Teaching Methodology and Receptive Vocabulary Measures[1]

(Metodología de enseñanza y pruebas de vocabulario receptivo)

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ABSTRACT

This study discusses the role of receptive vocabulary and its effects on reading comprehension. It measures the levels of attainment of receptive vocabulary with the Vocabulary Levels Test at the 2000 level and with a reading comprehension test where vocabulary appears in context in reading passages. A comparison is made of results obtained by students in three high schools following different methodology. The statistical analysis shows statistically significant differences among the three schools. The results favor content-based instruction across the different tests.

RESUMEN

Se analiza la importancia del vocabulario receptivo y sus efectos en la comprensión de lectura. Se mide el conocimiento de vocabulario mediante la Prueba de Niveles de Vocabulario (a nivel de 2000 palabras), así como mediante una prueba de comprensión de lectura, donde el vocabulario aparece en contexto de lecturas. Se comparan los resultados de estudiantes de tres colegios con distintas metodologías. El análisis estadístico señala diferencias estadísticamente significativas entre los tres colegios y sobresalen los estudiantes que reciben enseñanza por contenidos.

Introduction

In second language learning, different types of methodology are used to teach English as a Foreign Language (EFL) in distinct educational settings. These methodologies inevitably have direct effects on the learning of various aspects of the target language. Vocabulary learning is one aspect that can be identified as an outcome of the learning process. In this study, we analyze the level of receptive vocabulary mastery that students have reached in their last year of secondary schooling. We compare the results obtained at three educational institutions in Costa Rica, with somewhat different language teaching programs. For Baker and Wright, language programs in bilingual education can be categorized as monolingual forms of education, weak forms of bilingual education, and strong forms of bilingual education depending on the program outcomes and their aim in regard to language attainment. Whereas weak forms of bilingual programs produce either relative monolinguals or limited bilinguals at the end of their programs, strong forms of bilingual education aim at producing bilingual and biliterate students.[3]

In the present study, we can categorize two of the schools as belonging to weak forms of bilingual education programs. Following Baker and Wright, the first two programs are found in a public school and a semi-private school, and exhibit the characteristics of weak forms of bilingual education. They can be classified as *mainstream with world (foreign) language teaching* programs where students typically speak the majority language (Spanish); the language of the classroom tends to be the *majority language with L2/foreign language lessons*; and the

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3   Colin Baker and Wayne E. Wright, *Foundations of Bilingual Education and Bilingualism,* 6th ed. (Bristol: Multilingual Matters, 2017).

aim, on paper at least, could be described as *limited bilingualism*.[4] The results of the study, however, show that the outcomes are very different for students in each of these schools, with *relative monolingualism* being a more likely description for the language outcome in the public school. While the teaching methodology is the same in general terms, the semi-private school has increased the number of hours of instruction. The students thus have more opportunities to be in contact with the language in the classroom. Baker defines this form of mainstream education as one in which the contact with English is limited to a short period of class time per day or week and where "the language [is] is a subject in the curriculum similar to science and mathematics […] A very limited knowledge of a foreign language tends to be the typical outcome for the mass of the language majority."[5] The third school follows a program described by Baker and Wright as a strong form of bilingual program. English is used as a medium of instruction in content courses such as Ecology, Social studies and Biology. For Baker and Wright, this program could be described as a *mainstream bilingual* program in which the students speak the country's *majority language*; the language used in class fluctuates between English and Spanish, depending on the course; and the ultimate language aim of the school is bilingualism.[6]

With the above information in mind, we have analyzed the effects that these types of instruction have on receptive vocabulary knowledge attained by the students in the sample in two types of task: a controlled cloze test and a reading comprehension test. The study compares the levels of attainment of receptive vocabulary as measured by the Vocabulary Levels Test (VLT, Nation[7]; Schmitt, Schmitt, and Clapham[8]) at the 2000 level in a controlled context, and by a reading

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4   Baker and Wright, 199.
5   Colin Baker, *Foundations of Bilingual Education and Bilingualism,* 5th ed. (Bristol: Multilingual Matters, 2011) 218.
6   Baker and Wright, 199.
7   Paul Nation, "Testing and Teaching Vocabulary," *Guidelines* 5 (1983): 12-25.
8   Norbert Schmitt, Diane Schmitt and Caroline Clapham, "Developing and Exploring the Behaviour of Two New Versions of the Vocabulary Levels Test," *Language Testing* 18, 1 (2001): 55-88. DOI: https://doi.org/10.1177/026553220101800103.

comprehension test (Cambridge ESOL, UCLES)[9], where vocabulary appears in reading passages. But first we will explore key aspects of vocabulary theory and its importance.

Why Vocabulary?

Studies on vocabulary learning have gained much recognition in the last few decades,[10] emphasis on vocabulary studies has grown, and they have become more specialized as a result of the acknowledgement of their importance. In the past, vocabulary had a secondary role in the process of language learning and it was seen as an isolated aspect of language. More recently, vocabulary and its role in the language learning process has been strengthened, and it now occupies a more prominent role in connection with language development. Dóczi and Kormos insist that the boundaries between grammatical and lexical aspects of language are not as clear-cut today as they were in the past. Consequently, the incidence of knowledge of vocabulary aspects on grammatical aspects such as morphology and syntax has gained more recognition.[11] The conceptualization of the mental lexicon is thus studied as much in connection with the form, meaning, and use of certain concepts, as it is in connection with the contribution of these aspects to general skill knowledge in areas such as reading and writing in the second language.

Vocabulary learning, on the one hand, is one of the aspects of language learning that students encounter in their first stages of the second language acquisition process and it is also a task that is never complete, just as in one's first language. Contrary to what occurs at

9   Cambridge English Language Assessment. *Cambridge English ESOL Skills for Life: Entry 3* (Cambridge: CUP, 2011). Available at: <http://www.cambridgeenglish.org/exams-and-tests/skills-for-life/>.

10   Paul Nation, "Research into Practice: Vocabulary," *Language Teaching* 44, 4 (2011): 529-539. DOI: https://doi.org/10.1017/s0261444811000267.

11   Brigita Dóczi and Judith Kormos, *Longitudinal Development in Vocabulary Knowledge and Lexical Organization* (Oxford: OUP, 2016).

early stages of vocabulary development in our first language, second language vocabulary development requires much more attention and effort on the part of learners. For Dóczi and Kormos, although vocabulary growth develops faster at initial stages of language learning, it tends to match general language development at later stages.[12] Vocabulary development thus requires attention at initial stages as a solid basis for future vocabulary growth, even more attention at later stages to ensure its growth and the adequate reinforcement of language skills developing along with it.

Vocabulary study is often associated with word lists based on frequency in written and spoken discourse. For Nation and Webb, word lists are valuable for researchers, instructors and curriculum designers by allowing for different actions at various stages of the language learning process.[13] They find word lists useful for course design, setting learning goals, guiding the process of simplification of texts and materials, analyzing vocabulary in texts, analyzing the lexical variety of students' language, creating word lists for specific purposes, or guiding the design of vocabulary tests. As vocabulary studies increase, researchers find more advantages for vocabulary knowledge, and more links between vocabulary and other language skills.

Nation provides a detailed description of the different word lists: the high frequency words, mid frequency words and low frequency words.[14] For Nation, the high frequency word list comprises a small group of around 2000 words[15] (3000 for Schmitt and Schmitt[16]). Nation insists that the high frequency 2000 word list should be given direct attention because:

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12 Dóczi and Kormos, 30.

13 Paul Nation and Stuart Webb, *Researching and Analyzing Vocabulary* (Boston: Heinle, 2011).

14 Paul Nation, *Learning Vocabulary in Another Language* (Cambridge: CUP, 2001, 2013).

15 Nation (2013), 23.

16 Norbert Schmitt and Diane Schmitt, "A Reassessment of Frequency and Vocabulary Size in L2 Vocabulary Teaching," *Language Teaching* 47, 4 (2014): 484-503. DOI: https://doi.org/10.1017/S0261444812000018.

1. it covers such a large proportion of connected spoken and written text that such text will be inaccessible until a reasonable amount of high-frequency vocabulary is known (Nation, 2006), so it needs to be learned as quickly as possible;

2. comprehension of text will suffer if learners cannot access high-frequency vocabulary with some degree of fluency (Perfetti and Hart, 2001; Rasinski, 2000); and

3. without knowledge of high-frequency vocabulary, learners will not be able to produce spoken or written text.[17]

The reasons outlined above point to the critical role that knowledge of this vocabulary list has on the general development of second language ability. This word list gives great advantages to learners who master it because they can access key information for understanding texts and general communication. Given the large percentage of these words in texts, the return of benefits for students is undeniable once they master this word band. These words serve as a cornerstone for a steady development of vocabulary in particular and language skills in general. Additionally, Nation argues that this small number of words appears in large percentages in running texts.[18] Nation insists that this word list represents the baseline on which subsequent word lists develop. He also maintains that only after knowing these words can students develop upper vocabulary knowledge.[19] Along these lines, Read notes that knowledge of upper vocabulary levels means, by default, that students already know the 2000 word band.[20]

The ideas discussed above represent the reasoning behind selecting the 2000 word band as the base for the present study. Given its importance, it makes sense that we want to determine how much of that word band is known by the students in the Costa Rican context at the end of their high school education.

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17   Nation (2003), 25.
18   Nation (1983), 13.
19   Nation (2003).
20   J. Read, "Measuring the Vocabulary Knowledge of Second Language Learners," *RELC Journal* 19, 2 (1988):12-25. DOI: https://doi.org/10.1177/003368828801900202.

Receptive Vocabulary

One area of vocabulary studies concentrates on analyzing productive and receptive vocabulary ability as it develops in students in connection to the different language skills. According to Webb and Nation, receptive vocabulary knowledge is

> the knowledge required to understand words through listening or reading […] Because the majority of language learning is receptive and it is easier to gain receptive knowledge than productive knowledge, people tend to have greater receptive knowledge than productive knowledge.[21]

Receptive vocabulary ability is thus studied for different purposes. Webb and Nation maintain that vocabulary knowledge at the receptive level develops first, is easier to acquire, and tends to be larger than productive vocabulary.[22] Schmitt also argues that vocabulary knowledge grows from receptive to productive ability.[23] For Nation and Webb, research measuring lexical richness is justified because it allows researches and instructors to distinguish between different levels of proficiency between learners. Studies on lexical richness particularly at the receptive level offer information about different aspects of vocabulary in connection with SLA: on how many words are required to understand texts, how much reading is necessary to be able to read more advanced texts, how many unknown words are come across in everyday classroom speech, and on how much vocabulary can be learned through exposure to written and spoken language.[24]

Regarding word knowledge, Nation argues that different types of knowledge are required to truly know a word. He discusses a series

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21 Stuart Webb and Paul Nation, *How Vocabulary is Learned* (Oxford: Oxford University Press, 2017): 283.

22 Webb and Nation, 283.

23 Norbert Schmitt, "Review Article: Instructed Second Language Vocabulary Learning," *Language Teaching Research* 12, 3 (2008): 329-363. DOI: https://doi.org/10.1177/1362168808089921.

24 Nation and Webb, 252-255.

of requirements necessary for complete knowledge at both the receptive and the productive level. For Nation, in the receptive realm, for example, expertise is needed related knowledge aspects at the *form*, *meaning* and *use* of words. First, for Nation, truly knowing aspects of form means that learners would know what the word sounds like, what it looks like and what different parts comprise this word. Second, at the level of meaning, learners need to know the meaning that is signaled by the word and what the concept includes, along with the other words that one specific word makes us think of, that is, its associations. Finally, in terms of use, learners should know the patterns in which the word can occur, what words and word types a specific word can occur with, as well as when, where and how often we can use the word.[25] Knowing all three aspects of the word would mean that learners fully know the word. The present study, however, focuses mainly on form-meaning knowledge of words both in controlled and open tasks at the VLT as well as in reading test contexts.

Vocabulary and Reading

Receptive vocabulary size can be said to have a mutually beneficial relationship with the reading skill. Learners with a larger, well-built vocabulary will deal with different types of texts with more ease; at the same time, the more learners read, the more likely they will be to increase their vocabulary size. Although a limited vocabulary size can be aided by reading strategies when reading simplified texts, a solid vocabulary baseline is necessary to deal with more specialized types of texts. For Hunt and Beglar, lexicon plays a fundamental role in language comprehension,[26] it follows that vocabulary size is key in the reading comprehension process. Authors such as Laufer have established a minimal vocabulary threshold for reading comprehension

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25 Nation (2013), 48-50.
26 Allan Hunt and David Beglar, "A Framework for Developing EFL Reading Vocabulary," *Reading in a Foreign Language* 17, 1 (2005): 23-59.

at 3000 word families.[27] Additionally, Laufer defines the vocabulary threshold as the minimal number of words that learners must be able to recognize automatically, regardless of the context, when they are reading a text.[28] Laufer also argues that knowledge of these 3000 word families is necessary for learners to be able to use the reading strategies that they already have developed in their first language. Lack of knowledge of these 3000 families, on the other hand, would impede the use of these strategies.[29] Laufer argues that knowledge of these 3000 families allows 90-95% of text coverage, which can be described as a reasonable goal in text comprehension.[30]

In a subsequent analysis, Laufer and Ravenhorst-Kalovski (2010) argue that the percentage of text coverage that researchers consider adequate varies depending on the researcher and on the study itself. They propose different types of thresholds that serve different purposes. An *optimal threshold* of between 6000 and 8000 word families allows for up to 98% of text coverage. A *minimal threshold* of between 4000 and 5000 words allows for a text coverage of between 93.4 and 95.5%; and a threshold of around 3000 words would allow for a text coverage of between 90.56% and 92.66%.[31] In sum, depending on the specialization of the text and the depth of understanding we want to reach, we may require knowledge of more words or higher word bands. As mentioned above, knowledge or higher word bands requires knowledge of the basic 2000 words of the language. This word band should thus be considered a starting point in the vocabulary learning process.

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27 Batia Laufer, "How much lexis is necessary for reading comprehension?," *Vocabulary and Applied Linguistics,* P. J. L. Arnaud and H. Béjoint, eds. (London: Macmillan, 1992): 126-132. DOI: https://doi.org/10.1007/978-1-349-12396-4_12.

28 Batia Laufer, "The Lexical Threshold of L2 Reading: Where It Is and How It Relates to L1 Reading Ability," *Approaches to Second language Acquisition,* K. Sajaara and C. Fairweather, eds. (Jyväskylä: University of Jyväskylä, 1996): 55-62.

29 Laufer (1992).

30 Laufer (1996).

31 Batia Laufer and Geke C. Ravenhorst-Kalovski, "Lexical Threshold Revisited: Lexical Text Coverage, Learners' Vocabulary Size and Reading Comprehension," *Reading in a Foreign Language* 22, 1 (2010): 15-30.

Previous Studies

A number of studies have looked into the vocabulary size of learners as determined by the VLT. Table 1 contains a selection of these studies. Those discussed in this section share similarities with the present study in the language background of students, the level of instruction, and/or age. For a more detailed summary, see Castro-García.[32]

In table 1, the word counts for students in Laufer[33] and Qian[34] stand out as far superior to the results in the other studies, regardless of the students' age. In both cases, the researchers report overall word counts in their studies rather than presenting word counts for each VLT band. The results reported in table 1 for the 2000 word band in Laufer are calculated based on the mean scores she described. She also uses a specific formula to calculate overall word counts. For the results presented in table 1, however, we used the formula proposed by Nation: "Vocabulary size = N correct answers multiplied by total N words in dictionary (the relevant word list) divided by N items in test."[35] In the case of Qian, calculating a separate score for the 2000 word band alone is not possible, as he does not refer to the item mean score.

The next group of analyses in table 1 is based on studies carried out by López Mezquita, Canga Alonso and Fernández Fotencha with secondary and upper-level students mainly in Spain,[36] where the word counts show that students are well below the level of mastery for this vocabulary band. Although in the first two the number of hours is higher than in other studies in table 1, the word counts are limited. The results

32 Damaris Castro-García, "Receptive Vocabulary Measures for EFL Costa Rica High School Students," *IJES* 17, 2 (2017): 81-99. DOI: https://doi.org/10.6018/ijes/2017/2/265681.

33 Batia Laufer, "The Development of Passive and Active Vocabulary in a Second Language: Same or Different?," *Applied Linguistics* 19, 2 (1998): 255-271. DOI: https://doi.org/10.1093/applin/19.2.255.

34 David D. Qian, "Investigating the Relationship Between Vocabulary Knowledge and Academic Reading Performance: An Assessment Perspective," *Language Learning* 52, 3 (2002): 513-536. DOI: https://doi.org/10.1111/1467-9922.00193.

35 Paul Nation, *Teaching and Learning Vocabulary* (New York: Heinle & Heinle, 1990): 78.

36 López Mezquita (2005); Canga Alonso (2013); and Fernández Fontecha (2014).

of Olmos,[37] Fernández Fontecha and Canga Alonso, Agustín Llach and Terrazas Gallegos,[38] and Özönder[39] show that those students have mastered the largest number of words. In the last two, word counts are above 1,500 words, indicating that students are near mastery levels of this word band. Using Nation's formula[40] with Özönder, students could be said to show mastery of this word band. The participants in that study are already university students. We do not know their exact number of hours of instruction, but we can assume that it is higher than the others in table 1. We must acknowledge that there is great variety in the results obtained by similar groups of students when the VLT has been used to measure these word counts. The present study contributes further information to this discussion.

As for vocabulary and reading, Qian found that students' vocabulary size is highly associated with reading comprehension, and it accounts for 54% of the variance of the reading scores. He insists that vocabulary size serves as a good predictor for the results students might obtain in a reading comprehension task.[41] Additionally, Jiménez Catalán and Terrazas Gallego also report a positive correlation between the vocabulary size of students and their reading scores. The higher the scores were in the VLT, the higher the scores were in the reading test.[42] In addition, Stæhr also found a correlation between the vocabulary size of students in their sample in the VLT and their reading comprehension scores. For Stæhr, 72% of the results in the reading test can be predicted based on the students' results in the VLT. Stæhr claims that the 2000 word band represents a probabilistic vocabulary

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37 Olmos (2009), 85-86.
38 Agustín Llach and Terrazas Gallegos (2012), 53.
39 Özönder (2016), 447.
40 Nation (1990), 78.
41 Qian (2002).
42 Rosa María Jiménez Catalán and Melania Terrazas Gallego, "The Receptive Vocabulary of English Foreign Language Young Learners," *Journal of English Studies* 5-6 (2005-2008): 173-191. DOI: https://doi.org/10.18172/jes.127.

threshold that can help determine the scores of students in their reading comprehension task.[43]

Table 1. Previous studies on receptive vocabulary size

Study	Size	Hours of instruction	L1
Laufer[44]	1,471 1,855	1,080 (10th grade) 1,260 (11th grade)	Hebrew
Qian[45]	7,224 6,663	--- ---	Korean Chinese
López Mezquita[46]	941	1,049	Spanish
Olmos[47]	1,019	---	Spanish
Canga Alonso[48]	935	1,049	Spanish
Fernández Fontecha[49]	985	839	Spanish
Agustín Llach and Terrazas Gallegos[50]	1,206	944	Spanish
Fernández Fontecha and Canga Alonso[51]	1,558 1,658	350 (1st year) 400 (2nd year)	Spanish
Özönder[52]	1,848	---	Turkish

43 Lars S. Stæhr, "Vocabulary Size and the Skills of Listening, Reading and Writing," *The Language Learning Journal* 36, 2 (2008): 139-152. DOI: https://doi.org/10.1080/09571730802389975.

44 Laufer (1998).

45 Qian (2002).

46 M. López Mezquita, "La evaluación de la competencia léxica: tests de vocabulario. Su fiabilidad y validez," Unpublished Doctoral Dissertation, University of Granada, Spain (2005).

47 Carmen Olmos, "An Assessment of the Vocabulary Knowledge of Students in the Final Year of Secondary Education. Is Their Vocabulary Extensive Enough?" *International Journal of English Studies* 9, 3 (2009): 73-90.

48 Andrés Canga-Alonso, "Receptive Vocabulary Size of Secondary Spanish EFL Learners," *Revista de Lingüística y Lenguas Aplicadas* 8 (2013): 66-75. DOI: https://doi.org/10.4995/rlyla.2013.1180.

49 Almudena Fernández Fontecha, "Receptive Vocabulary Knowledge and Motivation in CLIL and EFL," *Revista de Lingüística y Lenguas Aplicadas* 9, 1 (2014): 23-32. DOI: https://doi.org/10.4995/rlyla.2014.2077.

50 María Pilar Agustín-Llach and Melania Terrazas-Gallego, "Vocabulary Knowledge Development and Gender Differences in a Second Language," *Estudios de Lingüística Inglesa Aplicada* 12 (2012): 45-75.

51 Almudena Fernández Fontecha, and Andrés Canga-Alonso, "A Preliminary Study on Motivation and Gender in CLIL and Non-CLIL Types of Instruction," *IJES* 14, 1 (2014): 21-36. DOI: https://doi.org/10.6018/ijes/14/1/156681.

52 Özgül Özönder, "Student EFL Teachers' Receptive Vocabulary Size," *Procedia: Social and Behavioral Science* 232 (2016): 444-450. DOI: https://doi.org/10.1016/j.sbspro.2016.10.061.

As evidence from previous studies shows, vocabulary size does have a predictive effect on the performance of students in their reading comprehension task. This provides a basis now for analyzing the results of the present study.

This Analysis

Objectives

The purpose of the present study is to explore the following questions.

a. What is the receptive vocabulary size of students who attend schools following different types of methodology?
b. What are the scores of students from different schools in a reading comprehension task?
c. Is there a connection between the vocabulary size of students and their performance in the reading comprehension task?

Participants

A total of 257 students from three different types of high school participated in this study. Of these, 55 students (22 male and 33 female) attend a private school that follows content-based instruction; this school will be referred to as *Content School* (CS). Its students receive 6 hours a week of English as a foreign language instruction, plus 4 hours a week in a content course where the subject matter is taught in English. In sum, these students have received approximately 1,368 hours of English instruction, both through formal language learning and through the teaching of other subjects. The non-language subjects that students have received include Ecology, Social Studies, and Biology. The second school is semi-private and will be referred to as *Semi-Private School* (SPS). It has 130 students (65 male and 65 female). These students have received approximately 1,140 hours of English instruction. Although they do not receive non-language

courses in English, this institution has added more English language lessons to the curriculum than the minimum required by the Board of Education. They use English as much as possible in their classroom instruction. Finally, the third school is a public high school; henceforth, *Public School* (PS). There are 72 students (32 male, 40 female) from this school in our study. They have received the minimum number of lessons required by the Board of Education: 3 hours a week in 7th, 8th, and 9th grades, and 5 hours a week in 10th grade, for an approximate total of 532 hours of instruction in secondary education. The language classes in this school focus solely on formal language instruction and Spanish is often used for both teaching and learning the target language.

Instruments

The Vocabulary Levels Test (VLT)[53] was used to find the receptive vocabulary size of the participants. The VLT has proven to be very useful to determine the word level that students need to learn to reach the target vocabulary that they need to functionally use the target language and to identify whether students are lagging behind in term of lexical knowledge.[54] The VLT has been used in many studies to profile participants' vocabulary knowledge. In this test, students have to complete 30 items for which they have to match concepts to their corresponding definitions. Schmitt, et al. established a criterion of mastery for each level of the VLT in terms of a score of 26 or higher, out of 30, and specified that this score indicates that students have mastered the level relatively well.[55]

The students also took the Cambridge ESOL Entry Level Certificate in ESOL Skills for Life (Entry 3)/Reading.[56] This test was used to determine their receptive vocabulary knowledge, when vocabulary belonging mainly to the 1000 and 2000 word bands is contained in

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53 Nation (1983); and Schmitt et al. (2001).
54 Webb and Nation, 141-142.
55 Schmitt et al. (2001), 67.
56 Cambridge English Language Assessment.

the texts. This test is a subset of the standardized language level tests used worldwide in studies determining language level. The reading test consists of 5 texts and 32 questions. It was found that 80-89% of the words in the texts can fit within the 2000 word level band. From 2 to 6% of the words belong to the AWL (Academic Word List) and the remainder consists of words that are not part of these lists. We must keep in mind that words labeled *Not-on-the-list* include proper names and words that are part of word lists above the 2000 word level. In this case they correspond mostly to proper names or technology-related words such as *DVDs* or *CDs*.

Procedure

Students took these tests in two different sessions. For the VLT, they were given 15 minutes to complete the test. Instructions were presented in Spanish both orally and in writing. Additionally, the students were provided a sample item that illustrated what to do. For the reading test, the students had 1 hour and 15 minutes to complete the task. At the beginning of the session, instructions were given in Spanish to ensure that all students knew exactly what was expected. Written instructions were presented in English, for each one of the different sections of the test. After the tests were graded, inferential statistics were calculated using SPSS 20.[57]

Results for the VLT

The results for the total items and their corresponding total word counts are displayed in table 2. Following Nation's formula,[58] the total word counts are based on the total number of items that students obtained. Of the 30 items in the test, the CS obtained 26.91 items, while the SPS and the PS obtained 22.15 and 14.31 respectively.

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57 IBM Corp. IBM SPSS Statistics for Windows (Version 20.0), (Armonk, New York: IBM Corp, 2011).
58 Nation (1990), 78.

Table 2. Total item and word count per school

	Total item count			Total word count		
	CS	**SPS**	**PS**	**CS**	**SPS**	**PS**
Total	30	30	30	2,000	2,000	2,000
Mean	26.91	22.15	14.31	1,794	1,476	953.64
Median	27	23.5	12.5	1,800	1,567	833.3
Max	30	30	29	2,000	2,000	1,933
Min	21	10		1,400	600	200
SD	2.29	.24	6.75	152.9	349.7	50.15

These preliminary results point to a large gap in vocabulary knowledge existing between the CS and the PS. In terms of total word counts, the CS reached 1,794 words; the SPS school reached 1,476; and the PS reached 953.64 words. The distribution of words for each school in the 2000 word continuum is depicted in figure 1.
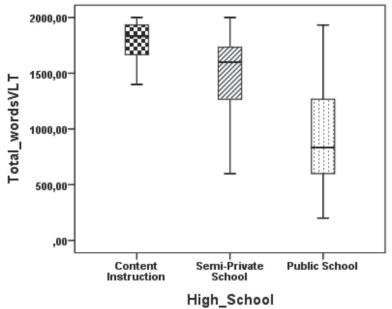

Figure 1. Word distribution per school

For the CS, the median is around 1,800 words and the data are positively skewed; the SPS reaches a median of 1,476, with the data positively skewed. For the PS, the median is clearly below the 1000 word limit and the data are negatively skewed. While some students in the CBT and SPS do reach the maximum number of words at 2000, none of the PS students reaches this maximum. The spread of distribution is also narrow for the CS school, with a minimum of 1,400 words (SD 152.9). In contrast, the spread of distribution is a bit wider for the SPS, with a minimum of 600 words (SD 349.7). Finally, the spread of distribution is much wider for the PS; they cover almost the whole band continuum, with a minimum of 200 words (SD 450.15).

To determine the type of distribution of the differences for each school a Kolmogorov-Smirnov test was used. The results of this test are displayed in table 3.

Table 3. Kolmogorov-Smirnov test for normality distribution

	Kolmogorov-Smirnov Test			
	School	**Statistics**	**gl**	**Sig**
Total Words VLT	CS	.182	54	.000
	SPS	.140	131	.000
	PS	.134	72	.003

According to this test, all schools follow a not normal distribution. This calls for non-parametric tests where the medians will be compared. With that purpose a Kruskal-Wallis test was used, and the results are displayed in table 4.

Table 4. Kruskal-Wallis comparison test for words in the VLT

Sample compared	**Statistical test**	**Error**	**SD**	**Sig**	**Sig**
PS-SPS	71.387	10.893	6.554	.000	.000
PS-CT	135.380	13.366	10.128	.000	.000
SPS-CT	63.993	12.007	5.329	.000	.000

The data in table 4 show statistically significant differences when comparisons are made among all schools. Statistically, the CS outperforms the SPS and the PS; the SPS, in turn, shows statistically significant better results than the PS. The distribution of words per school points to very marked differences in the results obtained by each school, especially when considering the gap existing between the PS and the other two, and even more so, when compared with the CS.

Reading Test Results

The results for each of the schools are presented in table 5. For this test we again observe that students from the CS outperform their counterparts in the other two schools. In terms of scores, the CS presents a median score of 86.13, the median is 74.18 for the SPS, and 46.28 for the PS. While the maximum scores are across the schools, the main difference is observed in the minimum scores, 57, 23, and 15, for the CS, SPS, and PS respectively.

Table 5. Scores in reading test per school

	Total item count		
	CS	SPS	PS
Total	100	100	100
Mean	86.13	74.18	46.28
Median	87	79	40.50
Max	98	98	96
Min	57	23	15
SD	8.564	17.327	21.190

The distribution of these scores is depicted in figure 2 where we can easily observe the complete distribution of the scores between the minimum (0) and maximum (100).
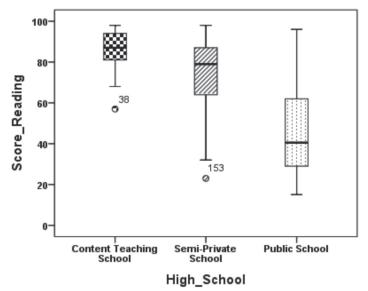
Figure 2. Distribution of scores

For the CS, the median is above the 80 mark and the distribution is very even around its median. We can see how all students are located well above the 60-point mark, thus showing a very similar kind of knowledge across the students' group (SD 8.564). Only one outlier lies below this mark at a little below 60. For the SPS, the median is a little below the 80 mark and the data seem positively skewed. One outlier stands out as obtaining a very low score close to the 20 mark. In the case of this school, the spread of distribution is wider (SD 17.327), more than double the spread of distribution observed for the CS. Finally, for the PS, it shows a median placed just over the 40 mark. The data appear negatively skewed. In this case, the spread of distribution is even wider (SD 21.190) than it was for the SPS.

A Kolmogorov-Smirnov test was used to find the characteristics of these differences between schools. The results are presented in table 6. This test shows that the distribution is not normal for either of the schools. Thus, non-parametric statistical tests are required.

Table 6. Kolmogorov-Smirnov test for reading scores

	Kolmogorov-Smirnov Test			
	School	**Statistics**	**gl**	**Sig**
Reading test scores	CS	.129	54	.026
	SPS	.126	131	.000
	PS	.125	72	.007

A one-way ANOVA test was implemented and a Kruskal-Wallis test was used to compare medians between schools. The results of this test are displayed in table 7. These results show that there are statistically significant differences among all the schools in the sample. That is, the numerical differences that are observed in the scores of the tests represent statistically significant differences between all schools with clear differences of the CS over the SPS and the PS and of the SPS over the PS.

Table 7. Kruskall-Wallis test results for the reading test

Sample compared	Statistical test	Error	SD	Sig	Sig
PFLT-FLT	80.687	10.897	7.405	.000	.000
PFLT-CBT	127.889	13.372	9.564	.000	.000
FLT-CBT	47.202	12.012	3.930	.000	.000

VLT Results and Reading Performance

Further tests were conducted to analyze the effect that the total number of words obtained by the students in the VLT could have on the students' performance in the Reading test. A regression analysis was implemented, and it indeed indicated analysis a relation between the words that students know in the VLT and the scores they obtained in the reading test.

First, in the case of the CS, the histogram in the output test displays residuals normally distributed around the mean. The results show a moderately high Pearson correlation coefficient of 0.730 and positive correlation with significance .000. A significant regression

indicates that 53% of the variance in the reading scores can be predicted by the results on the VLT. The score for the reading test increased by 0.819 for each word that students recognized.

A residual normal distribution is again confirmed in the data for the SPS. In this case the Pearson correlation shows a much lower relation of 0.322 for this school, although still positively significant (p = .000). For the SPS students, the reading test increased by 0.317 for each word that the students recognized on the VLT. Based on the R2 for this school, 10.4% of the variance in the reading score was predicted by the results on the VLT.

Finally, for the PS, the Pearson correlation shows a relatively high relation of 0.767, which is positively significant (p = .000). For these students, the reading test increased by 0.36 for each word students were able to recognize on the VLT. Based on the R2 for this school, 58.8% of the variance in the reading score was predicted by the results on the VLT.

Discussion

The results of the present study contribute different types of information. First, in the case of the VLT, following Nation,[59] the CS can be said to master the 2000 word band, although these numbers can be improved given that the minimum item requirement is set at 26 and this school's median is 26.91, just barely meeting the require-ment. The other two schools, the SPS and the PS do not meet this mastery requirement given that their medians are 22.15 and 14.31. The results for the PS are strikingly low. This information should serve as grounds for analysis and revision by students, teachers, and planning groups involved directly or indirectly in the public education sector in Costa Rica. Although the sample population is small, and

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59   Nation (1990).

thus generalizations are not possible, the study points to the need to look into the situation in each public school.

The results of the CS in terms of median word counts (1,800 words) can only be compared with those of the 11th graders in Laufer,[60] with 1,855 words, and Özönder,[61] with 1,848 words. In the former, the students are about the same age; in the latter, the students are already university students. However, comparison may still be valid as the difference in age is only slight. The results for the 11th graders in the present study fall a little below those reported in those studies. The results for the SPS school, where the number of words is approximately 1,567 words, is similar to those described in Fernández Fontecha and Canga Alonso,[62] who report 1,558 and 1,658 words. However, the students in their study are in first and second years of high school. The age and additional years of education already set the Costa Rican students at disadvantage as we would expect the Spanish students' word counts to keep growing as they advance in high school. As for the PS, where the total word count is approximately 833.3 words, a bit below those of Canga Alonso[63] and Fernández Fontecha,[64] who report 935 and 985 words respectively. In sum, like the data that has accumulated in studies in other areas of the world, the results in the present study also show wide variation in terms of total numbers of words obtained by students in the VLT. This suggests that the receptive level of vocabulary of students is susceptible to the effects that variables such as methodology and hours of instruction may have.

As for the students' reading ability, we were also able to confirm the existence of a wide gap between the reading skill exhibited by students following content instruction and those in mainstream education. Despite the strong emphasis given to the reading skills in secondary classrooms, the results point to much room for improvement.

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60   Laufer (1998).
61   Özönder (2016).
62   Fernández Fontecha and Canga Alonso (2014).
63   Canga Alonso (2013).
64   Fernández Fontecha (2014).

With a maximum possible score of 100, students obtained medians of 87, 79 and 40.5 for the CS, SPS and PS respectively. Although there are students with high scores in all the schools, it is evident that the performance of students in the PS is extremely lacking. Given that the passing score in the public system is 70, we can assume that most students in the CBT and SPS will pass. Some PS students are also likely to pass the test, but a large percentage of students in this school will find it difficult to achieve a passing grade.

In addition, evidence is also presented on the role of receptive/ passive vocabulary for the reading skill. It has been proven that there is indeed a direct relation between the vocabulary size of students and their performance on the reading task. For the CS and the PS a strong correlation of 53 and 58.8% was found. The SPS also shows a small, but significant correlation of 10.4%. These results should direct the attention of students, instructors and planning authorities towards the importance that vocabulary holds in regard to reading comprehension. As discussed in the literature review (Nation[65]), Nation and Webb[66] have argued that knowledge of the 2000 word list is essential for an adequate performance of students in reading. The present study attests to their claims and adds evidence to studies such as those of Qian,[67] Jiménez Catalán and Terrazas Gallego,[68] and Stæhrt,[69] who have found a relation between students' vocabulary size and their reading ability. In five years of high school, instructors and students are given enough of time to dedicate time both inside and outside the classroom to learn at least the first most important 2000 words in English.

The results discussed in this study present revealing information. The fact that students following mainstream public instruction clearly lag behind (both in terms of receptive vocabulary measures and overall reading comprehension) should be considered seriously. The

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65   Nation (1983, 2003, 2013).
66   Nation and Webb (2011).
67   Qian (2002).
68   Jiménez Catalán and Terrazas Gallego (2005).
69   Stæhrt (2008).

mainstream with world (foreign) language teaching type of programs[70] indeed represent weak forms of bilingual programs. As these authors claim they produce either relative monolinguals or limited bilinguals at the end of their programs. The present results show that the performance of students in these school settings is poor and it distances itself from anything close to functional bilingualism. It is also clear that the PS students display the most limited proficiency out of the three schools; that makes us think that they are more identified with the characteristic of monolingualism than with any trait of limited bilingualism, which might be the case for the students in the SPS.

The Board of Education should make strong efforts to introduce significant changes into the national curriculum in English for our students to reach at least somewhat adequate results in terms of English proficiency. The results of the present study may be taken as a preliminary indication that this is not the case. While major movements in Europe are gearing towards Content and Language Integrated Learning (CLIL), the Costa Rican public education system continues to rely on traditional foreign language teaching despite the fact that decades of instruction in this approach have proven to yield deficient results in terms of functional bilingualism.

While the results of the present study in connection to the school that follows content instruction show that they can still be improved, they still are significantly better than those obtained by the PS. Along those lines, although the SPS does not offer content instruction, the adaptations that this school has made already yield better results than those of the PS. Those adaptations come mainly in the form of additional hours of foreign language instruction. That alone already has had an effect on vocabulary learning in particular and language learning in general. Because these students spend more time dealing with the English language, they find more opportunities to learn vocabulary. This together with more reading practice translates into

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70   Baker and Wright, 199.

better performance in the reading task. We should not lose sight of the idea that vocabulary growth also benefits from reading. That is, vocabulary knowledge results in better reading ability and at the same time vocabulary grows while students read.

Conclusion

The results of the VLT and the reading test suggest that EFL programs in Costa Rican are in need of reform so that they offer students the opportunity of learning at least the first 2000 words of English. These are the basic, most important words of the English language and they are also the words that students need to learn first to ensure learning of vocabulary of upper level bands. While students at the CS barely master this band, students following traditional foreign language instruction do not master this band. Lack of knowledge of this word band has an effect on reading comprehension as it hinders the students' performance in reading comprehension tasks. EFL programs in the country are in serious need of reform as students appear to be in disadvantage when competing with other students who have access to more effective language programs. Vocabulary learning should be included as a more active element in the curriculum so that students can make use of the many advantages that vocabulary brings in terms of general language proficiency. Whereas previous studies have shown that at least 3000 words are necessary for adequate reading comprehension (Laufer,[71] Laufer and Ravenhorst-Kalovski[72]), our students are graduating from high school without knowing the first 2000 or even the first 1000 words, in the case of the students in the public education system in our sample. National planning and the national curriculum implementation should opt for true forms of bilingual education that demand the use of English as a medium of instruction. Only then will our students have a fighting chance of achieving a functional use of the English language.

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71   Laufer (1992, 1996).
72   Laufer and Ravenhorst-Kalovski (2010).