessing the answer for unknown words is probably done with a lot more thought. Nurweni and Read indicated the low proficient subjects to be the ones who guessed the answer blindly. This is understandable because the low proficient subjects usually also have very limited vocabulary size. With just an average size of 1,226 words out of 2,800 words it was not unlikely for the subjects to guess, especially for the low proficient subjects. In this study, however, the result of the WAT can be considered more reliable. Since they have about 5,000 vocabulary size as indicated in the VLT scores, they were unlikely to guess blindly.

Looking at the result of the WAT, the subjects can be considered to have acquired the deep vocabulary knowledge of the most frequent 2,000 and academic words. Using the standard of 90% correct answer (Nurweni and Read, 1999), the subjects’ correct answer of 83.7% for the 2,000 word level and 75.2% for academic words show that they know the words in this level quite well. This means that the subjects do not only recognize the words in this level superficially, but they also able to know the other meanings of the words in the list, aside from the most common meaning as the one tested in the VLT. Kweldju (2001) underlines the importance of collocational knowledge (syntagmatic) as one aspect of deep vocabulary knowledge. She proposes collocationally competent learners may be more competent in their communication even though they have a limited size of vocabulary. As for the data from the questionnaire, the subjects who previously studied in English medium schools had better deep vocabulary knowledge than those who did not. Moreover, using English at home and having lived in English speaking countries seem to promote the subjects’ deep vocabulary knowledge than those who do not speak English at home and have never lived in English speaking countries.

Relationship between the Breadth and Depth of Vocabulary Knowledge

The result of the VLT and WAT used to measure the breadth and depth shows a positive correlation between the two: .77 of Cronbach’s alpha. This is higher than the findings in the study done by Nurweni and Read, 1999 (.62) but lower than Qian’s, 2004 (.84). However, the descriptive statistics of both tests shows that the subjects’ deep vocabulary knowledge does not go parallel with the breadth. The subjects did better on the test of breadth than they did on the test of depth for the same word level. This confirms the general assumption that deep vocabulary knowledge is more difficult to acquire than the breadth. Moreover, the fact that the result of the test on the depth of
the 2,000 most frequent words is quite high (84%) may indicate deeper knowledge of the words acquired or learned earlier. This is in line with the statement that vocabulary is acquired in an incremental way (Schmitt, 2000; Greidanus and Nienhuis, 2001; Qian, 2002; and Laufer et al., 2004). Therefore, it is not surprising if the subjects in this study who were calculated to have the average vocabulary size of about 5,000 words have mastered the lower word levels. Compared to Nurweni and Read’s study (1999), the vocabulary size of their subjects is 1,226 words. With this vocabulary size, they only managed a mean of 40% for the same test on deep vocabulary knowledge. The findings of this study confirm that there is a relationship between the size and the quality of one’s vocabulary knowledge. The bigger the size the better the quality of one’s vocabulary knowledge is, especially for the words acquired or learned earlier at the lower word level.

Relationship between Breadth and Depth of Vocabulary Knowledge and Academic Achievement

The correlations between breadth and depth of vocabulary knowledge and academic achievement are positive but low. The correlation between vocabulary breadth and English grades is only .47; the correlation between vocabulary breadth and average grades is even lower, .32. Between vocabulary depth and English grades the correlation is higher: .51; and between vocabulary depth and average grades the correlation is only .33. However, the correlation between English and averages grades is the highest of all already mentioned. The higher correlation can be explained on account of the assessment used by the school. The assessment of all subjects including English is not only based on one single type of assessment but a variety of assessment tasks such as projects, tests, regular tasks, participation, homework, etc. Furthermore, it is understandable if the correlation between both English and average grades and vocabulary breadth and depth scores is low. The vocabulary breadth and depth test the vocabulary knowledge receptively, whereas the assessment used by the school cover both receptive and productive vocabulary knowledge as mentioned in the variety of assessment tasks that they have to do. The following table is to see more of the relationship between vocabulary breadth and depth of the subjects and their academic achievement.

The general tendency of the relationship between the breadth represented by the VLT scores and the academic achievement (average grades) is that the higher scores in the VLT go parallel with the academic achievement. For example, with the scores for the 2,000 word level, the scores consistently go up: 91.5, 94.1, 96.3, and 98.6, for the achievement of average grades 3.6-4, 4.1-5, 5.1-6, and 6.1-7 respectively. Moreover, the scores of the VLT consistently decline as the level goes up and this goes for both the
Table 2 Descriptive Statistics of the VLT–WAT (%) by Academic Achievement

<table>
<thead>
<tr>
<th>Average</th>
<th>English</th>
<th>VLT 2,000</th>
<th>VLT 3,000</th>
<th>VLT Academic</th>
<th>VLT 5,000</th>
<th>VLT 10,000</th>
<th>VLT Total</th>
<th>WAT 1,000</th>
<th>WAT 2,000</th>
<th>WAT Academic</th>
<th>WAT Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6-4</td>
<td>Mean</td>
<td>4.6</td>
<td>91.5</td>
<td>92.4</td>
<td>86.7</td>
<td>79.0</td>
<td>47.1</td>
<td>79.1</td>
<td>83.3</td>
<td>80.7</td>
<td>75.5</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.8</td>
<td>10.0</td>
<td>8.8</td>
<td>7.7</td>
<td>15.4</td>
<td>19.5</td>
<td>10.9</td>
<td>4.3</td>
<td>10.4</td>
<td>8.4</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>7</td>
<td>7</td>
<td>7</td>
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<td>7</td>
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<tr>
<td>4.1-5</td>
<td>Mean</td>
<td>5.0</td>
<td>94.1</td>
<td>90.4</td>
<td>83.9</td>
<td>74.5</td>
<td>42.0</td>
<td>76.6</td>
<td>80.7</td>
<td>82.3</td>
<td>74.1</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.7</td>
<td>8.1</td>
<td>9.6</td>
<td>12.0</td>
<td>17.8</td>
<td>16.9</td>
<td>11.2</td>
<td>6.5</td>
<td>6.7</td>
<td>6.8</td>
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<td>38</td>
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</tr>
<tr>
<td>5.1-6</td>
<td>Mean</td>
<td>5.5</td>
<td>96.3</td>
<td>91.9</td>
<td>88.3</td>
<td>80.4</td>
<td>52.1</td>
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<td>85.0</td>
<td>84.9</td>
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<td>4.9</td>
<td>7.3</td>
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<td>16.6</td>
<td>22.6</td>
<td>11.2</td>
<td>5.8</td>
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<tr>
<td>6.1-7</td>
<td>Mean</td>
<td>6.1</td>
<td>98.6</td>
<td>97.5</td>
<td>92.1</td>
<td>86.3</td>
<td>59.2</td>
<td>86.5</td>
<td>84.9</td>
<td>89.0</td>
<td>81.5</td>
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<td>.6</td>
<td>3.9</td>
<td>3.9</td>
<td>9.2</td>
<td>12.7</td>
<td>17.9</td>
<td>8.5</td>
<td>3.3</td>
<td>3.7</td>
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</tbody>
</table>

high and low achievers. For example, those who got average grades of 4.1-5 scored 94.1, 90.4, 83.9, 74.5, and 42.0 for the 2,000, 3,000, Academic, 5,000, and 10,000 word level respectively. This is actually similar to the profile of the scores in this test, the higher the word level is the lower the scores are. Moreover, the higher the word level is, the more varied the scores are as seen in the standard deviation (SD). In this way the VLT is able to discriminate the high achievers from the low ones.

The relationship between the depth represented by the score of the WAT and academic achievement (average grades) in general also follows the same tendency as the VLT. Those who have high academic achievement also get high scores in the WAT. This can be shown in the example of the total scores of the WAT. The mean scores are 80.2, 79.2, 81.9 and 85.2 for those whose achievements in average are 3.6-4, 4.1-5, 5.1-6, and 6.1-7 respectively. The result of every word level also shows the same trend. In terms of the difficulty level for the WAT, the higher the word level is the lower the mean scores are. The academic words are more difficult than the 1,000 and 2,000 word level as the scores are the lowest among the three levels. Similar to the VLT, the WAT is able to discriminate the high achievers from the low ones. The high achievers are naturally expected to perform better, and they did in this test.

The data from the questionnaire analyzed in the terms of the subjects’ academic achievement also shows a similar tendency as with the breadth and depth. The subjects who previously studied in the English medium schools consistently have higher academic achievement than those who did not. Moreover, those who speak English at home have a little higher achievement than those who do not. The first language of the subjects and the experience of living in English speaking countries do not seem to affect their achievements significantly.
Conclusions

The result of the two vocabulary tests shows that the subjects who were year 10 students had the vocabulary size of 5,000 words and good deep vocabulary knowledge of the most frequent 2,000 words. With such vocabulary breadth and depth at their disposal, they have no difficulties in studying in the English medium secondary schools which require them to read authentic materials, do all the assignments, and communicate in English. Moreover, the tests also confirm a significant relationship between vocabulary breadth and depth as related constructs that vocabulary breadth can determine vocabulary depth. Although there are many factors that may affect academic achievement, this study shows that the subjects who have better vocabulary breadth and depth also achieved better academically. Finally, the intensive exposure and use of English at school and home can promote vocabulary knowledge as well as academic achievement.

REFERENCES


