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A Study of the English Vocabulary Knowledge of University Students in Hong Kong

Amy S. Y. CHUI
Hong Kong Community College, Hong Kong Polytechnic University

This article reports a study of Hong Kong university students' English vocabulary knowledge. The investigation addresses vocabulary knowledge from the two main perspectives which have pre-occupied vocabulary testing in recent years: breadth and depth. One hundred and eighty-seven students newly admitted to The Chinese University of Hong Kong participated in the study. Two vocabulary measures, (1) the Productive Vocabulary Levels Test (Laufer & Nation, 1999), which assessed students' vocabulary knowledge across different word frequency levels, and (2) a self-constructed depth-of-knowledge test which assessed students' lexical competence across different aspects of vocabulary knowledge, were employed. The results suggest that local tertiary students can master high-frequency English words fairly well. However, their knowledge of low-frequency words is disappointingly deficient. Although they can recognize a reasonable range of academic words, the quality of their knowledge of this group of words is unsatisfactory. Limited morphological and collocational knowledge is likely to hinder their productive use of the words in sentences. The study concludes by recommending that the teaching profession should attach equal emphasis to both breadth and depth in students' English vocabulary development.

Introduction

How many English words do Hong Kong students know? No one could probably provide an exact answer to this question for a number of reasons. In Hong Kong, most children begin to learn English at a very young age in kindergarten. However, none of us can be absolutely sure of how much of the language we have mastered at any particular stage, especially at higher

levels of proficiency. Although English is a compulsory subject in the two public examinations, the Hong Kong Certificate of Education Examination (HKCEE) and the Hong Kong Advanced Level Examination (HKALE), there is no separate paper or section on vocabulary. There is no standard vocabulary list in our syllabus either. Consequently, there is a dearth of information about local students' average English vocabulary proficiency.

Understanding students' vocabulary knowledge is important because vocabulary knowledge can be a good indicator of one's second language proficiency. Research evidence has suggested that "how many words [a student] know[s], as measured on the standard vocabulary tests," (Nation & Meara, 2002, p. 50) is closely related to "how well [the student] perform[s] on reading tests, listening tests and other formal tests of [the student's] English ability" (Nation & Meara, 2002, p. 50). Furthermore, from the point of view of language testing, it is relatively easy to isolate words and write separate test items, explaining why Schmitt (2000) described vocabulary as "a language unit particularly suited to objective testing, for technical as well as linguistic reasons" (p. 20).

In recent years, there has been growing concern for the general English proficiency of Hong Kong tertiary students. Indeed, the learning conditions in universities demand a much higher English language proficiency of students than in secondary schools. Not only do students need to read and write in English, but they also have to attend and participate in English-medium lectures and tutorial discussions. Given this vast amount of English that university students face, it becomes crucial to determine whether they possess adequate English language knowledge to cope with their studies. After the Hong Kong government's introduction of the International English Language Testing System (IELTS) as the exit test for graduates, there is an even more pressing need for tertiary institutions to improve their students' English proficiency. Therefore, the present study was conducted, with the objective of exploring the English vocabulary knowledge of university students in Hong Kong by focusing on both their vocabulary breadth and depth. This article reports the findings of this research project.

Literature Review

Vocabulary and Vocabulary Knowledge

Words are the basic building blocks of our languages. No matter whether we are reading, writing, speaking or listening, vocabulary plays a crucial

role in our daily communication. Nevertheless, the concept of *word* is not as straightforward as one may expect. A word may be defined as a "minimum meaningful unit of language" (Carter, 1998, p. 5), or as a sequence of isolated letters. But these definitions cannot serve the purpose of vocabulary testing. As suggested by Nation and Meara (2002), research evidence shows that, psychologically speaking, language users treat related word forms as a single unit of processing. So when assessing vocabulary knowledge, the notion of *lemma*, i.e., a headword (e.g., walk) plus its inflected forms (walks, walked, walking), or *word family*, i.e., a base word (e.g., context), its inflections, and its common derivatives (contextual, contextualize), should be adopted (Nation & Waring, 1997).

As tricky as the notion of word is our understanding of what it means to "know" a word. For some people, knowing a word simply means being able to recognize it; for others, it may indicate the ability to provide a definition, or even to use it in a sentence. Linguists have proposed various frameworks of vocabulary knowledge. For example, Nation (2001) believed that components of vocabulary knowledge should include grammar, morphology, semantics, pragmatics, association, collocation, idiomatic usage, frequency of occurrence, and the distinction between receptive and productive knowledge. The complexity involved in knowing a word explains the difficulty in measuring vocabulary knowledge. Knowing a word demands the mastery of many types of knowledge, which means that no one single test can possibly capture all of them. As a result, vocabulary tests are bound to be selective; one has to be careful about the extent of vocabulary knowledge measured in different tests.

Vocabulary Testing: Issue of Breadth and Depth

In second language vocabulary testing, two dimensions of vocabulary knowledge are often distinguished: one is "breadth" (i.e., vocabulary size); another is "depth" (i.e., quality of vocabulary knowledge). When estimating vocabulary size, researchers do not aspire to get the total numbers of words that language learners know; instead, they want to find out how many lexical items the learners know in some specific word lists. Hence, the accuracy of these measures depends very much upon "the representativeness of the sample" (Wesche & Paribakht, 1996, p. 26). Examples of breadth tests include Paul Meara's Eurocentres Vocabulary Size Test, which is a computerized checklist test measuring test-takers' knowledge up to the most frequent 10,000 English words, and Paul

Nation's Vocabulary Levels Test, which assesses test-takers' knowledge across five word frequency levels (Read, 1997). As for testing the quality of vocabulary knowledge, researchers either scrutinize the various aspects of word knowledge or investigate the different stages of vocabulary acquisition. Marjorie Wesche and T. Sima Paribakht's Vocabulary Knowledge Scale, which requires test-takers to report their knowledge of certain lexical items in relation to a 5-point scale, and John Read's Word Associates Test, which asks test-takers to identify four words semantically related to the test item out of eight words, belong to this category of depth test (Read, 1997). However, both breadth tests and depth tests have their own drawbacks. On the one hand, size tests are criticized for "only capturing partial knowledge of the target words" (Schmitt, 2000, p. 168) and "only [describing] the degree of knowledge in terms of correct/ incorrect" (Schmitt, 2000, p. 168). On the other hand, the relatively large amount of time required to complete the depth-of-knowledge tests affects the number of words to be tested, "limiting the practicality of such tests to some extent" (Schmitt, 2000, p. 171). Therefore, neither type of test is perfect.

Vocabulary Studies on Hong Kong Tertiary Students

Few studies investigating the English vocabulary knowledge of university students have been conducted in Hong Kong. Littlewood and Liu (1996) reported the findings of the LEAP (Learning Experience, Attitudes and Proficiency) project, a large-scale study intended to obtain a profile of local tertiary students' English. Their sample involved 110 first-year students from 7 faculties, with a range of proficiency levels including A to E grades in HKALE Use of English examination, at the University of Hong Kong and The Chinese University of Hong Kong. One area of their investigation was students' vocabulary proficiency. Besides analyzing students' essays, the researchers asked the participants to complete a shortened version (involving just the 3,000-word level, the 5,000-word level and the University Word List level) of Nation's Productive Vocabulary Levels Test. Their results showed that the students had wider knowledge of academic words than nonacademic ones, hinting at the likelihood for local undergraduates to encounter a significant proportion of unfamiliar words when reading general texts. Furthermore, students obtaining Grade D or E in the public examination were likely to struggle with reading both general and academic texts, as their scores in all three levels of the test were below 65%.

Two other pieces of research on tertiary students' English vocabulary proficiency are Cobb and Horst (1999) and Fan (2001). Cobb and Horst (1999) conducted a study measuring the vocabulary size of 49 diploma students majoring in language studies by using Nation's Vocabulary Levels Test. They found that the students did well on the high-frequency words but gave disappointing performance on the academic words. Nonetheless, due to the small sample size, the research findings could not be generalized. For the sake of a better picture of local university students' English vocabulary knowledge, Fan (2001) ran a research project with a much larger and more representative sample. One thousand and seventy-six students newly admitted to the seven tertiary institutions in Hong Kong participated in the study. The subjects consisted of learners with different English proficiency (in terms of their HKALE Use of English grades) and from different educational backgrounds (in terms of the medium of instruction of their secondary schools). The instrument was an especially long version of Nation's Vocabulary Levels Test, with 144 words and 72 definitions in each level. The findings illustrated that, to most students from English-medium (EMI) schools, vocabulary should not be a burden to their university studies: they scored highly in the sections of high-frequency words and academic words. However, those from Chinese-medium (CMI) schools or with low grades (i.e., grade E) in the public exam would need special help with vocabulary, especially the academic words.

The limited number of vocabulary studies conducted in Hong Kong reveals the dearth of information on local university students' English vocabulary proficiency, especially their productive ability and their knowledge quality. Therefore, the present study was designed to tackle this research gap.

Research Questions

Four research questions guided the present study, with the first two focusing on vocabulary breadth and the last two on vocabulary depth:

1. How many English words do Hong Kong university students know at different word frequency levels?
2. Do university students with different educational backgrounds show different patterns of vocabulary knowledge in terms of vocabulary size?

2.1. Is there a difference in vocabulary size between Hong Kong students and students from mainland China?
2.2. Is there a difference in vocabulary size between students admitted to university straight after Form 6 and those admitted after Form 7?
2.3. Is there a difference in vocabulary size among students from different faculties (Business, Engineering, and Science)?

3. Concerning academic vocabulary, which aspect(s) of vocabulary knowledge (grammatical, morphological, collocational, and semantic knowledge) is/are Hong Kong university students weak in?
4. Which aspect(s) of vocabulary knowledge (grammatical, morphological, collocational, and semantic knowledge) is/are most important for written productive use of academic vocabulary?

Research Design

Participants

One hundred and eighty-seven first-year students at The Chinese University of Hong Kong (CUHK) participated in the present study. Each of them completed a vocabulary size test and 31 of them further took another depth-of-knowledge test. Since Nurweni and Read (1999) suggested that students in different faculties appeared to exhibit distinct patterns of vocabulary knowledge, stratified sampling was adopted in the present study so that the performance of students in the three faculties, i.e., the Faculty of Business Administration, the Faculty of Engineering, and the Faculty of Science, could be compared (see Table 1).

Among the 186 participants, 155 participants studied in Hong Kong before entering the university, and 31 of them studied in Mainland China. The Hong Kong participants generally had at least 10 years of experience in learning English: 60% of the students had studied English for 11–15 years and over 30% for 16–20 years. Regarding their secondary education, 85% of the Hong Kong participants attended EMI schools, while the rest attended CMI schools. Over 70% of the Hong Kong participants entered the university after finishing their two-year matriculation course, i.e., Form

6 and Form 7; however, some were admitted through the Early Admission Scheme for Secondary Six Students (EAS), which allowed students with outstanding public examination results to enter the university one year earlier than was normal. Table 2 and Table 3 present the English public examination results of participants.

Concerning the group of participants studying in Mainland China before entering the institution, about 42% came from Beijing, 16% from Shanghai, 13% from Shenzhen, and the rest from places like Zhejiang,

Table 1. Students constituting the participants in the present study

Participant	Frequency
Hong Kong students	
Faculty of Business Administration	56
Faculty of Engineering	47
Faculty of Science	52
Students from Mainland China	31
Total	186

Table 2. AS† Use of English results (in HKALE††) of Hong Kong participants who entered university after Form 7 (*n* = 112)

Grade	Frequency	Percentage
B	4	3.6%
C	18	16.0%
D	56	50.0%
E	34	30.4%
Total	112	100.0%

† AS = Advanced Supplementary Level
†† HKALE = Hong Kong Advanced Level Examination

Table 3. English Language (Syllabus B) results (in HKCEE*) of Hong Kong participants who enrolled through EAS (n = 42)**

Grade	Frequency	Percentage
A	24	57.1%
B	7	16.7%
C	11	26.2%
Total	42	100.0%

* HKCEE = Hong Kong Certificate of Education Examination
* EAS = Early Admission Scheme

Guangzhou, and Fujian. Almost all of them attended secondary schools adopting Chinese as the medium of instruction. Nearly 75% of the students had studied English for 6–10 years; about 20% had studied English for 11–15 years. All the Mainland China students studied in the Business Faculty in CUHK.

Instruments

Two vocabulary tests were administered to elicit the participants' English vocabulary knowledge. These two tests, one constructed from the perspective of breadth and the other conceptualized from the perspective of depth, constituted a comprehensive framework to examine Hong Kong tertiary students' vocabulary proficiency. Presenting an overall impression of students' range of vocabulary, the first instrument was used to address Research Questions 1 and 2; examining the quality of their knowledge about academic words, the second instrument was used to address Research Questions 3 and 4. The first instrument, i.e., the one assessing participants' vocabulary sizes, was adopted in its entirety from one of Laufer and Nation's (1999) productive versions of Vocabulary Levels Test (Parallel Version 1 [Version C]), which was a standardized and widely used test in vocabulary studies. As Nation believed that it was useful to view English vocabulary as "consisting of a series of levels based on frequency of occurrence" (Laufer & Nation, 1999, p. 35), his test was so constructed. In this instrument, 18 lexical items were sampled from each of the 2,000-, 3,000-, 5,000- and 10,000-word frequency levels and the University Word List (UWL), a list of 836 words commonly appearing in academic texts. A meaningful sentence context, together with the first few letters of the target item, was provided in each question, and the test-takers were to supply the missing target word in the test.

Regarding the second instrument, i.e., the one assessing quality of vocabulary knowledge, the emphasis of the measure was placed on academic vocabulary, which was particularly important to my participants who studied English for academic purposes. Nonetheless, due to the apparent absence of any instrument measuring different aspects of vocabulary knowledge of academic words, this depth-of-knowledge test had to be self-constructed. Twenty headwords in Coxhead's (2000) Academic Word List (AWL) were sampled, forming a sampling rate of approximately 1:30. The selection criterion was to achieve equal distributions of words in terms of frequency and grammatical class.

Because the AWL is sub-divided into ten sub-lists of different frequency of occurrence, two words were sampled from each sub-list. These 20 sampled words consisted of 7 nouns, 7 verbs, and 6 adjectives. (Adverbs were not selected, since there are few adverb headwords in the AWL.) In addition, the words chosen were all polysemous words, each belonging to only one grammatical category, with more than one derivation. Four aspects of vocabulary knowledge, i.e., grammatical, morphological, semantic, and collocational knowledge, all of which received significant recognition as components of vocabulary knowledge, were selected for investigation. The test involved five tasks: for each of the 20 academic words, the students needed to (1) construct a meaningful sentence, (2) identify the part of speech, (3) provide an assigned derivative, (4) explain the word meanings, and (5) choose one collocational word out of four options. The format of the test was inspired by Nation's (2001) word knowledge framework, Paribakht and Wesche's Vocabulary Knowledge Scale instrument, and Read's Word Associates Test.

Procedures

The first instrument was administered to the 186 participants during their ELT class periods. They were allowed 30 minutes to complete the vocabulary size test. After the tests were collected, they were marked accordingly. Minor spelling mistakes and grammatical mistakes such as incorrect tense, person and number agreements in the responses were ignored. A total score, with a maximum of 18, in each word frequency level was calculated for each student. Since the second instrument required the participants to spend more time, it could not be administered during the class time. Participants were asked, at the end of the fist instrument, to indicate their willingness to take the second vocabulary test. The researcher then had to arrange a time with these volunteers individually to complete the second test. Altogether 31 students agreed to participate. This time, they could take a maximum of 45 minutes to complete the test. The sentences they produced were marked against two criteria: whether the meaning of the target word was clearly demonstrated and whether the target word was used correctly grammatically. Sentences fulfilling both criteria were awarded two marks; those fulfilling only one of the criteria were awarded one mark. Total scores of different parts (grammar, morphology, collocation, semantics, and sentence production) were then calculated by adding up the marks in the 20 sampled academic words. The

scores were subsequently input into the computer database for further analysis.

Data Analysis

The participants' performance in the two tests could be shown through descriptive statistics: means and standard deviations were calculated in the different word frequency levels of the first instrument and in the different aspects of vocabulary knowledge of the second instrument. At the same time, in the first instrument, the scores of students with different educational backgrounds were separated and compared. *T*-tests and analysis of variance were carried out to check if the differences were statistically significant. In the second instrument, correlation analysis was performed so as to find out which aspect of vocabulary knowledge was more relevant to students' productive use of academic words.

Results

Performance of Hong Kong University Students in the Productive Vocabulary Levels Test

Table 4 shows how many correct items the Hong Kong participants obtained out of the 18 items in each of the five word levels in the vocabulary size test. The trend observed, as expected, was that the students could produce more high-frequency words elicited in the test than low-frequency ones.

Table 4. Mean scores (out of 18) in the Productive Vocabulary Levels Test by Hong Kong participants (*n* = 155)

Word Level	Mean Score (*SD*)	Percentage of Known Words
2000	15.09 (2.40)	83.8%
3000	8.66 (3.12)	48.1%
5000	5.65 (2.75)	31.4%
10 000	1.46 (1.75)	8.1%
UWL[†]	10.21 (3.19)	56.7%

[†] UWL = University Word List

Performance of Students with Different Educational Backgrounds in the Productive Vocabulary Levels Test

Hong Kong Students and Mainland Chinese Students

Table 5 summarizes the mean scores and the standard deviations of these two groups of students in the vocabulary breadth measure. Similar to the Hong Kong participants, the mainland China group's performance dropped across the 2,000-, 3,000-, 5,000-, and 10,000-word frequency levels.

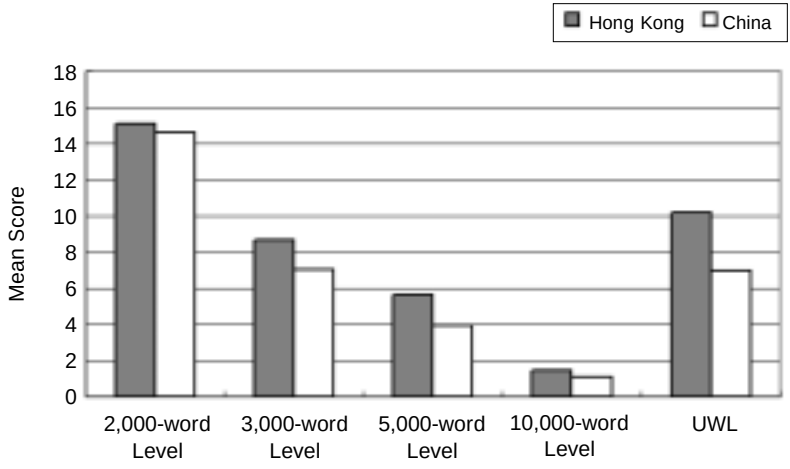
Table 5. Mean scores (out of 18) in the Productive Vocabulary Levels Test by the Hong Kong students and Mainland Chinese students

Word Level	2000	3000	5000	10 000	UWL†
Hong Kong (*n* = 155)	15.09 (*SD* = 2.40)	8.66 (*SD* = 3.13)	5.65 (*SD* = 2.75)	1.46 (*SD* = 1.75)	10.21 (*SD* = 3.19)
China (*n* = 31)	14.58 (*SD* = 2.38)	7.03 (*SD* = 2.92)	3.97 (*SD* = 1.82)	1.13 (*SD* = 1.63)	7.00 (*SD* = 2.73)

† UWL = University Word List

However, the Hong Kong students outperformed their Mainland China counterparts in all the levels, with the most obvious distinction in the University Word List level (see Figure 1).

Figure 1. Mean scores of Hong Kong students and Mainland China students



A *t*-test (independent samples) was carried out to compare the scores of these two groups of students.

Table 6. Results of *t*-test comparing the scores of Hong Kong and mainland China students

Word Level	2,000	3,000	5,000	10,000	UWL[††]
t–value[†]	1.08	2.67**	4.27***	0.98	5.23***

[†] The variances of the two groups had been checked by the Levene's Test for Equality of Variances.
[††] UWL = University Word List
*** significant at the 0.001 level (2-tailed)
** significant at the 0.01 level (2-tailed)

The results (see Table 6) showed that the differences in the average scores between the Hong Kong students and the students from Mainland China were significant at the 3,000-word level ($t = 2.67$, $p < .01$), the 5,000-word level ($t = 4.27$, $p < .001$) and the University Word List level ($t = 5.23$, $p < .001$).

Form 6 Students and Form 7 Students

Table 7 compares the results of the early admitted Form 6 students with those students admitted to university after Form 7. In all the word levels, the Form 6 students scored much higher than the Form 7 students (see Figure 2).

Table 7. Mean scores (out of 18) in the Productive Vocabulary Levels Test by university students admitted after Form 7 and those admitted through EAS

Word Level	2,000	3,000	5,000	10,000	UWL[†]
Form 6 (n = 42)	16.74 (SD = 1.08)	11.21 (SD = 2.79)	8.26 (SD = 2.72)	2.88 (SD = 2.02)	12.81 (SD = 2.56)
Form 7 (n = 112)	14.46 (SD = 2.47)	7.72 (SD = 2.70)	4.65 (SD = 2.04)	0.94 (SD = 1.31)	9.26 (SD = 2.85)

[†] UWL = University Word List

The *t*-test (independent samples) confirmed that the differences between the mean scores of the Form 6 and the Form 7 students were statistically significant ($p < .001$) at all word frequency levels (see Table 8).

Figure 2. Mean scores of Form 6 and Form 7 students

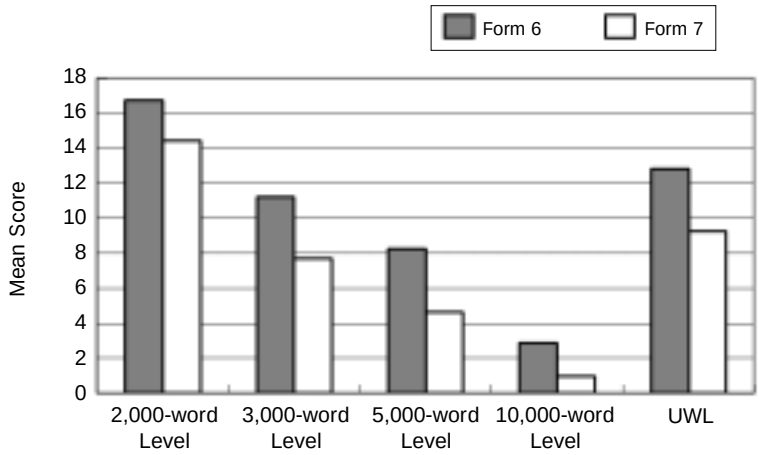


Table 8. Results of *t*-test comparing the scores of Form 6 and Form 7 students

Word Level	2,000	3,000	5,000	10,000	UWL†
t–value†	7.92***	7.08***	7.83***	5.81***	7.07***

† The variances of the two groups had been checked by the Levene's Test for Equality of Variances.

†† UWL = University Word List

*** significant at the 0.001 level (2-tailed)

Students in the Three Faculties

Among the 155 Hong Kong students that took part in this study, 56 students were from the Faculty of Business Administration, 47 the Faculty of Engineering, and 52 the Faculty of Science. Their results in the Productive Vocabulary Levels Test are listed in Table 9. Again, there was

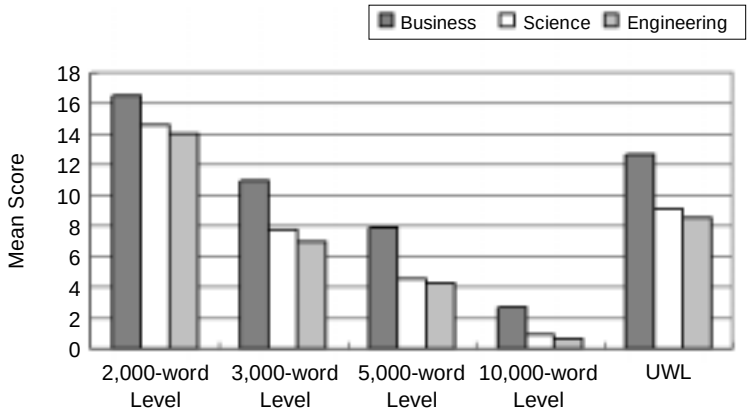
Table 9. Mean scores (out of 18) in the Productive Vocabulary Levels Test by students in the three faculties

Word Level	2,000	3,000	5,000	10,000	UWL
Business (*n* = 56)	16.50 (*SD* = 1.40)	10.95 (*SD* = 2.74)	7.88 (*SD* = 2.56)	2.70 (*SD* = 1.94)	12.66 (*SD* = 2.54)
Science (*n* = 52)	14.56 (*SD* = 2.46)	7.7 (*SD* = 2.05)	14.54 (*SD* = 2.01)	0.88 (*SD* = 0.76)	9.08 (*SD* = 2.90)
Engineering (*n* = 47)	14.00 (*SD* = 2.49)	6.98 (*SD* = 2.97)	4.23 (*SD* = 1.90)	0.64 (*SD* = 1.48)	8.53 (*SD* = 2.31)

† UWL = University Word List

a decreasing trend from the most frequent 2,000-word level to the least frequent 10,000-word level in each faculty (see Figure 3). In all the five levels, the Engineering and the Science students obtained similar mean scores. In contrast, the Business students outperformed their Engineering and Science counterparts in a noticeable manner.

Figure 3. Mean scores of students in the three faculties



A one-way analysis of variance (ANOVA) was performed to establish whether the differences in the three groups were statistically significant. Table 10 shows the results of ANOVA. The *F*-values indicated that some significance existed among the three groups at all word frequency levels. The S-N-K (Student-Newman-Keuls) post hoc test was then applied to find out where the significance lay. The post hoc test confirmed that the Business students' scores in the vocabulary size test were significantly different from both the Engineering students' and the Science students' in all the five levels. No significant difference was found between the scores of the Engineering students' and those of the Science students.

Performance in the Depth-of-knowledge Test

Table 11 shows the aspects of vocabulary knowledge that the participants were weak in. Generally speaking, the participants were weak in both morphological and collocational knowledge. It should be noted that the

Table 10. Results of one-way ANOVA comparing the scores of students from the three faculties

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	*F*
2,000-word Level				
Between Groups	181.91	2	90.95	19.67***
Within Groups	702.83	152	4.62	
Total	884.74	154		
3,000-word Level				
Between Groups	472.39	2	236.19	34.70***
Within Groups	1034.49	152	6.81	
Total	1506.88	154		
5,000-word Level				
Between Groups	435.71	2	217.86	45.27***
Within Groups	731.47	152	4.81	
Total	1167.19	154		
10,000-word Level				
Between Groups	134.56	2	67.28	30.26***
Within Groups	338.00	152	2.22	
Total	472.56	154		
UWL Level				
Between Groups	535.45	2	267.72	39.51***
Within Groups	1029.95	152	6.78	
Total	1565.39	154		

*** significant at the 0.001 level (2-tailed)

Table 11. Mean scores (out of 20) obtained in the depth-of-knowledge test (*n* = 31)

Aspect of Vocabulary Knowledge	Mean Score (*SD*)	Percentage Mean Score
Grammatical	17.52 (1.96)	87.6%
Semantic	12.90 (2.95)	64.5%
Collocational	11.48 (3.37)	57.4%
Morphological	10.45 (3.70)	52.3%

standard deviations in these two parts were larger than normal, indicating the wide range of performance among the participants. The aspect of vocabulary knowledge with the highest average score was grammatical knowledge.

Relationship between Different Aspects of Vocabulary Knowledge and Sentence Production in the Depth-of-knowledge Test

In order to investigate the relationship between the different aspects of vocabulary knowledge and sentence production, a correlation analysis (Pearson correlation) was performed (see Table 12).

Table 12. Correlation between different aspects of vocabulary knowledge and sentence production

	Grammatical Knowledge	Semantic Knowledge	Collocational Knowledge	Morphological Knowledge
Sentence Production	.617***	.501**	.751***	.714***

*** significant at the 0.001 level (2-tailed)
** significant at the 0.01 level (2-tailed)

Scores of all four types of knowledge correlated significantly, as well as positively, with the score in sentence production. The highest correlation appeared between collocational knowledge and sentence production. The correlation between morphological knowledge and sentence production was also strong. The correlation between semantic knowledge and sentence production was the smallest of the four.

Discussion

Vocabulary Size of University Students in Hong Kong

General Vocabulary

As demonstrated in scores of the Productive Vocabulary Levels Test, the Hong Kong students joining this study on average knew more than 80% of the words at the 2,000-word level. In other words, they could master this group of second most frequent 1,000 words in English fairly well. What was worrying was that the students' performance fell dramatically when it came to the 3,000-word level. This was a rather disappointing result, given that the majority of the students had studied English for 11–20 years and yet about 500 words at this level were not ready for productive use. Nation (1990) argues that "[i]f learners need to cover the whole range of language skills, then a productive vocabulary of around 3,000 base words and a larger receptive vocabulary is needed" (p. 5). In other words, the high-

frequency words in these two word levels are necessary for learners to function effectively in English. The present results certainly imply that local tertiary students could be expected to encounter problems frequently even when communicating in English in everyday situations. They may find it difficult to express their ideas, as they do not possess an adequate pool of vocabulary.

Regarding the low-frequency words, participants' performance in the test continued to drop, even though the drop was less sharp than the transition from the 2,000 to the 3,000-word levels. At the 5,000-word level, only one third of the blanks were filled in successfully; at the 10,000-word level, the percentage of correct answers was further reduced to less than 10%. One may argue that second language learners do not usually use these less frequent words in communication. Nevertheless, as pointed out by Nation and Meara (2002), advanced English language learners "exhibit richer vocabulary in their writing than less advanced learners do" (p. 51). Accordingly, it is the ability to appropriately use words beyond the high-frequency band that differentiate the proficient English language users from the less competent ones. Hence, Hong Kong university students should continue to acquire these less frequent lexical items.

Unfortunately, there have been relatively few studies, when compared with the amount of research on reading, investigating the "vocabulary difficulties [second language learners] face in expressing themselves through speaking and writing" (Read, 2000, p. 63). Thus, it is not easy to judge how much vocabulary is needed for productive use in university contexts. Nonetheless, the amount of vocabulary required for our productive use should be less than that for our receptive comprehension (Macaro, 2003). When second language learners encounter "lexical gaps," i.e., "words or phrases in the target language that they need to express their intended meanings but do not know" (Read, 2000, p. 63), they can solve the problem by employing different communication strategies like paraphrasing. Therefore, the participants' small size of general vocabulary might not result in serious communication disruption in English; however, they might need more time and effort to get their ideas and messages across.

Academic Vocabulary

The present study focused on investigating local tertiary students' English vocabulary knowledge. For this group of learners, words that often appear

in academic studies are especially important. But the mean score in the UWL level was less than 60%, indicating that the students could not even master two thirds of the words commonly used in university contexts. Nation (2001) specified that a score of at least 83% in the UWL level of the receptive Vocabulary Levels Test was "desirable" (p. 196) for learners doing academic study at university. This high standard may seem to be severe, yet it is understandable, taking account of the unusual feature of the language. One way that English is distinct from many other languages is the presence of "very different vocabulary registers for special areas of discourse" (Nation & Meara, 2002, p. 51). Moreover, the choice of vocabulary is "a strong indicator of whether the writer has adopted the conventions of the relevant discourse community" (Nation, 2001, p. 178). This characteristic adds to the importance of university students' gaining good control of the academic words. However, the UWL level score in the vocabulary size test and the results in the depth-of-knowledge test suggested that the participants did not master the academic words well.

To sum up, the results of the Productive Vocabulary Levels Test in the present study revealed a worrying inadequacy in terms of English vocabulary knowledge on the part of the local university students. The general picture gives us cause for alarm about Hong Kong students' English proficiency: it is highly likely that they often experience difficulty in finding the right words to express themselves. This lack of vocabulary is commonly regarded by second language learners as the culprit of their poor writing (Leki & Carson, 1994, as cited in Nation, 2001). The writer's choice of vocabulary also seriously influences one's perception of the quality of that piece of writing. Consequently, Hong Kong university students should devote more efforts to expanding their English vocabulary.

Differences in Vocabulary Breadth

Hong Kong Students and Mainland China Students

As reported in the previous section, similar vocabulary knowledge patterns were observed in both the Hong Kong and the Mainland China groups: students' performance dropped across the four word frequency levels, showing that they all possessed a better knowledge of the more frequent words than the less frequent words. But relatively speaking, the Hong Kong students knew a larger percentage of words at each word level, which was quite reasonable considering the very different educational

backgrounds and linguistic environments of the two groups. Yang (2000) perceived that English language teaching and learning in Mainland China was generally "confined to the classroom" (p. 3). Outside the classroom, students had little or even no exposure to English. In contrast, students in Hong Kong could get access to more English language materials such as television, newspapers, and books. In addition, in the present study, the Hong Kong participants had studied English for a much longer period and many of them attended EMI secondary schools. Given the larger amount of language input, it was not surprising that the Hong Kong students had a wider range of English vocabulary than their Mainland counterparts.

Form 6 Students and Form 7 Students

It was observed that the early admitted sixth formers performed exceedingly well in the vocabulary size test. In all the five word frequency levels, the Form 6 group outperformed the Form 7 group. In fact, this result should not be surprising because students enrolled through the EAS were all students with academic excellence. In order to become eligible for the EAS, the Form 6 students must have obtained grade A in at least six subjects in HKCEE, and grade C or above in both Chinese language and English language (syllabus B). Consequently, it can be understood that the sixth formers admitted through the EAS are elite students with outstanding performance in content subjects, together with a high language proficiency.

The Faculty Factor

In the present study, it did not seem to be the case that university students enrolled to different faculties differed much in their vocabulary breadth. The results of ANOVA and post hoc tests verified that only the students in the Business Faculty were statistically different from the students in the other two faculties. Table 13 provides a profile of the English public

Table 13. AS Use of English grades of participants in the three faculties

AS Use of English Grade	Faculty		
	Business	Engineering	Science
B	4	0	0
C	10	7	1
D	1	23	32
E	0	16	18
Not Applicable (F.6 Students)	41	0	1

examination results of the participants of the three faculties. According to The Chinese University of Hong Kong (2004), all the undergraduate programmes under the Business Faculty assigned a heavier weighting to applicants' AS Use of English results in HKALE. In contrast, only one programme in the Science Faculty and four programmes in the Engineering Faculty had the same admission policy. Programmes in these two faculties attached greater importance to applicants' results related to content subjects. Therefore, it was possible to explain the difference in the students' performance in the vocabulary size test by the variation in the admitted students' English language proficiency. But of course another possible factor affecting the results was the outstanding early admitted Form 6 students who constituted the major population of the Business Faculty participants.

Quality of Academic Vocabulary Knowledge

Students' performance in the vocabulary depth measure, to a certain extent, exposed the problems of English vocabulary teaching in Hong Kong secondary schools. In the depth-of-knowledge test, the participants obtained the highest score in the section on grammatical knowledge. Their good performance in identifying the part of speech of academic words coincides with Hong Kong English language teachers' strong emphasis on students' grammar. The second best performance occurred in the semantic knowledge section. On average, the participants could explain the meanings of two thirds of the 20 sampled lexical items. Nevertheless, when asked to supply extra meanings of the words, most of the participants simply left it blank in the vocabulary test. The mean score for this part, 1.16 out of 20, was indeed disappointing. The huge difference in the two scores concerning semantic knowledge suggested that the students were only taught one meaning, normally the primary or the most common one, of an English word. As a result, they were not acutely aware of the different meanings of polysemous words. The unsatisfactory scores in the sections testing morphological and collocational knowledge imply that these two aspects of vocabulary knowledge are often neglected in language classrooms. In the academic vocabulary test, the participants could convert barely 52% of the headwords into the required derivatives and they could only identify the correct collocational words for 57% of the test items. Consequently, the teaching profession should put more effort in enhancing students' awareness of these two aspects of vocabulary knowledge.

Importance of Collocation and Morphology for Sentence Production

The transition of learners' receptive vocabulary to productive vocabulary is one of the research pursuits in second language vocabulary acquisition. It is generally agreed that vocabulary knowledge cannot be accomplished instantaneously; rather, we have to accumulate our vocabulary knowledge gradually. But at which point do we start to become capable of using a word spontaneously and accurately in speaking and writing, instead of only recognizing it in listening and reading? So far there has been no satisfactory answer to this question. In the present study, a very high correlation was reported between the collocational knowledge of academic words and the sentence production task, as well as between the morphological knowledge and the sentence production task. The results hint at the close relationship of collocation and morphology with productive vocabulary. Perhaps certain aspects of vocabulary knowledge are more conducive to the productive ability than others, and this can be an interesting area for future research.

Conclusion

The results in the Productive Vocabulary Levels Test expose the limited vocabulary size of Hong Kong university students. It is a cause for concern that the participants could only barely master the high-frequency words and did not know many low-frequency words. Although they possessed a reasonable range of academic words, on further testing, the quality of vocabulary knowledge of this group of words was unsatisfactory. Evident deficiency in morphological and collocational knowledge was observed. The weaknesses reflected in the present study, to a certain degree, represent the problems of English language education in Hong Kong.

Secondary school education exerts great effects on Hong Kong students' English vocabulary development, because in this period, they usually undergo the transition from beginner to intermediate level in English proficiency. It is also during this period that they gain knowledge of most of the high-frequency words. Therefore, the secondary school English language teachers should deliver to the learners the important message that vocabulary knowledge is more than knowing one meaning of a word. In addition to semantic knowledge, the teachers should incorporate other aspects of knowledge like morphology and collocation into classroom instruction. The teachers' emphasis on both a large vocabulary

size and sophisticated use of words (i.e., breadth and depth) is influential in developing good English vocabulary knowledge of students.

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Amy S. Y. CHUI obtained her M.Phil. degree in Applied English Linguistics from The Chinese University of Hong Kong. She is currently teaching English to associate degree students at the Hong Kong Community College, Hong Kong Polytechnic University.