Introduction

English classes generally taught at colleges of science and technology consist of three types: English for General Purposes (EGP), English for Specific Purposes (ESP), and, "semi-ESP" courses. EGP courses are taught to freshman and sophomore students and are designed to further the student's abilities in using English as a communicative tool. Standard EFL college level textbooks are used in these courses.

ESP courses are taught to seniors and graduate students and are designed to inculcate students with an ability to read and write the technologically oriented English that they are likely to encounter in their professional careers, a set of goals that have been greatly underscored by the rise of English as the recognized international language of Science and Technology. Consequently, technical articles from professional journals are used in lieu of a text.

Semi-ESP courses are taught to juniors and are meant to bridge the gap between the types of English used in EGP and ESP classes; or, in other words, to supply transition between EGP and ESP classes. An example of one such textbook used in these classes is *English for Science and Technology: Starting from the Basics.*

The authors hypothesized that the efficacy of the English could probably best be improved, by the selection of semi-ESP course teaching materials that would connect EGP and ESP classes in a graduated, step-by-step fashion.

Previous to this study there existed no work which measured either the vocabulary levels presented in the textbooks or the efficacy of the vocabulary items selected for them. This study was designed to confirm the above hypothesis by identifying and comparing the vocabulary of representative texts and materials used by students in junior and senior high school (JSH), and EGP, semi-ESP, and ESP classes.

2 Purpose of the Study

The purpose of this study, is to 1) measure the graduations among vocabulary levels found within JSH, EGP, semi-ESP, and ESP teaching materials, as well as other English-language materials; 2) to measure the degree in percentages to which JSH texts, EGP texts and materials, and semi-ESP textbooks cover vocabulary presented within three selected ESP articles; and 3) to identify "bridge-level" materials that connect more closely EGP textbooks and other educational resources to ESP articles in terms of vocabulary level.

3 Procedure

First, samples of ESP articles and a semi-ESP textbook and a variety of English language materials shown in Table 1, Table 2, and Table 3, respectively, were collected.

Table 1   The Three ESP Articles Analyzed

Area	Articles	Tokens	Types
Electrical Engineering	Laser Based and Air Coupled Ultrasound as Noncontact and Remote Techniques for Testing of Railroad Tracks	5,002	848
Applied Molecular Chemistry	The Measurement and Meaning of Void Volumes in Reversed-phase Liquid Chromatography	7,335	925
Civil Engineering	Stresses within a Soil Mass	5,110	679

Table 2   Other English-Language Educational Materials

Grade	Category	Teaching Materials	Tokens	Types
Junior & Senior High School	N / A	*Horizon* , *Powwow* series	34,026	2,443
College Freshman	EGP	*First Listening* , *Introduction to College Life* (CALL materials)	6,465	1,122
College Sophomore	EGP	*American Ideas in Japan, Wonderful USA*	12,644	1,670
College Junior	Semi-ESP	*English for Science and Technology*	12,907	2,171

Vocabulary-Level Assessment for ESP Texts Used in the Field of Science and Technology

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Table 3 General-Use English-Language Materials

Medium	Tokens	Types
TIME	9,202	2,228
Japan Times	9,262	1,940
CNN News	9,035	1,766
TOEIC	7,642	1,411
TOEFL	7,174	1,464

Second, word lists were created and the vocabulary level of each text or transcript were assessed by comparing it with the British National Corpus High Frequency Word List (BNC HFWL), which is a lemmatised, 14,000-word list representing 86,123,934 words in the BNC. Each targeted text or transcript's vocabulary level was defined by identifying and quantifying the number of words from the BNC HFWL that equaled 95 percent coverage of that text. The current thinking in the field of vocabulary teaching and learning puts the threshold of meaningful input at 95%, therefore, 95% coverage was chosen as the target. Thus, the BNC HFWL was used to calibrate the graduations among the diverse vocabulary levels contained within the ESP articles, the EGP and semi-ESP teaching materials, and the other English language materials.

Third, the rate of vocabulary coverage provided by the teaching materials (vis-à-vis the ESP articles) was identified. We calculated the extent to which the vocabulary in JSH texts, EGP texts and materials, and the semi-ESP text match the vocabulary used in the ESP articles. Word matches between the ESP articles and the other materials were determined in order to obtain a good estimate of the percentage of increase in the amount of vocabulary learned at each stage by the students as they advanced from the JSH texts toward the ESP articles.

In the next step, we created a specialized ESP word list by following the two criteria of providing reasonable frequency of occurrence and encompassing a wide range.

Finally, we combined the ESP vocabulary list with the normal semi-ESP textbook in order to determine the percentage of increase in known ESP-article vocabulary that students might reasonably be expected to obtain in this case.

4 Result

The result of measuring the vocabulary levels of the ESP articles, and of the other educational and general-use English-language materials is shown in **Figure 1**. The result confirms the existence of a large gap in vocabulary level between the EGP teaching materials and the ESP articles.
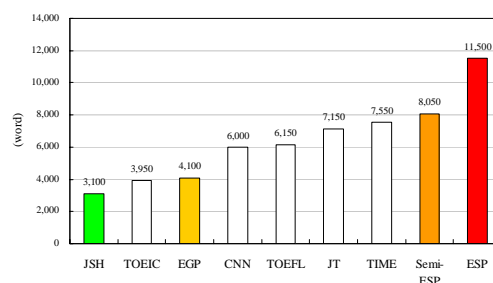
Figure 1   Vocabulary Levels Measured by the BNC HFWL

The study also reveals that the texts used in the semi-ESP classes that were meant to bridge this gap have only a limited efficacy in doing so. Finally, the authors discovered that the gap in vocabulary level existing between EGP teaching materials and ESP articles could be further reduced by supplementing the semi-ESP texts with a specialized ESP vocabulary list created according to the criteria of range and frequency.

The authors firmly believe that this study does provide some valuable insights on how to effectively bridge any gaps in vocabulary coverage that might occur between varying levels of English classes, from JHS and EGP to semi-ESP and ESP.

Further research is generating advanced, intermediate, and beginning ESP vocabulary lists from 3.75 million-word Natural Science and 7.37 million-word Applied Science components of the BNC by applying statistical measures.

References

Chujo, K. & Genung, M. (2003). Vocabulary-Level Assessment for ESP Texts Used in the Field of Industrial Technology, *English Teaching*, 58(3), pp.259-274.

Chujo, K. & Genung, M. (2004) Comparing the Three Specialized Vocabularies Used in 'Business English,' TOEIC, and British National Corpus Spoken Business Communications, *Practical English Studies*, 11: 49-63.

Chujo, K. & Genung, M. (2004) Utilizing the British National Corpus to Analyze TOEIC Tests: the Quantification of Vocabulary-Usage Levels and the Extraction of Characteristically Used Words, *TOEIC Research Report*.