A Review of Methods in Identifying Technical Words

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Abstract

Vocabulary is crucial for English as a foreign language (EFL) learners in English learning. In the same vein, specific or technical vocabulary significantly affects EFL learners' language comprehension in a particular field. The purposes of this article are thus intended to reveal methods employed in identifying technical words and examine the most promising method. Five methods that are investigated in this study are, a technical dictionary, use of context clues, a computer-based approach, a rating scale, and a combined method. Benefits of technical words toward EFL learners and English for Specific Purposes (ESP) teachers are also discussed.

Keywords: Technical word, ESP, Vocabulary

Introduction

Vocabulary plays a major role in language learning and academic lives of language learners (Nation, 2001). As texts are considered a crucial source of knowledge for learners, to comprehend the texts, vocabulary knowledge is required for language learners because vocabulary is a major prerequisite and causative factor in comprehension (Nagy, 1988). Without sufficient vocabulary, learners are almost impossible to comprehend texts (Koda, 2007; Laufer, 1997, 2003). In linguistic research into second language reading, the studies have focused on several language-related aspects of reading, for example, vocabulary knowledge, grammar knowledge, word recognition, and syntactic parsing (Paltridge & Phakiti, 2010). However, vocabulary knowledge is the language knowledge element that is most strongly associated with second language reading comprehension (Koda, 2005). Therefore, since vocabulary knowledge has directly influenced reading and writing proficiency of language learners, vocabulary acquisition is concerned as a crucial factor in language learning (Read, 1998; Nation, 2001). A large amount of vocabulary assists possessors to read texts easier, conversely, limited

vocabulary impedes them from gaining a fluent reading comprehension (Hsu, 2013). In the same vein with English for Specific Purposes (ESP), not only general vocabulary knowledge affect students' reading comprehension, but specific, or technical, vocabulary is also crucial for students to effectively comprehend specific texts (Mehrpour & Rahimi, 2010). In this situation, a technical word list is needed as a medium in order to provide a set of necessary words that suits ESP students.

A technical word list provides a direct access to essential vocabulary in a specific field for ESP students to learn. It comes in a set of necessary words that have a specific meaning to a particular field with high frequency of occurrences. The technical word list helps teachers and ESP students center on truly necessary words, assist students to study vocabulary in a more valid and effective way, and guide them in setting their vocabulary learning and teaching goals. It also provides some guidelines for teachers concerning essential vocabulary in English for Specific Purposes (ESP) curriculum preparation. It helps teachers to design their own ESP course books or choose teaching materials for their own classrooms.

However, one of the important considerations in the development of a technical word list is which methods of identifying technical words that will be employed. There are several methods that were employed in previous lexis studies aiming to develop a set of technical words. The more effective method provides the more comprehensive technical word list. Therefore, in the making of technical word list, a researcher should select the method that best in identifying technical words. Pros and cons of these methods will be discussed in the further section.

As it is clear, the method of identifying technical words plays an important role in technical word list development. Therefore, the objectives of this article are (1) to reveal methods that are employed in identifying technical words and (2) to examine the most promising method in identifying technical words.

Division of vocabulary

Vocabulary can be classified into several groups. Nation (2001) differentiates between 4 levels of vocabulary in a text: high-frequency words, academic words, technical words, and low-frequency words.

High-frequency words are the words that cover a large proportion of words in texts. This vocabulary normally covers approximately 80% of the words of academic texts and newspapers, and approximately 90% of conversation and novels (Chung & Nation, 2003).

Academic words are the words that are commonly found in academic texts. The words regularly cover on average 8.5% of the words in academic texts and less than 2% of the words

of novels. The researchers in language field have discussed that these words are not technical because they are not commonly related with just one field (Chung & Nation, 2003).

Technical words are the words that are very closely related to a particular area or text. They are commonly found in texts in the fields which they are used but not commonly found elsewhere (Nation, 2001). They cover 5-30% of the words in specialized texts (Chung & Nation, 2003; Nation, 2001).

The last level of vocabulary is low-frequency words. They are all the remaining words or the words that are not high-frequency words, not academic words, and not technical words. They regularly cover around 5% of the words in texts (Chung & Nation, 2003). They are words that are rarely found in use of the language.

Technical word list development

Word lists provide a multitude of advantages in pedagogical purposes. They facilitate setting up vocabulary learning targets, creating and modifying vocabulary teaching and learning materials, as well as designing lexical coursework (Gardner & Davies, 2013). In English language classrooms, word lists play an important role in lexical studies. They aid teachers to determine what words should be taught in classroom and assist students to reduce time focusing on essential vocabulary. High-frequency words, academic words, and technical words thus have been compiled into word lists and used as classroom materials. The well-known list of high-frequency words is 'A General Service List of English Words' created by Michael West in 1953. It was developed from a corpus of five million words collected from general texts and contained the most widely useful 2,000 English word families for language learners. The famous list of academic words is 'Academic Word List' firstly developed by Avril Coxhead in 1998. This 570 academic word list (Coxhead, 2000) can be described as a list of high frequency words that were often used in academic circumstances. It was developed from 3.5 million words which were divided into four sub-corpora of arts, commerce, law, and science. Each corpus contained approximately 875,000 running words and each was subdivided into seven subject areas. GSL words were removed from the list in order to avoid redundancy. For essential vocabulary in specialized texts, technical word lists have been created in numerous fields. For instance, sub-technical and lay-technical vocabularies in medicine (Hsu, 2013), business (Tangpijaikul, 2014), and finance (Tongpoon-Patanasorn, 2018). The knowledge of technical word benefits ESP curriculum preparation and helps ESP teachers in order to decide what words should be included in the ESP learning materials. Likewise, the word lists are crucial for students who want to enhance their ESP knowledge in order to increase their future employment opportunities (Tongpoon-Patanasorn, 2018).

Concerning technical word list construction, “technical words are words whose meanings are tied to one specific subject area” (Tongpoon-Patanasorn, 2018), such as finance, law, or medicine. The technical word list is thus made up of words that occurred frequently in a specialised text but do not occur or occur in very low frequency in other fields (Nation, 2001). Since one word can be used in several different specific fields, the meanings of the word sometimes differ depending on subject area or field that they belong to (Tongpoon-Patanasorn, 2018). The same word from different fields can be classified into different Nation’s (2001) levels of vocabulary. According to this polysemy, a researcher should carefully choose appropriate approach for identify technical words that take an issue of semantics into account for a comprehensive technical word list.

Methods of identifying technical words

There are several methods which were used in previous studies in the making of a list of technical words: using a technical dictionary, using clues provided in the text, using a computer-based approach or so-called keyword analysis, using a rating scale, and using a combined method of keyword analysis and a rating scale. Details are described as follows.

The first method is using a technical vocabulary dictionary. The concept of this method is to use a technical dictionary, for example an engineering dictionary, as a guideline to decide whether a word is a technical word or not. The criterion in selecting a technical word of Chung and Nation’s (2004) is simple. If a word occurs in a technical dictionary of a particular field, it is considered as a technical word. There are two elements that should be concerned while using this method. The first one is a technical dictionary that will be used as a reference. Chung and Nation (2004) suggested that the largest dictionary might not be the best dictionary to use as it might include too many words that are not relevant. The second one is that a researcher has to decide whether the word families of the word, or the word in any other forms, should be also considered as technical words or not. This method is such a simple way in order to identify a technical word. However, Chung and Nation (2004) suggested that the one of the disadvantages of the use of this method is the criteria of word selection in the making of the dictionary. Words in dictionary, at worst, might be chosen from only one person’s intuition so these factor can affect the results of the obtained technical words.

The second method is using clues provided in the text. In texts (Flowerdew, 1992), sometimes writers signal which words are technical terms. The three major types of clues to be concerned in identifying a technical word are (1) definitions, (2) typographical clues, for example, bolding, italics, and brackets, and (3) labels in diagrams or illustrations (Chung & Nation, 2004). However, finding clues is rather difficult, for example, typographical signals are

sometimes merely used for general purposes such as to emphasize the words in texts, not being used to imply that a word is a technical term. (Chung & Nation, 2004). One of the disadvantage of this method is that a researcher can be bias in deciding which words to be considered as technical words since the process relies on the researcher's intuition to interpret the clues (Tongpoon-Patanasorn, 2018).

The third method is using a computer-based approach or so-called keyword analysis (Scott, 1997; Anthony, 2004). This is an analysis method compiled by a concordance programs, for example, AntConc and WordSmith (Tongpoon-Patanasorn, 2018). It is a corpus-comparison approach for identifying keyword from a corpus by comparing word frequencies in a target text with those in a reference corpus (Chung and Nation, 2003). If the occurrence of a word is outstandingly more frequent in a target corpus than its occurrence in a reference corpus, it will be considered a positive keyword. Therefore, the obtained list of keywords contains: 1) low-frequency words which their meanings are not semantically related to the field of study, for example, proper nouns; 2) technical words which their meanings are specifically related to the field of study (Nation, 2001; Tangpijaikul, 2014); 3) West's (1953) general word list (GSL); and 4) Coxhead's (2000) academic word list (AWL). Since keyword analysis method does not prevent low-frequency words, GSL, and AWL words from being included in the resulting list. The obtained positive keywords therefore may or may not be technical words.

The fourth method is using rating scales developed by Chung and Nation (2003). This rating scale approach is adopted to determine which words that are semantically related to the field of study. This rating scales is an approach which researchers provide for experts in the field to decide which terms they think are technical and which terms are not regarding their semantic relations to the field. Chung and Nation (2003), and Tongpoon-Patanasorn (2018) suggested that this rating scale is "the most accurate and consensus-driven way" in identifying technical vocabulary and is more valid than the computer-based approach. Words will be classified by experts on a four-step scale ranging from step 1 or words that do not have specific meanings to the field of study to step 4 or words that have specific meanings to the field of study. Only words classified at step 3 and 4 will be considered to be technical words (Chung and Nation, 2003). Although Chung and Nation (2004) suggested that the rating scale method is the most valid method, it is also the most time-consuming compared to the other methods.

The last method is using a combined method of keyword analysis and a rating scale (Tangpijaikul, 2014, Tongpoon-Patanasorn, 2018). Keyword analysis is firstly employed in order to indicate positive keywords of the corpus of the study. Rating scale is latterly utilized by giving experts, who should be comprised of experienced professionals in the particular field

of the study, a list of keywords to determine which words are specifically related to the field by using their intuitive judgement. Tangpijaikul (2014) suggested to use this combined method (called 'a mixed approach' in his study) in a technical word list construction as well as stated that "neither of which is without problems when used alone".

The most promising method

The limitation of solely using keyword analysis method is "the computer program does not take semantic association into calculation" (Tangpijaikul, 2014). Consequently, it is unable to indicate how relevant the words are to the field (Tangpijaikul, 2014) and unable to identify which words are truly technical words. Moreover, technical words are unable to be distinguished from GSL and AWL words because some of them are also used in general and academic settings (Tangpijaikul, 2014). Similarly, the sole use of another method, a rating scale, some words can be included in the list of keywords by the program just because they are frequently appeared in the corpus (Tangpijaikul, 2014). As previously mentioned, this method also takes a lot of time for experts to manually examines a large number of words in order to identify words that are relevant to the field (Tongpoon-Patanasorn, 2018). In identifying technical words with this combined method, it eliminates these weaknesses of the two methods. The keyword analysis helps produce a list of significant keywords in a reasonable amount within a short period of time. Experienced professionals at the rating scale process help examine a list of obtained keywords to find technical words that are definitely relevant to the field of study yet unable to be detected by computer programs. Regarding to all previous mentions, consequently, the combination of these two methods seems to be the most promising method and advisable for identifying technical words.

Conclusion

A combined method is arguably the promising method that is used in order to identify technical words. It enhances strengths as well as eliminates weaknesses of the two methods: keyword analysis and a rating scale, consequently, it provides us the method that can be employed to identify technical words in a more effective way so we can develop a valid technical word list with a shorter amount of time.

Moreover, the identification of technical words contributes some significances to language teaching and learning in the ESP context. The identification of technical words gives us lists of important technical words in a particular field. These crucial technical word lists can be used as a guideline for ESP teachers in developing curriculum, setting up vocabulary

learning targets for learners, and designing materials and learning tools in ESP class. They are also can be used as a guideline for learners in setting up their vocabulary learning targets.

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