

A corpus-based analysis of collocations in corpus research articles

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ABSTRACT

Corpus-based studies have provided an accurate description of language, and its new potentials for language structure and use have many applications in language learning. This research tried to analyse types and frequency of the collocations used in 5 corpus research articles published during 2013-2017 by using corpus approach. The text was processed by an online concordance. The collocations appeared in the concordance was taken out manually before comparing with an online collocation dictionary. A total of results of this study revealed that the collocations were found with 1,364 occurrences. Regarding to grammatical collocations, there were 4 types found: n. + prep. ($f = 348$), prep. + n. ($f = 93$), V. + prep. ($f = 43$), adj. + prep. ($f = 10$). Similarly, there were 4 types of lexical collocations found: adj. + n. ($f = 837$), adv. + adj. ($f = 14$), v. + n. (creation) ($f = 12$), and n1 + of + n2 ($f = 7$).

Keywords: *Corpus analysis, Collocations, Research Articles*

1. Introduction

As a world's major language, English is an international language for connecting people around the world. It is claimed that, English is the most spoken official language [1]. It is also the primary language of business throughout the world [2]. Moreover, English is used in entertainment, politics, business, media, and education in many countries [3]. As a result, English can create possible opportunities for business persons, diplomats, scholars, as well as students.

Similarly, English in Thailand is very important similar to many other developing countries. English has become a mandatory subject for Thai students in all levels for a long time with an attempt to develop English skills of Thai people. Besides, the widespread of project-based and problems-based learning in Thailand requires the students to construct their knowledge by themselves. As a result, Thai students, especially in higher education, are

required to conduct projects or researches in order to gain new knowledge. Therefore, English, especially for educational purposes, plays a major role in finding and reviewing information as well as reporting the result of their studies. To achieve the language, EFL students need to be aware of using grammar, vocabulary, and punctuation as well as spelling accurately and precisely [4]. However, it was reported that Thais' level of English proficiency is low in comparison with other 6 countries in Southeast Asia [5]. Apparently, writing is one of the biggest problems for Thai students [6]. According to [7], they claimed that one of the main problems that cause poor writing skills is lacking of collocation knowledge. Collocation is a group of words that often used together [8]. It is widely accepted that collocation is an important part for EFL users to speak or write fluently and accurately [9]. Both teachers and learners should be interested in collocations because it can increase fluency of learners' language and develop learners to speak like a native English speaker [10]. Teaching materials on collocation were needed to compensate lexical limitation of textbooks [11]. [12] pointed out that collocation is necessary and useful for enhancing learners' communication, listening, reading, and writing skill.

According to [13], collocations are useful for helping students to improve their writing quality. Because when learners use collocations correctly and appropriately, they can write sentences efficiently and use language fluently. According to [14], lacking collocations knowledge can be the cause of poor writing more than grammatical problems. In addition, learners who lack collocational competence seemed to produce long sentence because they do not know how to use collocations accurately. As collocation knowledge is necessary for teaching and learning language, it can be the biggest challenges for second language learners [15]. It is relevant to [16] who described that collocation is one of the most problems in second language learning. It is arbitrary and cannot predict. Therefore, it is difficult for students and non-native speakers to use them [17] Therefore, this study aims to enhance collocation learning of Thai EFL learners by providing them with a list of collocations used in research report articles.

According to [18], the corpus-based analysis could be used as an effective way for teaching and learning collocations because corpus-based analysis could raise students' awareness in writing and enhance students' communication skills. Similarly, [19] explained that a corpus-based analysis presents the data about word frequency, grammar, vocabulary, relational language, idioms, and chunks accurately; it is a vast impact on teaching and learning English. It was used as an important tool in the language teaching classroom [20]. Furthermore, the corpus-based analysis is a benefit for students to learn about the application of language, content, and contexts at the same time. According to [21] corpus-based analysis has many advantages for foreign language teachers and learners because they can find the differences between words that they are often confuse for example “excited” and “exciting.”

However, it was found that many previous studies focused on some patterns of collocation in some sections of research articles [22,23,24,25, & 26]. Therefore, this study was conducted a corpus-based analysis to find the types and frequency of collocations used in all sections of recent research articles to enhance research report writing of EFL students.

2. Corpus Linguistics

Corpus linguistics first appeared in the early 1960s [27]. In contemporary, linguistics is one of the vastly popular methodologies [28]. In this part, we describe definitions of corpus linguistics and implications of corpus-based analysis in teaching and learning English writing skill. Corpus linguistics is a main methodological example of the theory and practice in linguistics. It was greatly interested from many researchers; therefore, it was defined in various meanings [29].

Corpus linguistics is the study of language based on examples of real-life language use stored in corpora (or corpuses) - computerized databases created for linguistic research” [21]. According to Mukherjee [30], defined corpus linguistics is “the analysis of naturally occurring language on the basis of computerized corpora.” Moreover, [31] also explained that corpus linguistics is “a methodology or approach for studying language use. Similarly, [32] described that “corpus linguistics is a whole system of methods and principles of how to apply corpora in language studies and teaching/learning.” It can be concluded that corpus linguistics is the study of language through using computers analysis that is an important methodology in linguistic theory. In the next section, some theoretical studies about implications of corpus-based analysis in teaching and learning English writing skill were reviewed.

In teaching and learning English writing, one of the most problems is writing for academic and professional purposes as well as for scholarly publications, it is always difficult for student and novice writers [33]. Therefore, in this study described the important implications of corpus-based analysis for the teaching and learning English writing skills were reviewed. Corpus-based analysis refers to the method carried out with specialized software programs on a computer [21]. To analysis in multiple registers and keep track of results for each one, corpus-based analysis is the easy method and get less time-consuming more than analysis by hand [34].

According to Santos [18], corpus-based analysis might increase awareness of students of written structures and help students to improve their communication. A corpus-based analysis shows the data about word frequency, grammar, vocabulary, relational language, idioms, and chunks accurately, it is a vast impact on teaching and learning English [19]. Similarly, [20] described that corpus-based analysis could be used in the language teaching classroom. Moreover, [21] also explained that corpus-based analysis has many advantages for foreign language teachers and learners because they can find the differences between words they often confuse (e.g. excited vs. exciting). It is relevant to [35] said that corpus-based analysis is a benefit for students to learn with the application of language, content, and contexts at the same time. From what has been mentioned above, it can be noticed that corpus-based analysis can be as a tool for teaching collocations in the classroom. It is important impacting in teaching and learning English writing skill.

3. English Collocations

The essential basis of every language is collocation patterns [36]. Collocation is a major element of language and an important feature that makes language specific and [7]. Thus, it is important for language learning. In this part, definitions and types of collocation were described. Finally, teaching and learning collocations.

The natural languages that words tend to occur together with a restricted set of other words have known as collocations which it has been vastly interested from linguists [15]. Therefore, it has been defined in various meaning. For example, [31] explained collocation as the way in which words co-occurs in natural texts in statistically significant ways or the co-occurrence of lexical meanings of words with other surrounding lexical units. Similarly, [38] describes collocations as word combinations which are arbitrary and recurrent. According to [39] also defined collocation as “the ways in which words often show near each other (P.35)”. Moreover, collocation as “words that often occur together or the company a word keeps” [40]. Therefore, collocation is a group of words that always show together in natural language.

[38] and [41] identified collocation into two major types: these are grammatical collocations and lexical collocations. Grammatical collocation referred to a phrase, which consists of a preposition and the main word (noun, adjective, and verb) or a structural pattern such as a clause or two-word verbs [38] It was classified into eight major patterns including *n + prep*, *n + to inf*, *n + that clause*, *prep + n*, *adj + prep*, *adj + to + inf*, *adj + that clause*, and *v + prep*.

In the other hand, lexical collocation is combination words, which is composed of nouns, adjectives, verbs and adverbs [42].” [43] classified lexical collocations into seven types including *v + n (creation)*, *v + n (eradication)*, *adj + n*, *n + v*, *n1 + of + n2*, *adj + adv / adv + adj*, and *v + adv*. According to [15], lexical collocations are classified into seven including *adj + n*, *n + v*, *n + n*, *v + n*, *v + prep*, *v + adv*, and *adv + adj*.

Collocation is recommended by many other researchers that teachers should motivate their students to learn collocations because it is one of the most important ways of knowing a word [44]. When teaching vocabulary, teachers of English must focus on importance to the teaching of collocation [7]. According to [45], English teachers should not focus on grammar rather than collocation instruction, because although accurate grammar is used, problems writing such as lexical selection still remain, thus, it is overt that the teaching of collocation should be a top priority in every language course. In addition, teaching materials on collocation were needed to compensate lexical limitation of textbooks [11].

From the research result of [47] shown that in teaching and learning collocation need corpus-based analysis approach because it was not only necessary for developing writing fluency of L2 learners but also it was the method to help L2 learners use language accurately.

In addition, to supporting teaching and learning collocation, Collocations dictionary is a good case for students of English whenever students and teachers meet a difficulty in collocation, they can the type words in the collocation dictionary, and then all its collocations are listed sequentially according to the frequency of each collocation [7].

Research Methodology

This study was designed as a descriptive study with the aims to describe the types and frequency of collocations used in recent collocation research articles. The corpus-based analysis was determined as the main framework of the present study. Meanwhile, a mixed method was applied for analysing the collected data. The qualitative data analysis involved identifying types of collocations appearing in the corpora. In the other hand, quantitative data analysis involved examining the frequency of the occurrence of the collocations in the corpora. This study covered both grammatical and lexical collocations. The samples of this study were 5 online research articles focused on English. The corpus consisted of 20,788 words. As this study aims to investigate language uses in the recent year; therefore, the articles published from 2013 to 2017 were selected by random sampling method and accessibility. The articles were selected regardless of varieties of English used in the articles because it was difficult to verify by the authors' biography [47]. After the selecting process, the format of the articles was changed from “.pdf” files into “.txt” files. In this process, the articles were combined and renamed as combine text. Afterword, the reformatted files were checked for some errors. The preference of each article was be cut out in this step. After the reformatting process, the "sample. txt” file was be uploaded to www.lextutor.ca/concordance to produce a corpus concordance. Afterward, the concordance was printed out for data analyzing process. In the data analyzing process, manually line-by-line analyzing by the researchers and the supervisor will was used for taking out collocations used in the samples. The suspect collocation was checked with an online dictionary at www.freecollocation.com as a reference.

Research Results

To give a brief overview of the results of the entire study, this section provides the summary of the findings of this present study combining the frequency of the occurrences of the collocations used in the research articles following by the number of types of collocations found in this study as well as the most 50 frequently used collocations respectively.

The overview of the occurrences of the collocations used in the research articles was presented in Table 1. According to the collected data of this present study, collocations were found totally 1,364 times combining 494 grammatical collocations and 870 lexical collocations. In other words, the collocations were used approximately 65 times per 1,000 words.

Table 1 The Occurrences of Collocations in the Sample Articles

Classifications	Frequency of Occurrences	Frequency of Occurrences Per 1,000 Words
Grammatical Collocations	494	23.76
Lexical Collocations	870	41.85
Total	1,364	65.61

In fact, there were only 206 types of collocations detected in this study. It was found that grammatical collocations were more frequently used in the research articles than lexical collocations. There were 122 types of grammatical collocations and 84 types of lexical collocations as shown in Table 2.

Table 2 Types of Collocations in the Sample Articles

Classifications	Frequency of Occurrences	Percentage
Grammatical Collocations	122	59.22%
Lexical Collocations	84	40.78%
Total	206	100%

In addition, the 50 most frequently used collocations were drawn out here to illustrate the collocations found in this study. According to Table 3, the 50 most frequently used collocations were found totally 427 times or 20.54% of the total collocations in this study. It was found that the most frequently used collocations in the research articles was the words *base on*. The use of the words *base on* in the research articles is illustrated by the following excerpt. The other 50 most frequently used collocations were presented in Table 3.

This study utilizes a new international learner corpus to quantitatively wwwim how the lexical diversity (LexDiv), lexical density (LexDen), lexical complexity (LexCom), lexical fundamentality (LexFun), and noun-orientation (NO_r) of Chinese (CHN), Indonesian (IDN), Japanese (JPN), and Taiwanese (TWN) learners' speeches and writings change in proportion to their L2 proficiencies based on the Common European Framework of Reference (CEFR) proficiency band. Furthermore, English native speakers are used as a reference for comparison.

Table 5 The 50 Most frequently used collocations in The Sample Articles

No.	Collocations	F	%	No.	Collocations	F	%	No.	Collocations	F	%
1.	base on	45	2.16	18.	upper level	7	0.33	35.	second language	3	0.14
2.	high frequency	30	1.44	19.	foreign language	6	0.28	36.	spoken language	3	0.14
3.	use of	28	1.34	20.	article in	6	0.28	37.	set of	3	0.14
4.	type of	25	1.20	21.	development in	5	0.24	38.	advantage of	3	0.14
5.	focus on	25	1.20	22.	need for	5	0.24	39.	basis of	3	0.14
6.	native speaker	24	1.15	23.	step in	5	0.24	40.	benefit from	3	0.14
7.	model for	19	1.39	24.	different way	5	0.24	41.	data from	3	0.14
8.	part of	19	1.39	25.	graduate student	5	0.24	42.	depending on	3	0.14
9.	academic text	16	0.76	26.	term of	4	0.19	43.	kind of	3	0.14
10.	addition to	13	0.62	27.	model of	4	0.19	44.	knowledge of	3	0.14
11.	relate to	11	0.52	28.	process of	4	0.19	45.	nature of	3	0.14
12.	amount of	10	0.48	29.	acceptable level	4	0.19	46.	stage of	2	0.14
13.	word for	9	0.43	30.	intermediate learners	4	0.19	47.	word from	2	0.14
14.	different between	8	0.38	31.	language teaching	4	0.19	48.	awareness of	2	0.14
15.	divide in	8	0.38	32.	medical research	4	0.19	49.	burden of	2	0.14
16.	instance of	8	0.38	33.	engineering student	3	0.14	50.	capacity for	2	0.14
17.	variety of	8	0.38	34.	Language learner	3	0.14				
Total of Occurrence						427					
Total of Text Coverage						20.54%					

4. Discussion

According to the results from the previous chapter, the occurrences of collocations were detected totally 1,364 times across the 5 samples of the collocation research articles. In other words, the collocations were used 65 times per 1,000 words. As the matter of the fact, it could be concluded that at least 6 collocations were used in every 100 words. Significantly, lexical collocations were found in the greater number ($f = 870$) than those of grammatical collocations ($f = 494$). However, there were only 206 of collocations identified in this study including 122 and 84 grammatical and lexical collocations respectively.

In this study, grammatical collocations were found only four out of eight types: noun-preposition collocations were found 348 times ($f = 494$). Similarly, lexical collocations also

found four out of nine types of lexical collocations, adjective noun collocations were found 837 times ($f = 870$). However, only some outstanding points were discussed below.

As the topic of the text obviously has a great effect on the frequency of the words, most of them contains meanings related to types. The term based on is the most frequently used in the 5 corpus-based research articles to use particular ideas or facts to make a decision, do a calculation, or develop a theory. For another example, high frequency, this term appeared most commonly in every part of research. Therefore, this term high frequency is used as the second frequency collocation in The 5 corpus-based research articles to show the number of times that collocations happen within a particular period of time. Moreover, the term high frequency words are quite simply those words which occur frequently in written material, for example, use of, types of, and focus on. They are often words that have little meaning on their own, but they do contribute a great deal to the meaning of a sentence.

However, the analysis of this study discovered that the words used of were the third most frequently used collocations in the articles analyzed in this study. It was possibly because the word used of is use to present the act of using something describing an action or exploit for advantage. Moreover, the terms types of in this study always occurred with of to describe the characteristics of a specified thing. In addition, in the study the term focus on usually used in the corpus-based research articles. The term focus always occurred with on to concentrate on something and pay particular attention to it.

Therefore, it is inevitable that the word based on, high frequency, use of, type of and focus on often appeared in every research report writing, including research articles. It also indicates that word lists alone might not provide full understanding of the texts because individual words can associate with other words to form a totally different meaning. Thus, it seems necessary to learn academic words by comparing their meanings with those in other genres in order to productively use these words.

Second, most of the high frequency collocations are important. Among the two types of collocations, adj + n is the most frequently found in research articles. The finding of the main study is supported by those of [44]. There are adj. + n appeared 837 times (40.26%), n + prep appeared 348 times (16.74%), prep + n appeared 92 times (4.42 %), v+ prep appeared 43 times (2.06 %), adv + adj appeared 16 times (0.76n%), v + n (Creation) appeared 12 times (0.57 %), adj + prep appeared 10 times (0.48 %) and nl + of + n2 appeared 7 times (0.33%) respectively. Since, adj + n is the most frequently used collocations in research articles which was related to study of [49]. We are bringing forward for both language learners and teachers to take adj + n into considered in term of including this type of collocations in their instructional media. However, n+ prep and prep + n should not be ignored. [50] claimed that noun + prep collocations as the most frequently used in research articles. They both should be considered to be included in language teachers' teaching materials, as which number of

collocations might be based on the finding of the present study. This is because collocations often appeared in English reading, writing, speaking, and listening. Collocations knowledge can improve language learners or even employees' reading and understanding when they have to communicate or understand English. It is widely acknowledged in the English Language Teaching (ELT) that collocations are useful for helping students to improve their writing quality [37]. If learners use collocations correctly and appropriately, they could write sentences efficiently and use language fluently [51]. Collocation is recommended by many other researchers that teachers should motivate their students to learn collocations because it is one of the most important ways of knowing a word (Parisa 2012). Similarly, [49] also suggested that teachers of English should pay special attention to teaching collocation to enhance students' communication and writing skills.

As mentioned above, it could indicate that collocation is important for both students and teachers. Therefore, English teachers should focus on teaching how to use the collocations in communicative skills, especially writing skills. In addition, the finding of this study might help improve their better their understanding of collocations whereas novice writers could get advantages and knowledge about collocations from the list of collocations presented in the study.

5. Conclusion

This study aims to investigate types frequency of collocations used in 5 recent researches. All of the research procedure has been done so far. According to the findings of completely this study, there were 4 types of grammatical collocations, and 4 types of lexical collocations detected in this study. In addition, it was found that the collocations were used around 65 times in every 1000 word. Besides the main aims stated above, the results of this study are expected to be used as a teaching and learning guide about collocations which most frequently used in the research articles. In addition, this study would like to be a channel for encouraging Thai and other and other non-native English learners in learning and using proper collocations during producing both written and spoken language as it is widely accepted that collocation is an important part for EFL users to speak or write fluently and accurately [11].

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- P. Chairat, A. Unchantee, and B. Phaengsri. (2017). Designing and Implementing Project-based Learning in an ESP course: A Path Way to Hands-on Students, Proceedings of 7th International Conference on Education, Humanities and Social Sciences Studies (EHSSS-17), Pattaya (Thailand), pp. 121-124.

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- P. Chairat and P. Srisakhon. (2015). A Development of Supplementary Materials on Some ASEAN English for Khon Kaen University Students, Proceedings of the 2nd International Conference on Language, Literature, Culture and Education, Sabah (Malaysia) eds. L. A. Wahid et al., pp. 72-75.
- P. Chairat, (2016). “The Potential Benefits of Internet-Based Learning in Thai EFL Context” *The Asian EFL Journal*, eds. P. Robertson and J. Adamson, pp. 172-176.
- P. Chairat, A. Unchantee, and B. Phaengsri. (2017). Designing and Implementing Project-based Learning in an ESP course: A Path Way to Hands-on Students, Proceedings of 7th International Conference on Education, Humanities and Social Sciences Studies (EHSSS-17), Pattaya (Thailand), pp. 121-124.