PILOT TEST: ANALYSIS OF TECHNICAL VOCABULARY SIZE AMONG ENGINEERING STUDENTS AT UNIVERSITI MALAYSIA PAHANG

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ABSTRACT

English for Specific Purposes (ESP) is designed to appeal learners learning languages in specific disciplines. ESP deals with words that are designed precisely or has their own meaning in specific fields. As engineering students read texts with technical terms that have specific meaning in the engineering field, the vocabulary knowledge of technical terms is important for them to comprehend the texts. However, engineering students were found to face problems whenever they encounter texts containing technical terms. Hence, this study aims to investigate the vocabulary size on technical vocabulary among engineering students at Universiti Malaysia Pahang. This study employs a quantitative analysis which seeks to measure the size of engineering students' technical vocabulary. A vocabulary test which is a word meaning test adapted from Schmitt (1994) is used in this research. The technical terms are taken from Engineering English Word List (EEWL) developed by Hsu (2016). The test was administered to 41 students majoring in engineering from five engineering faculties in their fourth year at Universiti Malaysia Pahang. The current research recommends further research be done in helping the students to improve their vocabulary size on technical terms.

Field of Research: *English for Specific Purposes, technical vocabulary, vocabulary size, engineering field, vocabulary test*

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1. Introduction

Malaysia is one of the countries in which English is treated as the second language (Bigelow & Ennser-Kananen, 2014), and is used in schools as one of the important subjects. Despite being treated as important as compulsory subjects in schools, English is one of the compulsory subjects to be taken by university students regardless of their majors. The reason why English is essential for one to master is due to demands of job markets in which English is the global language for communication. Lower English proficiency results in a lower chance of getting employed by companies and employers. English has become one of the fundamental needs that employers now are looking for in future employees.

English for Specific Purposes (ESP) is one of the area of English in which it is designed to cater to special or specific needs of the usage of the language. Engineering English is one of the areas that fall under the scope of ESP. It is essential for one to learn or acquire the vocabulary of their chosen professions before they involve themselves with the professions. According to Rolls & Rodgers (2017), ESP has generally rejected literature, due in part to the genre's insufficient coverage of discipline-specific vocabulary.

Technical vocabulary is defined as vocabulary that has a specific use, especially in the technical area. Chung & Nation (2004) defined that technical vocabulary is subject related, occurs in a specialist domain, and is part of a system of subject knowledge. Even though the technical language is new to students, students learning in the second language have a harder time compared to students learning in the first language. According to Kwary (2011), technical vocabulary knowledge is rising to one of the important knowledge to be mastered with the advances of numerous subject disciplines. Resulting from this situation, many research has been done to develop ways of assisting one in learning the technical vocabulary knowledge. One of the methods that have been proposed is constructing word lists. There are now numerous word lists that have been constructed according to different disciplines and fields. Hsu (2014), for example, developed Engineering English Word List (EEWL) that aims to help engineering students in mastering technical vocabulary that later will help them in performing tasks that requires the use of technical terms.

Vocabulary knowledge is one of the building blocks of any language (ÿzönder, 2016). Vocabulary knowledge can be divided into two aspects: breadth and depth. The breadth of knowledge refers to the number of words the meaning of which one has at least some superficial knowledge (Qian, 2002). This is supported by I. S. P. Nation (2001) which defines vocabulary breadth as vocabulary size or the number of words for which a learner has at least some minimum knowledge of meaning. The depth of knowledge, on the other hand, deals with how well a person knows the word. Vocabulary size and vocabulary level are in the same category of vocabulary breadth. According to Schmitt (2008), it is crucial for one to have a deep knowledge of a word in order to fully understand the word and be able to use the word properly. Anderson & Freebody (1981) state that it is the general vocabulary knowledge of the reader that best predicts how well that reader understands the text.

There are a few tests related to measuring vocabulary which is divided into size and depth respectively. Vocabulary level test is designed to measure one's vocabulary size while Word Associates Test is suitable to test on one's vocabulary depth. This is supported by Zhang & Koda (2017) that stated Word Associates Format (WAF) tests are often used to measure second language learners' vocabulary depth with a focus on their network knowledge. Vocabulary level test as developed by N Schmitt (1994) has five level of words which 1,000, 2,000, 3,000, 5,000 and 10,000.

2. Literature Review

ÿzönder (2016) made one research on vocabulary size which focuses on receptive vocabulary among undergraduates in English Language Teaching (ELT) Department of a major state in Turkey. The research employs Vocabulary Levels Test by Schmitt, Schmitt, & Clapham (2001) and it was distributed to 104 undergraduates which comprise 76 females and 28 males. The vocabulary level test was given along with a survey pertaining to GPA scores and genders. The results of the vocabulary level tests were compared to the GPA of the students involved. ÿzönder (2016) reports that the 2,000-

word level test has the highest mean scores among the involved students. Comparing to other word level test, the 10,000-word level test shows the lowest mean scores and it indicates that students have lower vocabulary size on that level of vocabulary. The students show that they have sufficient knowledge of the academic vocabulary that involves sub-technical vocabulary that occurs in many ranges of fields (P. Nation & Waring, 1997; Norbert Schmitt et al., 2001). ÿzönder (2016) also reports that there is no significant correlation between the vocabulary size and their GPA in the research. This is also the same when the vocabulary size was compared to the gender of the students.

Şen & Kuleli (2015) made a research investigating the effect of vocabulary depth and size on reading in EFL context. The instruments used in the research are vocabulary size test developed by I. Nation & Beglar (2007), Word Associate Test by Read (1998), and a reading achievement test that was designed by the researchers. All three tests were given to 361 students who were in a preparatory programme of Duzce University, School of Foreign Languages. The results show that there is a positive correlation between the size of vocabulary and the depth of vocabulary. Şen & Kuleli (2015) added that the larger the size of words the students know, the more deeply they can use those words in reading activity. As for the relationship between vocabulary size and reading performance, the results found that there is a significant effect of vocabulary size on the reading achievement. It implies that the bigger the size of the vocabulary of the students, the better they perform at the reading activity. This result shows a similar correlation between vocabulary depth and reading achievement. The study concludes that both vocabulary depth and size does have a significant effect on students' reading performance.

A study by ſentürk (2016) investigated the relationship between self-regulation strategies on vocabulary size among EFL Turkish University students. The research employs two instruments which are a 150-item Schmitt vocabulary test and a self-regulation questionnaire. Both the test and questionnaire was administered to 179 students from two different universities. The study measures the students' receptive vocabulary size in which the results show the difference between advanced level students and intermediate and pre-intermediate students' vocabulary size. ſentürk (2016) suggests that vocabulary size of the students increase as to continue their learning to the higher level. This research also suggests that there are no significant differences in vocabulary size between male and female students. The result also shows that there is a significant correlation between vocabulary size and self-regulated learning components in which the higher the vocabulary size of the students, the more self-regulated learning components the students have.

In terms of identifying which words fall into which groups of vocabulary, Chung & Nation (2004) has compared four different techniques in identifying technical terms. The four approaches were used to identify technical vocabulary in an anatomy text used by first-year anatomy courses globally. The first approach in recognizing technical terms is by using a rating scale, followed by using a technical dictionary. The third and fourth approach is using clues found in the text and using computer software respectively. According to Chung & Nation (2004), the most reliable and recommended approach out of these four techniques is said to be the rating scale approach. However, this approach is time-consuming because every single term must be checked using the scale to determine whether it is a technical term or not.

Kwary (2011) conducted a research focusing on ways to classify vocabulary and this research put a concern on technical vocabulary. The research found that there are four methods that can be used in determining technical vocabulary. The first three methods are vocabulary classifications, keyword

analysis, and term extraction. However, Kwary (2011) found that those three methods have some disadvantages in which it includes excluding some technical words automatically by the computer programs. The research proposes a new hybrid method for determining technical vocabulary which mixes keyword analysis method and vocabulary classification method. One of the advantages of using this hybrid method is it considers the nature of the text and goes beyond English language concept of word in which symbols such as Greek letters and unique abbreviations are included as technical words.

Wanpen, Sonkoontod, & Nonkukhetkhong (2013) conducted a research investigating on technical vocabulary proficiency among engineering students undertaking English for Engineers course at a university in Thailand. The technical vocabulary proficiency obtains from technical vocabulary test was compared to students' educational background. The result of this research shows that students with educational backgrounds of the vocational stream had higher proficiency in technical vocabulary compared to students with general education stream background. Wanpen et al. (2013) imply that the differences in technical vocabulary proficiency between students with general stream education and vocational education are due to the differences in curriculum and courses provided by both institutions. The research suggests that students from vocational education background had adequate experiences in terms of constructing words' meaning during the process of acquiring technical words.

The current research is designed to answer the following question:

1. What is the technical vocabulary size among engineering undergraduates at Universiti Malaysia Pahang?

3. Research Methodology

3.1 Samples

41 undergraduate students from engineering faculties at Universiti Malaysia Pahang (UMP) were selected as samples in this study by using purposive sampling. The research samples only include students from engineering faculties and currently in their final year of study. The reason why only final year students were chosen is because they have finished English for Technical Communication course offered by Centre for Modern Languages and Human Sciences and have read most engineering textbooks and materials compared to the students in their first, second and third year of study.

3.2 Instruments

This research employs a vocabulary size test and it is adapted from N Schmitt (1994) vocabulary level test format. It is a tool to measure the written receptive vocabulary knowledge, that is mainly the word knowledge required for reading (Kremmel, Schmitt, Kremmel, & Schmitt, 2017). The word list that is used to write the vocabulary test is Engineering English Word List (EEWL) developed by Hsu (2014). The technical vocabulary size test was divided into two parts: technical noun and technical verb. This division was made to measure the differences in terms of the technical vocabulary size based on verbs and nouns. The content was examined and validated by two senior English lecturers before the test is distributed to the students.

3.3 Data collection and data analysis

The students participating in this research were informed about the purpose of the study and the confidentiality of the data before the test was distributed to them. The test was completed in approximately 20 minutes. The data of this test were analyzed using SPSS. The descriptive analysis was used to describe the technical vocabulary size possessed by engineering students.

4. Results & Discussion

In response to the research question, what the technical vocabulary size among engineering undergraduates is, Table 1 shows the overall score of all engineering students' technical vocabulary size involved. The results are grouped according to the faculties of the students that were involved in this research.

Table 1: Technical vocabulary size among engineering undergraduates according to faculties

Faculty	N	Minimum Score	Maximum Score	Mean Score	Std. Deviation
Mechanical	6	32.00	40.00	36.17	3.54
Manufacturing	7	34.00	41.00	36.71	2.29
Electrical	8	10.00	37.00	29.50	9.10
Civil	10	23.00	35.00	30.30	3.59
Chemical	10	4.00	40.00	28.60	12.69
Overall	41	4.00	41.00	31.68	8.20

The result shows that the mean scores for engineering students that are involved in the current research 31.68. According to a study by Abmanan, Azizan, Fatima, & Mohd (2017), the students who sit for the test are considered to possess a certain level of vocabulary size if they manage to score 80% of the test. In this study, 80% is equal to 34 in which the students who scored 34 and above are considered as to be achieving a certain level of vocabulary size. However, the study is different to the research by Abmanan et al. (2017) as this vocabulary test is testing on technical vocabulary and not academic and general vocabulary. Based on the table, the overall mean score for engineering students' technical vocabulary size which is 31.68 does not reach the level of vocabulary size that can be considered as adequate which is 34.

In terms of the mean scores of engineering students according to faculties, students from manufacturing engineering faculty records the highest mean scores compared to other faculties with 36.71. This shows that the students from this faculty passed the level for technical vocabulary size. Similarly, students from mechanical faculty also passed the technical vocabulary size level as the scores

passed 80% with a mean score of 36.17. The students from three other faculties which are electrical, civil and chemical engineering do not pass the level score as the mean scores are 29.50, 30.30, and 28.60 respectively. Students from manufacturing engineering faculty also score the maximum score in the vocabulary size test with 41.00 while a student from chemical engineering faculty was found performing the weakest with a score of 4.00.

As this paper concerns on the pilot test to check on the reliability score of the instrument, the technical vocabulary test was found to be reliable to be tested on further research as it scores 0.91. According to Tavakol & Dennick (2011), improper use of alpha can lead to situations in which either a test or scale is wrongly discarded or the test is criticised for not generating trustworthy results. He added that there are numerous views on the values that are acceptable for one instrument to be considered reliable. However, the agreed lowest value of instrument's reliability is said to be 0.70. Thus, this technical vocabulary test passes the minimum values and is considered to be reliable to be used in further research.

5. Conclusion

Based on the results of the study, engineering students' vocabulary size in technical terms as a whole passed the minimum level in which it determines that engineering students have adequate vocabulary size in technical words. In terms of the differences between scores, it can be inferred that this situation happens are due to some words are not mainly used in the certain engineering field. Wanpen et al. (2013) suggested that the differences in knowledge of the vocabulary might be due to the fact that students were from different institutions that provide differently curriculum and courses too. However, further research needs to be conducted using broader and wider coverage of lexical items and using more students as samples to represent the entire population. As the purpose of this research is to measure the reliability of the technical vocabulary test, the instrument passed the minimum value of reliability score and can be used for further research. This instrument would be fruitful for teachers especially those teaching in specific purposes to measure the vocabulary size of other students majoring in technical courses or different engineering majors. The result from the vocabulary size test can be used to compare between vocabulary learning strategies, Grade Point Average (GPA), or even placement tests.

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