

Structural and Functional Analysis of Lexical Bundles in Articles of Law and Economics Found Science Direct

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Abstract. Lexical bundles have drawn a lot of linguists' attention during the past few decades. It is important to investigate the lexical bundles utilised in different genres because Biber and Conrad's (1999) study demonstrated that some lexical bundles can be genre characteristic. The goal of the current study was to look into the lexical bundles in international journal of economics and law. A fair quantity of tokens from both journals were attempted to be included. In comparison to the articles from the "Journal of Economics," which comprised 50 files, 613.793 word tokens, and 26.435 word types, the "Journal of Law" articles took up 50 files, 354.942 word tokens, and 21192 word types. The corpus contained 968.735 tokens distributed among 100 files in total. The bundles were then evaluated and classified using Biber et al. (2004)'s structural and functional taxonomy of lexical bundles. Structural analysis revealed that lexical bundles with dependent sentence fragments and prepositional phrase fragments were the most often produced type in the international Journal of Economics and Law. Most of the bundles were successful in acting as referential expressions for the functions. News pieces, lexical bundles, and the worldwide journal of economic and law published by Elsevier.

Keywords: Lexical bundles · Functional analysis · Structural bundles · Corpus

1 Introduction

Generally, there are four skills to be mastered in language. However, writing is the most difficult skill to be mastered in every educational level. For example, for students pursuing higher education who are always required to write academic works such as essays or papers, will regarded these works as challenging tasks [1]. In this case, as foreign language in Indonesia, writing becomes challenging especially in term of how to produce a good text. Proposing by Al-Buainain et al. (2009), writing problems may consist of nine defects; (1) high frequency of grammatical errors, (2) lack of variety of grammatical structure employed, (3) use of inappropriate vocabulary, (4) use inappropriate grammatical structure, (5) limited ranges of vocabulary, (6) poor spelling, (7) inadequate understanding of the topic, (8) deficiency in clear self-experience, and (9)

poor punctuation [2]. In addition, Purnama (2017) also stated that students always make a generalization, simplification, less of knowing vocabularies, punctuation, spelling, and grammar in their writing [3].

The other difficulties in writing may also consist of generating and organizing ideas, translating these ideas into a text Hudson et al. (1996) in order to be understood [4]. The other source also proposed that writing problem faced can be students' anxiety which used generally to mean the negative and anxious feelings that disrupt part of the writing process Rukmini (2009) One of those problems' effect is the students are often confused how they start their writing, although they have some ideas about what they want to write [5]. According to Wahyuni & Umam (2017) there are four main factors that cause writing anxiety; linguistics difficulties, fear of teachers' negative comments, insufficient writing practice, and time pressure [6]. From all of the writing problems mentioned above from some researchers, it can be concluded that one of the most difficult things in writing is linguistic features especially for EFL students. According to Hasnia et al. (2020) some aspects need get noticed in components of good writing, such as word choice, grammar, and dot. In this case, along with word choices and punctuation, grammar becomes an important aspect in a text that conveys ideas to be understood by the reader [7]. In addition good writing is more than just rephrasing messages or ideas using grammatically correct phrases or expressions, but also organize an idea or message in an understandable form Furthermore, regarding the drafting of a text, (Thornbury, 2005) says that something is called a text when it has meaning whether in oral or written form. Students should be interested in some features also has a linking role with the general structure and grammatical structure Featured [8]. Halliday et al. (2004) believe that coherence and coherence, as Two important textual elements have been recognized as important features of Good Viet [9]. Along the same lines, (Sumarna, 2010) also says that the most the important elements in a written language are coherence and coherence. Students really need to write with an interest in coherence and coherence to produce qualified English texts [10]. According to the Canadian Language Standards Center (Agustien, 2004), cohesion can be defined as the use of word or phrase to hold a text together and give it meaning [11]. This means yes are words that can be used to create a coherent text. On the other hand, Coherence is one of the requirements of a good paragraph having unity, coherence, and continuity. According to Odell and Hobbs (2001 cited in (Faradhibah, R. N. & Nur, 2017) when a paragraph has coherence, ideas are streamlined progression, or a meaningful order for the reader to move easily from one idea to the next [12]. Consistency of writing is achieved through the use of certain linguistic knowledge. The right combination of features and equipment as well as in the production of spoken language.

In the corpora of Applied Linguistics articles, lexical bundles are one of the branches in the linguistic tree. In a wide range of domains, applied linguistics makes use of language-related research (e.g. language acquisition, language teaching, literacy, gender studies, language policy, speech therapy, discourse analysis, censorship, workplace communication, media studies, translation, lexicography, forensic linguistics). The goal of applied linguistics is to use the understanding of the nature of language gained through linguistic study to increase the effectiveness of a practical task in which language plays a key role. Lexical bundles, which are groups of four words that frequently co-occur,

are also recognized. Examples are on the other hand and as a result of. Over the course of a three-year undergraduate degree, a corpus of student essays in a single field—psychology—was created. A corpus of published articles in the same field was produced to serve as a standard against which to compare student academic writing. The amount of academic vocabulary that was present in the student essays was measured using the Vocab Profile tool. Similarly, the density of lexical bundle use was analysed by means of Word Smith Tools (Crossley & McNamara, 2012). The results of the students' essays served as a gauge of their academic performance, which was then connected with the densities. A key characteristic of academic discourse and a key element of fluent language creation is the lexical bundle [13]. Lexical bundles are actually continuous word sequences that have been located through the use of a corpus-driven strategy and predefined frequency and distribution criteria. The recalled recurrent sequences are fixed multi-word units with typical pragmatic and/or discourse functions that speakers of a language employ and are aware of in particular settings. This method is thought to be a frequency-based way for figuring out phraseology [14]. Despite having significant grammatical correlations, it is typically neither idiomatic nor a complete structural unit [15]. The goal of the purpose of the, on the other hand, one of the most, etc. are lexical bundle examples used in academic discourse.

Noun-based, prepositional-based, and verb-based bundles are the three basic types of lexical bundles, respectively [15]. Noun-based bundles make up the first major lexical bundle structure. There are only two types of noun-based bundles: (1) noun phrases with fragments and (2) noun phrases with additional post-modifier fragments. Its existence in writing serves a number of purposes, including (1) describing how a process works—for example, the degree to which, etc.—and (2) identifying relationships between things. For instance, the relationship between the, etc. Prepositional-based bundles are the second major category of lexical bundle. Prepositional based-bundles are subdivided into two categories: prepositional phrases with fragments and prepositional phrases with additional fragments. Prepositional phrases with fragments are used to (a) mark abstract and logical relations, such as-as a result of, as a function of, in the absence of, in the case of, and so on; (b) mark temporal relations or to compare two prepositions or events if it begins with the prepositional at, such as at the end of, at the time of, at the same time, and so on; (c) identify time periods, a specific location or discourse context. Lexical bundles, a relatively newborn category of multi-word expressions, have been receiving considerable attention from linguists. One of the earliest studies on lexical bundles was conducted by (Biber et al., 1999) and (Conrad, 1999) who investigated the most commonly used lexical bundles in conversation and academic prose [16]. The data revealed that lexical bundles are quite abundant in both conversation and academic prose, but the lexical bundles discovered in each genre differ dramatically. For example, I'm not sure what is utilized up to 44% of the time in conversation but not at all in scholarly written data. On the contrary, lexical bundles such as the nature of and as a result of are common in scholarly prose.

This clearly shows that some lexical bundles are typical of a particular genre. Readers and writers who regularly participate in a particular genre would be familiar with the bundles typically used in the genre. Thus, the presence of these bundles could be used as an indicator of someone's competence in a given genre, and the absence of these

bundles might reveal someone's lack of fluency in the genre [17]. Verb-based bundles are the final major structural form of lexical bundles. There are seven sub-categories of verb-based bundles: (1) anticipatory it, (2) passive verb, (3) copula be, (4) that clause, (5) to clause, (6) adverbial clause, and (7) other expressions. Anticipatory verb-based bundles are the first type. Anticipatory it is made up of anticipating it with a verb phrase and anticipating it with an adjective phrase. Thus, in order to obtain precise and valid data, this study used the Science Direct website, which provides access to a huge bibliographic library of scientific and medical papers published by the Dutch publisher Elsevier. It hosts about 18 million pieces of information from this publisher's more than 4,000 academic periodicals and 30,000 e-books. The full-text requires a subscription, however the bibliographic metadata is free to view.

The research on Structural and functional analysis of lexical bundles in law and economics articles extracted from science-direct, more specific result and discussion sections of Journal, appears to be restricted. As a result, the authors would want to perform a study on the utilization of lexical bundles in legal and economic articles in terms of the four most common bundles, structures, and functions, more specifically in the result and discussion sections. Elsevier operates Science Direct. It debuted in March 1997. This study seeks to address the following research questions: what is the frequency of lexical bundles in articles of law and economics mined from science direct, what are the bundles' structures, and what are the bundles' functions.

2 Method

In this study, the lexical bundle approach is used to identify multi-word sequences in an electronic corpus, with priority given to frequency, fixedness, and sequences longer than two words [18]. It follows Biber et alstructural.'s taxonomy and characterization of lexical bundles from 1999. Because 4-word lexical bundles are more common than 5word strings and provide a broader range of structures and functions than 3-word bundles, the study emphasizes them and takes register perspective into account (Hyland, 2009). It employs an inductive, corpus-driven methodology. Unlike corpus-based research, no multi-word sequences were pre-selected in this study, and "the language constructions themselves emerge from a corpus analysis (Biber et al., 2004)". Technically, the original corpus LRAC (law research articles corpus) and ERAC (economics research articles corpus), which are a registry of academic research publications in the field of law and economics, were assembled for the purposes of the study. The articles were published between 2018 and 2021 in Science-Direct (Elsevier). The analysis only included works by academics. It was tried to add about how many tokens from both journals. The articles were downloaded on June 2022. A fair quantity of tokens from both journals were attempted to be included. In comparison to the articles from the "Journal of Economics," which comprised 50 files, 613.793 word tokens, and 26.435 word types, the "Journal of Law" articles took up 50 files, 354.942 word tokens, and 21192 word types. The corpus contained 968,735 tokens distributed among 100 files in total. The articles had to be converted in Word because they had been published in pdf format. After that, the data must be converted in TXT from to be easier in analysis by using ANTCON (see Fig. 1). The following details were added to the descriptive metadata for each file: the name of



Fig. 1. The form of data in TXT



Fig. 2. Antcon Display

the journal, the month and year the article was published in, the names of the authors, the type of article (such as an original scientific work), the reference number, and the article's title.

All the articles were manually cleaned after the conversion to remove any information not important for linguistic analysis (names of authors, headings, tables, graphs, footnotes, references, page numbers and formulas were removed). The digits that were a crucial element of the discourse (such as years, quantities, and percentages) were left in since books in the economics and law genre inherently contain numerical data. To make the Word files usable by the concordancing programme, the next step was converting the files into a plain text format using Unicode 8 encoding. AntConc (Version 3.5.9) [Windows] 2018 (see Fig. 2), a concordance tool created by Anthony Laurence, is the programme utilised for the study. To prevent counting digits and other symbols as tokens, the software's global settings limit the definition of a token to a single letter.

The software's "n-grams" tool was used to locate 4-word lexical bundles in the corpus using their frequency as a primary criterion for identification (see Fig. 3). To prevent idiosyncratic language use, the range, or distribution of lexical bundles in the corpus files, is the second identification criterion (Biber and Barbieri, 2007). The word string must regularly appear in a particular register and within a certain range to be considered a lexical bundle, while Conrad and Biber (2005) note that the frequency cut-off is arbitrary.



Fig. 3. The 4-Lexical Bundles

3 Result and Discussions

3.1 Structural Forms of Lexical Bundles

Academic prose lexical bundles were categorised into twelve structural types by Biber et al. (1999: 1014–1024). All of the lexical bundle structures are listed. Here are quick descriptions of each of the twelve lexical bundle structural types:

a) Noun phrase with of- phrase fragment

This type of lexical bundles structure consists of a noun phrase followed by a post-modifying of-phrase. These lexical bundles used in some different ways. First, they are used for physical description, including identification of place, size, and amount, such as the surface of the, the shape of the, the position of the, the total number of, etc. Second, they are used to mark simple existence or presence, such as the presence of the, the existence of a, etc. Third, they are used to identify a variety of abstract qualities, such as the nature of the, the value of the, the use of a, etc. The last, four- word lexical bundles are used to describe processes or events lasting over period of time, such as the development of an, the course of the, etc.

b) Noun phrase with other post-modifier fragments

This type of lexical bundles structure consists of a noun phrase followed by a post-modifier other than an of- phrase. This category is divided into two major types; (1) noun phrase with post-nominal clause fragment (e.g. the way in which, way in which the, the extent to which, etc.), and (2) noun phrase with prepositional phrase fragment (e.g. the relationship between the, the difference between the, etc.). Several of the lexical bundles in this category are used to describe how a process occurs (e.g. the way in which, the extent to which), to identify relationships among entities (e.g. the relationship between the, the difference between the), and include the only noun + complement clause combination to recur frequently (e.g. the fact that the).

c) Prepositional phrase with embedded of- phrase fragment

This type of lexical bundles structure consists of a prepositional phrase with an embedded of-phrase fragment functioning as pot-modifier of the noun. Most of these lexical bundles mark abstract, logical relations which are formed with the prepositions as and in (e.g. as a result of, in the absence of, etc.). In contrast, this type of lexical bundles beginning with the preposition at are mostly used to mark temporal relations (e.g. at the end of, at the time of, etc.). While the number of lexical

bundles which beginning with in are used to identify time periods or processes (e.g. in the course of, in the process of, in the development of, etc.)

d) Other prepositional phrase (fragment)

This type of lexical bundles begins with a prepositional phrase without an embedded of-phrase. Several of these are used to identify a particular location or time period (e.g. in the United States, in the present study, in he next chapter, etc.). There are two specific lexical bundles especially common in this category which have relatively idiomatic meaning; at the same time is used to contrast two propositions or events which are considered compatible, and on the other hand is used for contrasting two arguments or events which are presented as mutually exclusive.

- e) Anticipatory it + verb phrase/adjective phrase
 - This type of lexical bundles is divided into two major types; (1) anticipatory it + adjective phrase and (2) anticipatory it + verb phrase (usually passive). The majority of these lexical bundles are used to report possibility/likelihood, importance, and necessity (e.g. it is possible to, it is important to, it is necessary to, etc.). In contrast, the main verb in these structures similarly presents a kind of stance, identifying the information in most cases (e.g. it should be noted that, it has been shown that, etc.).
- f) Passive verb + prepositional phrase fragment

The majority of these lexical bundles incorporate a passive voice verb followed by a prepositional phrase. Two expressions are moderately common in this category;

- (1) the first identifies tabular/graphic displays of data (e.g. are shown in table, is shown in figure), and (2) the second identifies the basis of some finding or assertion (e.g. is based on the).
- g) Copula be + noun phrase/adjective phrase
- h) This type of lexical bundles is divided into two major types
 - (1) copula be + noun phrase, e.g. is one of the, are a number of, etc. and (2) copula be + adjective phrase, e.g. is due to the, may be due to, etc. These lexical bundles with adjectival predicatives are used to identify causative relations (is/be due to) or comparative relations (is equal/similar to), e.g. may be due to, is equal to the.
- i) (Verb phrase +) that- clause fragment
 - This type of lexical bundles is divided into three major types; (1) verb phrase + that-clause, e.g. should be noted that, be noted that the, has been shown that, etc.
 - (2) that-clause with there as subject (e.g. that there is a) and that-clause with it as subject and the copula is as verb (e.g. that it is not).
- i) (Verb/Adjective +) to- clause fragment
 - This type of lexical bundles is divided into three major types; (1) predicative adjective + to-clause, e.g. are likely to be, is likely to be, more likely to be, etc. (2) verb phrase + to-clause (passive), e.g. has been shown to, been shown to be, have been shown to, etc. (3) to-clause, e.g. to be able to, to ensure that the, to be found in, etc. Lexical bundles with predicatives controlling a to-clause are all used to indicate possibility/ability such as is not possible to, should be able to. In contrast, several of them with verb predicates controlling a to-clause are used to identify previous findings or know information, such as has been shown to, was found to be, is said to be, etc.
- k) Adverbial clause fragment

This type of lexical bundles consists of only four-word lexical bundles begin with an adverbial clause, three of those are introduced by the subordinator as, such as as shown in figure, as we have seen, as we shall see, if there is a. These lexical bundles are used for deictic reference to other discourse segments.

1) Pronoun/noun phrase + be (+...)

This type of lexical bundles is divided into two major types; (1) this + be which are used to link the information that follows to the preceding discourse, such as this is no the, this is not to, (2) there + be which are used for informational packaging purposes, such as there was no significant, there are a number, there has been a. Phrases about statistical significance or correlation are particularly common in academic prose (especially research articles).

m) Other expressions

There are a few lexical bundles in academic prose that do not fit neatly into any of the other types. They are such as as well as the, as well as in, than that of the, may or may not, the presence or absence.

3.2 Functional Types of Lexical Bundles

Hyland (2008) modified the functional classification of lexical bundles into three categories which reflected on research writing. They are:

1) Research-oriented lexical bundles

Usually, they help writers to structure their activities and experience of the real world. These lexical bundles are divided into five sub-categories; (1) location, e.g. at the time of (2) procedure, e.g. in the development of (3) quantification, e.g. in a variety of (4) description, e.g. the ways in which and (5) and topic of the research, e.g. as part of the.

2) Text-oriented lexical bundles

They concerned with the organization of the text and its meaning as a message or argument. These lexical bundles include (1) transition, e.g. on the other hand, (2) resultative, e.g. as a result of, (3) structuring, e.g. it can be said (4) framing, e.g. from the perspective of.

3) Participant-oriented lexical bundles

They focused on the writers or readers of the text with the help of stance and engagement features. For example, stance (it is important to) and engagement (we have, other people).

From the result of data analysis, here are the lexical bundles which have found on Antcon software, Table 1 show the lexical bundles of Economics and Table 2 for law articles.

However, from the both source of bundles, researchers also found several similarities of lexical bundles which have found on the two journals by using Antcon. In addition, these lexical bundles have 401 the total of lexical bundles (Table 3).

Moreover, here are several most shared lexical bundles among the 20 most frequent in Economic research article corpus (ERAC) and Law Research Article Corpus (LRAC). See Table 4.

Table 1. The Result of Lexical Bundles Economic

Lexical bundles	Rank	Freq	Range
In Sci Fi and	1	91	1
In the case of	2	51	15
In the original CIR	3	38	2
In the form of	4	33	13
In the long run	4	33	17
In the context of	6	30	17
In the presence of	7	28	14
In terms of the	10	23	13
On Contemporary Speculative Economic	1	93	1
On the other hand	2	36	19
On stock market performance	3	21	3
On the stock market	5	16	2
On the historical path	4	18	2
On the basis of	8	13	9
At the province sector	1	25	1
At the same time	2	23	12
At the paper level	3	18	1
At the and percent	4	15	1
At the expense of	4	15	9
At the journal	15	8	3
Of Economic dynamics control	1	54	2
Of Economic and statistic	2	38	12
Of editorial board members	3	35	1
Of the COVID pandemic	4	30	8
Of the Environment Kuznets	5	27	1

Table 2. The Result of Lexical Bundles Law

Lexical Bundles	Rank	Freq	Range
In the form of	1	35	11
In the context of	2	25	11
In the presence of	3	20	9
In the terms of the	4	13	7

(continued)

 Table 2. (continued)

Lexical Bundles	Rank	Freq	Range
In the case of	5	12	10
In terms of the	10	23	13
On behalf of Faculty	1	68	34
On sulfate saline soil	2	15	1
On the basis of	3	9	7
On the performance of	3	9	3
On isothermal lines at	5	7	1
On the other hand	5	7	4
On the surface of	7	6	3
At the end of	1	17	8
At the head of	2	16	1
At the village level	3	15	6
At the same time	4	14	10
At the local level	5	13	7
At science direct forest policy	6	11	11
At the journal	6	11	11
At the national level	6	10	1
Of engineering Alexandria University	1	108	35

Table 3. The similarity of both Journals

lexical bundles	Freq		
	Law	Economic	
In the case of	12	51	
In the form of	35	33	
In the context of	25	30	
In the presence of	20	28	
In terms of the	23	23	
On the other hand, Compound Conj, NP	7	36	
On the basis of	9	13	
At the same time	14	23	
At the journal	11	8	
Totals	156	245	

Table 4. Shared bundles among the 20 most frequent in ERAC and LRAC

ERAC	In Sci Fi and, In the case of, In the original CIR		
	In the form of, In the long run, In the context of		
	In the presence of, In terms of the, On Contemporary Speculative Economic, On		
	the other hand, On stock market performance, On the stock market, On the		
	historical path, On the basis of, At the province sector, At the same time, At the		
	paper level, At the and percent, At the expense of, At the journal, Of Economic		
	dynamics control, Of Economic and statistic, Of editorial board members		
	Of the COVID pandemic, Of the Environment Kuznets		
LERAC	In the form of, In the context of, In the presence of, In the terms of the, In the		
	case of, In terms of the		
	On behalf of Faculty, On sulfate saline soil		
	On the basis of, On the performance of, On isothermal lines at,		
	On the other hand, On the surface of		
	At the end of. At the head of, At the village level		
	At the same time, At the local level		
	At science direct forest policy, At the journal		
	At the national level, of engineering Alexandria University, Of faculty of		
	Engineering, Of sulfate saline soil, Of the republic of, Of the project is		

4 Conclusion

The current study discovered that, particularly in economics and law journals, multinational platforms of journal publishing created a comparatively high number of lexical bundles in their writings, demonstrating their proficiency in the genre. According to structural analysis, the two most common types of bundles were those including dependent clause fragments (CF) and prepositional phrase fragments (PP). Additionally, it was discovered that one of the traits of papers in journals of law and economics was the usage of adverbial clause fragments with the conjunction as. Most of the bundles in the conversation served referential functions in terms of their roles.

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