Word Frequency and Sentence Structure in Stating Objectives in Review Articles: Useful Findings for EFL learners and Novice Researchers
ความถี่ของคำและโครงสร้างประโยคแสดงวัตถุประสงค์ ในบทความปริทัศน์: ผลการศึกษาอันเป็นประโยชน์ ต่อผู้เรียนภาษาอังกฤษเป็นภาษาต่างประเทศและผู้เริ่มวิจัย

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Abstract

The purpose of this article is to provide guidelines for EFL learners and novice researchers on two key aspects of academic review articles: the frequency of word use and the structure of sentences used in stating objectives in review articles in laboratory animal research. The corpus was comprised of 160 review articles published between 2010 and 2014 in the *Journal of the Institute for Laboratory Animal Research (ILAR)*. The statements of objectives were classified according to the frameworks of Swales and Feak (2012) and Soranastaporn (2013). The statistics for data analysis included frequencies and percentages of words and sentence patterns stating the objectives. The results of this study revealed that there were 133 sentences stating the objectives, which used 68 words stating the objectives and eight different patterns, six of which were consistent with the examples in the

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textbooks about writing research or fundamental research. Moreover, the subjects used in the eight patterns included 35 personal and 80 impersonal subjects. The *present simple tense* was also the most frequently used tense used for the objectives (78.20%). Each pattern was analyzed and labeled to help EFL learners and novice researchers to understand and apply the objectives more easily and/or accurately.

Keywords: statement of objectives, verb tenses, laboratory animals research, review articles

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บทคัดย่อ

จุดประสงค์ของบทความนี้ คือ การเสนอประเด็น 2 ประเด็นในบทความปริทัศน์ ทางวิชาการแก่ผู้เรียนภาษาอังกฤษเป็นภาษาต่างประเทศและผู้เริ่มวิจัย กล่าวคือความถี่ ของการใช้คำและโครงสร้างประโยคที่แสดงวัตถุประสงค์ในบทความปริทัศน์ในงานวิจัย สาขาสัตว์ทดลอง คลังข้อมูลภาษาประกอบด้วยบทความปริทัศน์จำนวน 160 ฉบับ ที่ตีพิมพ์ระหว่างปี 2553 ถึง 2557 จากวารสาร *Journal of the Institute for Laboratory Animal Research (ILAR)* ข้อความที่แสดงวัตถุประสงค์จัดกลุ่มตามกรอบแนวคิด ของ Swales and Feak (2012) และ Soranastaporn (2013) สถิติสำหรับการวิเคราะห์ ข้อมูลคือค่าความถี่และร้อยละของคำและรูปแบบประโยคแสดงวัตถุประสงค์ ผลการศึกษา ครั้งนี้พบว่า มีประโยคแสดงวัตถุประสงค์ทั้งหมด 133 ประโยคซึ่งใช้คำแสดงวัตถุประสงค์ ทั้งหมด 68 คำและจัดกลุ่มรูปแบบประโยคได้ 8 รูปแบบ ซึ่งรูปแบบประโยค 6 รูปแบบ สอดคล้องกับตัวอย่างในแบบเรียนที่เกี่ยวกับการเขียนวิจัยหรือการวิจัยเบื้องต้น นอกจากนั้นประธานที่ใช้ในรูปแบบประโยคทั้ง 8 รูปแบบประกอบด้วยประธานที่เป็นบุคคล 35 ตัวและประธานที่ไม่เป็นบุคคล 80 ตัว และมีการใช้ *present simple tense* มากที่สุด ในประโยคแสดงวัตถุประสงค์ จากการวิเคราะห์และจัดกลุ่มรูปแบบประโยคแต่ละรูปแบบ จะช่วยให้ผู้เรียนภาษาอังกฤษเป็นภาษาต่างประเทศและผู้เริ่มวิจัยเข้าใจและใช้ข้อความ แสดงวัตถุประสงค์ได้ง่ายขึ้นและถูกต้อง

คำสำคัญ: ประโยคแสดงวัตถุประสงค์, กริยาแสดงกาล, งานวิจัยด้านสัตว์ทดลอง, บทความ ปริทัศน์

1. Introduction

The purpose of English for academic purposes (EAP) is to study the language and the discourse used in various academic disciplines and to help learners learn the language of academic discourse. For example, EAP is concerned with particular fields (Cook, 2003): EAP vocabulary (Paltridge & Starfield, 2013), and rhetorical and organizational functions in academic writing (Paquot, 2010). Sentences with complex patterns also pose particular problems in interpretation for L2 readers (Flowerdew, 2002). Understanding the relationship between word classes and sentence patterns is thus vital for learners so that they can read and write academic texts.

However, both reading and writing scientific academic articles in English is particularly problematic for EFL and novice researchers of the science field (Hirvela, 2004) who cannot easily publish in peer-reviewed journals or simply read the journals (Glasman-Deal, 2010). Those potential scientists possibly are not fluent in the language, and their inability to work or publish in English may limit their effectiveness (Graham & Perin, 2007; Ecarnot, Seronde, Chopard, Schiele, & Meneveau, 2015). These science researchers conduct their research and need to publish their work in the scientific-academic community, but they cannot write English scientific articles at the standard level of international journals. Thus, their work is more difficult to be attained. It is clear that their writing problems are frequently embedded in the complexities they undergo when reading (Hirvela, 2004).

Given reading and writing the articles, the objective of the research is very important for the readers before they continue their further reading because the objectives attract their attention and give them an overview of the research. However, EAP papers and textbooks provide a few simple examples of sentence structures regarding research functions such as the

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statements showing objectives of the research (See Swales & Feak, 2012, pp. 262-263; McMillian, 2012, p. 33), but the sentences found in journals are more complex (See results of this study). Most examples in the textbooks also use a few signal words for objectives. Moreover, the textbooks do not provide novice researchers the patterns of the sentences presenting objectives to read or write such sentences easily. Furthermore, when searching for the keywords, "word lists", "objective sentences", and "laboratory animal" in two e-databases (*ScienceDirect* and *Scopus*), we found none of these studies showed the analysis of the structure of statements indicating objectives although statements of objectives are found in every article. Additionally, a search shows that the studies of the linguistic features have focused on the research articles more than the review articles.

Thus, to fill this gap in knowledge, a corpus-based study of the words and forms presenting objectives was conducted. The aims of the study are to investigate the word frequency used in the statement of objectives from the wordlists of laboratory animal corpus (LAC), which its researchers use in review articles to elucidate the forms, subjects, and verb tenses in the statements of objectives that laboratory animal researchers write in their review articles.

In the following section, we provide background knowledge for this study regarding the review articles and the vocabulary and structures used to accomplish the function of stating objectives in academic texts used in review articles in the field of laboratory animal studies.

1.1 Review articles and research articles

Both review articles (Salager-Meyer, 1992; Rethlefsen, 2014; Taylor, 2011) and research articles (Swales & Feak, 2012; The University of Texas at Austin, 2016) are different. The difference is beneficial for the novice

researchers with few research experiences to read and write their articles fluently and correctly. The differences are shown in Table 1.

The present tense is used the most frequently in review articles (Salager-Meyer, 1992), whereas tenses are varyingly used in research articles (Swales and Feak, 2012, p. 287).

We select review articles to analyze because review articles are both a summary and an evaluation of other articles, so they help EFL and novice researchers to save their time, effort, and energy to search, seek, read, and evaluate research articles for their reading. Moreover, as EFL teachers, we realize that our learners learn to read and write through explicit English structure, so the results of our study serve their learning style.

Table 1 Difference of review articles and research articles

review articles	research articles
• dictionary-like; encyclopedia-like	• novel-like; book-like
• from the general to the universal	• from the particular to the general
• pretensions to universality	• pretension to generalization
• a topic, and consist of an introduction, a body, and a conclusion	• Introduction, Method, Result, and Discussion (IMRD)
• both a summary and an evaluation of other articles	• a "cutting edge" research and authoritative information about older research

1.2 Words and forms indicating objectives

The introduction of an article makes clear the objective of the study (Pyrczak & Bruce, 1998; Swales & Feak, 2012). The objective statement usually occurs in the introduction of an article, regularly at the end of the paragraph (Pyrczak & Bruce, 1998; McMillian, 2012) and in the abstract (Soranastaporn, 2013). This element is essential if readers are to be oriented to the investigation (McMillian, 2012). Hence, the readers have to know the vocabulary and the form indicating the objective with a subject and verb

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tenses so that they can easily understand and correctly write the research objectives.

1.2.1 Vocabulary indicating objectives

EFL learners in scientific fields need to acquire more vocabulary specific to their field than general vocabulary (Peters & Fernández, 2013). Academic texts are classified into four categories by the criteria of word frequency: high-frequency words (HFW), academic words (AW), technical words, and low-frequency words (Nation, 2001). HFW covers around 80% of tokens (both function words and content words) in academic texts. *A General Service List of English Words (GSL)* by West (1953) is the classic high-frequency word list. AW covers around 10% of tokens in academic texts (Coxhead, 2000). The occurrence of AW is normal in various academic texts. The examples of HFW and AW studies are an academic text corpus (Coxhead, 2000; Hyland & Tse, 2007), a medical research corpus (Chen & Ge, 2007; Wang, Liang, & Ge, 2008), an agricultural science corpus (Martínez, Silvia, & Carolina, 2009), a chemistry corpus (Valipouri & Nassaji, 2013), an environmental science corpus (Liu & Han, 2015), and a laboratory animal corpus (Tampanich & Soranastaporn, 2015; Soranastaporn & Tampanich, 2016). Technical words (around 5% of tokens in academic texts) are the words that are frequently used in specialized areas but rarely used elsewhere (Nation, 2001). Low-frequency words (around 5% of tokens in academic texts) are seldom found in academic texts. According to the vocabulary division, the vocabulary indicating objectives may occur in the list of HFW (See results of this study) because the research objective occurs in every article, and it provides the overview of the article to the readers (McMillian, 2012). Briefly, knowledge of words from the list of HFW is very important for EFL learners if they are to prepare themselves for reading and writing the research objectives.

1.2.2 Statements of objectives

The different forms of the objective provide different senses with the subject and the verb tenses. In the statements of objectives, there are two variants: Purposive and Descriptive.

Purposive (P): *The author(s) indicate(s) their main purpose(s).*

e.g. The aim of the present paper is to give ...

Descriptive (D): *The author(s) describe(s) the main feature of their research.*

e.g. This paper reports on the results obtained ...

(Swales & Feak, 2012, p. 262)

The research objectives can be expressed in three different ways: using certain words signaling purposes of the study, using the statement explaining the purposes of design and conduct, and the choice of certain verbs indicating "research" or "study" (Soranastaporn, 2013).

a) Words Signaling Purposes

They include various words such as *investigate, explore, discover, find, determine,* and *develop.* These words are used in the following patterns.

The	purpose(s) aim(s) of goal(s) of objective(s) of reason(s) of	of	this	paper book research study	is (was) are (were)	Verb infinitive *(to + V1)*		phrase giving details of purpose(s).
						investigate explore determine	find develop discover	

Soranastaporn (2013, p. 122)

e.g. *This aim of this study was to investigate whether cloze exercises could ....*

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b) The statement explaining the purposes of design and conduct

This	paper book research study	was	designed conducted	(in order) to	**Verb infinitive**		noun or noun phrase.
					study	ascertain	
					compare	examine	
					analyze	evaluate	

Soranastaporn (2013, p. 125)

c) Verbs indicating study or research

This study	**The past form (V2)**		noun or noun phrase.
	investigated	analyzed	
	explored	developed	
	discovered		

Soranastaporn (2013, p. 125)

e.g. _This study_ _analyzed_ the discourse of visually impaired older adult ....

Swales and Feak (2012) explain that some reference to the present text, such as the uses of _this, the present, reported,_ and _here_, signals the beginning of a purpose statement. Furthermore, it is common to change from the impersonal to the personal by using _"we"_ or, less frequently, _"I"_. An example (1) is found more often than (2).

(1) _We_ present the results of three experiments _in this paper_.
(2) _In this paper,_ _we_ present the results of three experiments.

(Swales & Feak, 2012)

Personal pronouns are a feature sometimes found in scientific journal articles. Personal pronouns are considered as personal deixis, indicating social status and the relationship between senders and receivers (Levinson, 1983; KÖvecses, 2006). Personal pronouns are used in face-to-face interaction

and expose interpersonal relationships between or among the individuals. A deep comprehension of pragmatics is beneficial if learners are to learn to critically read and write academic texts. Moreover, a study of the use of personal pronouns in the scientific field revealed that the most frequent personal pronoun is the first person (Kuo, 1999; Harwood, 2005; LuzÓn, 2009). The first person plural pronoun *(we)* is used for several discourse functions such as explaining what was done, proposing a theory or approaches, stating an objective, showing the results, or comparing approaches or viewpoints (Kuo, 1999; LuzÓn, 2009). In stating the purpose, personal pronouns help authors "state their discoursal purposes to signal their intentions and provide an overt structure for their texts" (Hyland, 2002). The first person plural pronoun can have two semantic meanings: inclusive and exclusive (Kuo, 1999). The former includes the speaker-writer and hearer-reader, while the latter includes speaker-writer and other individuals but excludes the hearer-reader.

Swales and Feak (2012) describe that verbs in both present and past are used in statements of objectives. How verb tenses are used relies on referring to the type of *text* and *investigation*. The former refers to the paper, article, thesis, report, or research note, so the present tense is used. The past tense is used when referring to an original aim which has later changed. The latter refers to an experiment, investigation, study, or survey. This option can use either the present or the past. However, the present highly tends to be used to the freshness and present relevance of the research.

In short, the objective function makes use of signal words (verbs and nouns) of objectives. Researchers can choose to suitably use these signal words in their works. Moreover, various forms of objectives are used in the articles, which include personal or impersonal subjects and verb tenses.

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Personal subjects perform various discourse functions with different meanings. Statements of objectives also use various verb tenses referring to different types of work. That is, researchers can form the statements of objectives with the proper words and forms with meaningful subjects and correct verb tenses in their works.

2. Methods

2.1 Selection of the journal

Three criteria were used to select the review papers from the *ILAR* journal to generate the laboratory animal corpus (LAC). Firstly, the *ILAR* journal does not appear on Beall's list (https://scholarlyoa.com/publishers/). The impact factor of the *ILAR* journal in 2014 was 2.393. Finally, the value of the *ILAR* journal was rated as high (Q2) from 2010 to 2014 by SCImago Journal and Country Rank (http://www.scimagojr.com/). Thus, the *ILAR* journal is considered reliable for use in this study.

2.2 Determining which words and forms indicate objectives

Sixteen topics are included in the review articles published between 2010 and 2014. The corpus contains 160 review articles by more than 400 authors, containing 840,773 running words. The corpus is divided into four sub-corpora published between 2010 and 2014. To study the words and forms used in statements of objectives, all the statements of objectives were compiled and analyzed via Microsoft Office Excel 2007. The words used in each sentence were classified according to which word lists in the LAC (Tampanich & Soranastaporn, 2015; Soranastaporn & Tampanich, 2016). Additionally, the verb patterns and tenses used in statements of objectives were analyzed. The following steps were used to determine which words and forms indicated purpose.

The first step was to identify the statements of objectives. They were found in two sections: *Introduction* and *Abstract* of the articles. They were coded, as *volume no. issue year* to re-check easily while collected and counted in Microsoft Office Excel 2007. After the statements of objectives were patterned, the same patterns were set into one group, and frequencies and percentages of each form were computed. Next, words signaling objectives were deliberated, set, and matched with the word lists of LAC (Tampanich & Soranastaporn, 2015; Soranastaporn & Tampanich, 2016) with calculation of the frequencies and percentages. Then the verb tenses from the statements of objectives were considered, and frequencies and percentage of each verb tense were calculated. After that the frequencies and discourse functions of subjects were analyzed. Finally, the statements of objectives and their forms were inspected by one native speaker who is an expert in linguistics.

In short, the statements of objectives in the LAC include diversity of words and forms with subjects and verb tenses. Therefore, words signaling objectives and forms were analyzed and their frequencies and percentages were calculated. Additionally, the native speaker examined the statements of objectives and forms for the correct data.

2.3 Analyzing the words and patterns indicating objectives

We used the frameworks of Swales and Feak (2012) and Soranastaporn and Tampanich (2013) to determine words and forms indicating objectives. Kuo's study (1999) was used for the types of subjects, and Swales and Feak (2012) for the verb tenses. Words indicating objectives were considered as the main factor forming these sentences; these verbs were compared with the word lists derived from the laboratory animal review articles (Tampanich & Soranastaporn, 2015; Soranastaporn & Tampanich,

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2016). Furthermore, the statistical devices used in data analysis included frequency and percentage. The analysis of words and forms indicating objectives is presented in Figure 1.
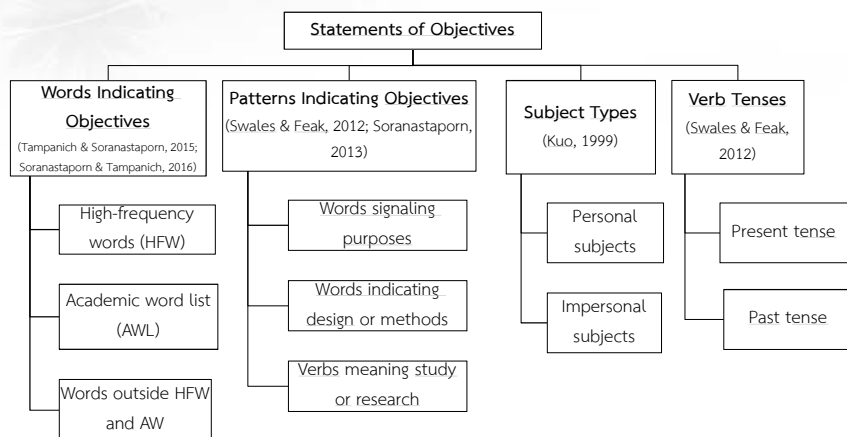

Figure 1 Framework for studying words and forms indicating Objectives

3. Results

Of the 160 laboratory animal review articles, the 133 had statements of objectives. The findings for the use of words and forms indicating objectives, classified according to verb tenses and subject types, are presented.

3.1 Content words indicating objectives

AWL 16.67%
OWL 3.87%
HFW 79.46%
High-frequency words (HFW)
Academic words (AW)
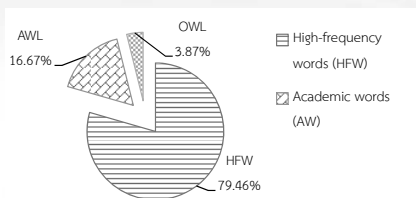
In Figure 2, the laboratory animal researchers used 68 different words indicating objectives. The words highest used for objectives appear on the HFW list, while 15 words come from the AWL in the classification in the LAC word lists (Tampanich & Soranastaporn, 2015; Soranastaporn & Tampanich, 2016). Words outside the HFW list and AWL are called the Outside Word List (OWL); eight content words from OWL were used for objectives, a much lower percentage than for the other two categories

Because of the highest occurrence of words indicating the objectives in the HFW list, they are presented here. Forty-five content words from the HFW list of LAC (Tampanich & Soranastaporn, 2015; Soranastaporn & Tampanich, 2016) were used to indicate objectives (79.46%) See Table 2. The word *"review"* occurred the most frequently, *"article"* was the second, and *"discuss"* was the third. Interestingly, the most frequent word occurred about 1.6 times more often than did the second most frequently used, while the second most frequent word occurred about 2.2 times as often as the third.

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Table 2 Words Indicating Objectives in the HFW List

Rank	HFW	f	%[1]	Rank	HFW	f	%[1]	Rank	HFW	f	%[1]
1	review	74	22.02	16	show	3	0.89	31	gain	1	0.30
2	article	46	13.69	17	use	3	0.89	32	give	1	0.30
3	discuss	21	6.25	18	address	2	0.60	33	important	1	0.30
4	provide	17	5.06	19	investigate	2	0.60	34	literature	1	0.30
5	focus	14	4.17	20	propose	2	0.60	35	main	1	0.30
6	present	14	4.17	21	act	1	0.30	36	mean	1	0.30
7	describe	8	2.38	22	allow	1	0.30	37	method	1	0.30
8	goal	7	2.08	23	assess	1	0.30	38	offer	1	0.30
9	identify	5	1.49	24	brief	1	0.30	39	procedure	1	0.30
10	purpose	5	1.49	25	broad	1	0.30	40	promote	1	0.30
11	study	5	1.49	26	compared	1	0.30	41	reason	1	0.30
12	overview	4	1.19	27	design	1	0.30	42	research	1	0.30
13	examine	4	1.19	28	determine	1	0.30	43	resource	1	0.30
14	intend	3	0.89	29	end	1	0.30	44	specially	1	0.30
15	report	3	0.89	30	evaluate	1	0.30	45	understand	1	0.30

[1]*% of objective words in HFW*

Bold words refer to words appearing on West's GSL (1953).

Underlined words refer to words appearing on the examples in the textbooks

Bold and underlined words refer to words appearing on both.

3.2 Patterns indicating objectives

Researchers used different patterns to express the objectives in LAC. Eight different patterns emerged in Table 3. Each pattern also expresses two variants.

Table 3 Eight Patterns for Expressing Objectives in the LAC

Patterns	ƒ	%	Variant	Consistent with
Personal subjects	50	37.60	descriptive	Swales & Feak (2012) McMillan, (2012)
Impersonal subjects	45	33.84	descriptive	Swales & Feak (2012) Soranastaporn, (2013)
Signal words for objectives and to-infinitive	20	15.04	purposive	Pyrczak & Bruce (1998) Swales & Feak (2012) McMillan, (2012) Soranastaporn, (2013)
Main verbs in the passive and to-infinitive	7	5.26	purposive	Soranastaporn, (2013)
Main verbs and to-infinitive	5	3.76	purposive	Swales & Feak (2012)
Signal words for objectives as the subject and phrases explaining the details of objectives	4	3.00	descriptive	Swales & Feak (2012)
It is + adjective + to-infinitive	1	0.75	purposive	a new pattern
Mixed patterns	1	0.75	descriptive	a new pattern
TOTAL	133	100		

% of the total of patterns

Pattern I: Personal subjects

Pattern I occurred the most often in the corpus. The subjects are personal nouns: the first personal pronouns *(I and We)* or the noun *"author(s)"*. Moreover, this pattern starts with a prepositional phrase referring to the text or an adverb of place *(here)*. Additionally, the objects of the main verb are either noun phrases or noun clauses showing the details of the objectives. This pattern is the descriptive discourse.

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References to the text			Personal subjects	Main verb (V1 / has, have + V3 / will + V. inf.)			Phrase / Clause
Prep.		Noun phrase		examine(s)	show(s)	highlight(s)	
In	this	review	I	discuss(es)	provide(s)	(briefly) review(s)	Noun
		essay		describe(s)	assess(es)	focus(es) on	phrase /
		article	we	present(s)	propose(s)	touch(es) upon	Noun clause
		(present) report	author(s)	identify(ies)	sketch(es)	summarize(s)	
		paper		evaluate(s)	determine(s)	illustrate(s)	
	Here			explore(s)			

e.g.

(1) *In this article, <u>we</u> briefly <u>review</u> research that contributes to understanding...*

First person pronoun		Main verb

(Decker et al, 2010)

(2) *In this article, <u>the authors</u> (one DVM and one MD) <u>present</u> examples of species...*

| Personal noun		Main verb

(Withrow & Wilkins, 2010)

Pattern II: Impersonal subjects

Pattern II, the second most frequent, resembles Pattern I. It uses a subject, a main verb, and a direct object. However, the subjects (impersonal nouns) differ from those in Pattern I. The object of the main verb is a noun phrase or a noun clause giving details about the objectives. The discourse of this pattern is descriptive.

DET.	Impersonal subjects		Main verb (V1 / will + V. inf.)			Phrase/ Clause
This	(present) review	article	provide(s)	allow(s)	explore(s)	
The	review article	essay	highlight(s)	purpose(s)	detail(s)	
A	overview	text	concentrate(s) on	review(s)	illustrate(s)	Noun phrase / Noun clause
	report	paper	summarize(s)	present(s)	show(s)	
	study of ...		focus(es) on	address(es)	identify(ies)	
	review of ...		(briefly) discuss(es)	outline(s)	end(s)	

e.g.

(3) *The* present *review* *focuses* specifically *on* the transmission...

| Impersonal noun | | Main verb | | Noun clause |
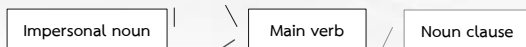
(Sanders, Watral & Kent, 2012)

(4) *This review* *highlights* [how recent comparative studies have enhanced ...]
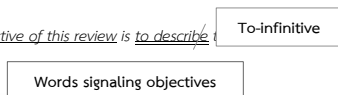
(Wall, 2013)

Pattern III: Signal words for objectives and to-infinitive

Twenty statements of objectives used Pattern III (signal words for objectives as the subject). The most frequently used verb was *"to be"* (is, are, was, and *were*) followed by *"to-infinitive" (to + V1)*. More verbs indicating objective statements were found. This pattern is the purposive discourse.

DET.	Subject (Words Signaling objectives)				Verb to be	to-infinitive (to + V1)				Noun phrase
The	objective (s) goal (s) (main) aim (s) purpose (s)	of	this the	article research review workshop (present) study	is (are) was (were)	to	describe present provide introduce give gain	use review identify design modify optimize	extend report investigate summarize discuss	Noun details of objective(s)
	objective (s) goal (s) purpose (s)									

e.g.

(5) *The objective of this review* is *to describe* [| To-infinitive |

[| Words signaling objectives |

(Garzón-Muvdi & Quiñones-Hinojosa, 2010)

Pattern IV: Main verbs in the passive and to-infinitive

The Pattern IV was formed into the structure of passive voice (be + V3) and followed *to-infinitive* to express the research purposes. The discourse of this pattern is purposive.

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Subject	Main Verb (Passive voice)		To-infinitive (to + V1)
	be	Past participle (V3)	
The (brief) overview of ...	is (are)	intended	aid
This review / article	was (were)	focused on	to (briefly) describe
A variety of procedure	will be	meant	provide
Several methods			

Passive verb

To-infinitive

e.g.

(6) This overview of Internet resources is intended to aid both beginning and experienced individuals ....

(Smith, 2012)

Pattern V: Main verbs and To-infinitive

This pattern used the main verbs and the to-infinitive to present the objectives. The subjects were the first person pronoun *(I* and *we)* and the impersonal noun. The objects of the pattern were noun phrases and noun clauses which explained the details of the research purposes. This pattern is the purposive discourse.

Subject	Main verb	To-infinitive (to + V1)		Phrase / Clause
I		address	study	
We	aim (s/ed)	to use	show	Noun phrase /
This review	act (s) as (+ object)	provide	understand	Noun clause
This article				

Personal noun

e.g.

(7) In this article we aim to address the above deficits by providing a broad overview ....

(Bateson & Feenders, 2010)

Main verb

To-infinitive

Pattern VI: Signal words for research purposes as the subject and phrases explaining the details of research purposes

Pattern VI was almost similar to Pattern III; the subject of this pattern was the signal words for research purposes, but the subject complement was comprised of phrases explaining the details of purposes. The main verb was also *'verb to be'*. This pattern is the descriptive discourse.

Subject (signal words for research purposes)			Verb to be	Phrase
The focus (es)			is (are)	Prepositional phrase
The focus (es)	of	this review / this article	will be	Noun details of purpose(s)

e.g.

Prepositional phrase

(8) In this article, the focus will be briefly on the human and canine spinal anatomy, ...

Signal words for research purposes

(Kranenburg, Hazewinkel & Meij, 2014: 150)

Pattern VII: It is + adjective + to-infinitive

The pattern is shown in the box below. The pattern starts with the anticipatory *'It'* and followed by the *'postponed subject'*. The pattern *'It is + to-infinitive'* emphasizes the information of the research purposes. This pattern is the purposive discourse.

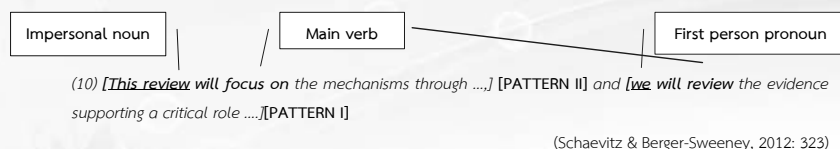It is + adjective + to-infinitive

To-infinitive

(9) ... all features of the disorder being studied, it is important to investigate the strengths and weaknesses ....

(Lutz, 2014: 284)

The example (9) stated the importance of investigating the strengths and weakness in the study. *To-infinitive phrase* was the expression of the details of the research objectives.

Pattern VIII: Mixed pattern

One sentence presenting the research purposes mixed the pattern I and II. In other words, the sentence used the pattern with the personal noun as the subject and the pattern with the impersonal noun as the subject, shown in the example, below. This pattern is the descriptive discourse.

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| Impersonal noun | | Main verb | | First person pronoun |

(10) [__This review__ will focus on the mechanisms through ....,] [PATTERN II] and [__we will review__ the evidence supporting a critical role ....][PATTERN I]

(Schaevitz & Berger-Sweeney, 2012: 323)

3.2.1 Subjects of the statements of objectives

In the eight patterns described by the LAC, two types of subjects are used for statements of objectives: personal subjects and impersonal subjects. Each type of subject can be further divided into two sub-types: the sub-types for personal subjects included the first person pronouns (*I* and *We*) [98.11%] and personal nouns (*author(s))* [1.89%]. Impersonal subjects consist of words signaling objectives [30%] and impersonal nouns [70%]. The words directly signaling objectives are *objective, goal, aim, purpose,* and *focus*. The impersonal nouns include *review, article, essay, text, review article, paper, overview, report,* and *study*. Each sub-type for impersonal subjects occurred with and without prepositional phrases (PP) shown in Figure 3.
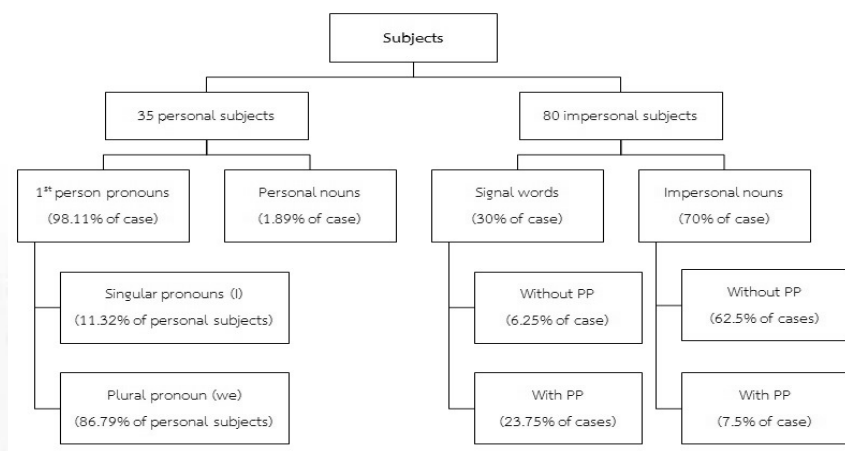

Figure 3 Types of subject in statements of objectives

In short, it was found that impersonal subjects were used more often than personal subjects. Pattern III was the most frequently used in presenting the objectives, so personal subjects, especially the first person plural pronoun (*We*), was the most frequently used subject in this pattern.
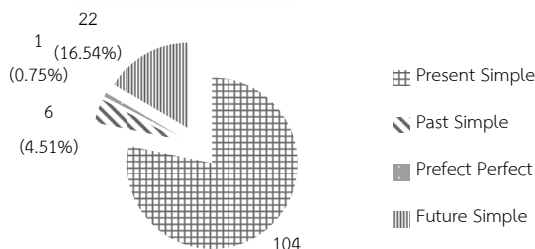
3.2.2 Verb tenses

Figure 4 Tenses in statements of objectives

In analyzing the collection of 133 statements of objectives in the LAC, it was found that four tenses were used in these statements of objectives, See Figure 4.

In Figure 4, the present simple tense was used the most often (104 occurrences; 78.2%), while the present perfect tense was used the least often (1 occurrence; 0.75%). The future simple tense (22 occurrences; 16.54%) was the second most frequently used. Finally, the past simple tense (6 occurrences; 4.51%) was the third most frequently used. Examples are shown below.

(1) *In this article, we **show** that it is possible to create a reproducible ovine model ...*

(Locatelli et al., 2011)

(2) *In this review, we **will explore** the comparative aspects of human...*

(Patterson-Kane & Rich, 2014)

(3) *We **aimed** to (1) study the anatomy of the brain vasculature...*

(Du et al., 2011)

(4) *In this review, we **have examined** the current literature and expert opinions...*

(Ho et al., 2012)

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In (1), the verb tense is the present simple tense, which is the base form. Example (2) uses the future simple tense *(will + V$_{inf.}$)*. The verb form in (3) is the past simple tense *(V$_2$)*. The example uses the regular verb *(aimed)*. As can be seen in (4), the present perfect tense is used in the statement of objectives. This verb tense is formed with *"have"* and the past participle (V$_3$).

Table 4 Frequencies and Percentages of Use of Verb Tenses in the Different Patterns

Tenses / Patterns	Present Simple		Past Simple		Present Perfect		Future Simple		TOTAL	
	N[1]	%[2]	N[1]	%[2]	N[1]	%[2]	N[1]	%[2]	N[1]	%[2]
I	43	32.33	0	0.00	1	0.75	6	4.15	50	37.60
II	32	24.06	0	0.00	0	0.00	13	9.78	45	33.84
III	15	11.28	5	3.76	0	0.00	0	0.00	20	15.04
IV	6	4.51	0	0.00	0	0.00	1	0.75	7	5.26
V	4	3.01	1	0.75	0	0.00	0	0.00	5	3.76
VI	3	2.26	0	0.00	0	0.00	1	0.75	4	3.00
VII	1	0.75	0	0.00	0	0.00	0	0.00	1	0.75
VIII	0	0.00	0	0.00	0	0.00	1	0.75	1	0.75
TOTAL	104	78.20	6	4.51	1	0.75	22	16.55	133	100

[1] Number of verb tenses in each pattern
[2] % of the total of verb tenses

The rate of occurrence of verb tenses differs according to the pattern selected, as shown in Table 4. The present simple was the most frequently used tense overall (78.20%). The present simple tense was most frequently used in Pattern I, whereas it did not occur in Pattern VIII. On the other hand, the present perfect, the least used tense, occurred only in Pattern I.

In the statements of objectives in the corpus, all the 68 words signaling objectives came from the three word lists: HFW, AWL, and OWL respectively. Moreover, this LAC exhibited eight patterns used for indicating objectives. The pattern with the personal subjects was found to be the most frequent. However, impersonal subjects were used more in the statements of objectives. Moreover, Pattern VII and Pattern VIII were found the least often. Interestingly, Pattern VIII is formed from Pattern I and II. Additionally, each pattern requires the use of different verb tenses. The present simple tense was used the most, while the present perfect tense was used the least. The present simple tense occurred most frequently in Pattern I, and the present perfect tense also occurred in the pattern I.

4. Discussion

The results of this study showed that there were 133 statements of objectives in the 160 review articles. The content words used to present the objectives fell into three groups: high-frequency words, words from the academic word list, and words outside HFW and AWL. The statements of objectives were formed using eight patterns which featured two types of subjects (both personal and impersonal subjects) and four verb tenses. Thus, the words signaling objectives and patterns of use of subjects and verb tenses are discussed in this section.

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Words signaling the objective: These words come from the three word lists of the LAC. The content words from HFW were used the most often (79.46%). It is interesting to note that more than half of the words signaling objectives from the HFW (66.67%) also appear on West's GSL (1953); these words are in boldface in Table 2. More than a quarter of the words signaling objectives in HFW (37.78%) are also consistent with the words in the examples in the textbooks of Pyrczak and Bruce's (1998), Swales and Feak's (2012), McMillan's (2012), and Soranastaporn's (2013); these words are underlined in Table 2. These words can be considered as the basis for the formulating statements of objectives in every article. That is, this finding confirms that knowledge of HFW is necessary for L2 learners and researchers if they are to recognize statements of objectives in the articles they read, an essential skill for understanding the research article, and write correct statements of objectives in their own articles. HFW content words are worthy of the attention of writers on academic topics (Paquot, 2010). More importantly, the word "review", the most frequently used word, is used to present statements of objectives in review articles. In terms of parts of speech, this word can be either a noun or a verb, functioning as a subject and as the main verbs in sentences as in the texts. The researchers used this word to show that they want to conduct the "review" of the articles. Academic words are used the second most frequently to present the objectives. Moreover, seven words signaling objectives from the AWL (46.67%) also appear on Coxhead's (2000) list: *highlight, summarize, briefly, aid, objective, modify,* and *survey*. Five words signaling objectives in AWL (33.33%) are consistent with the words in the examples in four mentioned textbooks, such as *aim, explore, objective,* and *extend*. These words are more academic than the words in HFW. The words on the AWL are useful for evaluating the difficulty of the texts and the targeting words which are worthy to read and write

academic articles. Finally, the words outside HFW and AWL are the least frequently used. Furthermore, when some spatial or temporal words from the wordlists such as *the present..., this...,* and *here...*, appear on the statements of objectives, they are signals referring to the present text. In short, it is very common that words from the HFW list are used the most frequently to present the objectives in review articles because they are the basic words used to present the objectives in every article, no matter whether it is a review or research article, to give the first indication of the topic of the research.

Statement of Objectives: The statements of objectives in LAC include eight patterns. The three most frequently used patterns were Pattern I, Pattern II, and Pattern III respectively. As compared with the examples in four textbooks, Pyrczak and Bruce's (1998), Swales and Feak's (2012), McMillan's (2012), and Soranastaporn's (2013), each objective pattern is consistent with the examples. Pattern I occurred the most often and is consistent with the observations of Swales and Feak (2012) and McMillan (2012), while Pattern II, the second most frequently used pattern, is consistent with the observations of Swales and Feak (2012) and Soranastaporn (2013). Interestingly, both of the patterns are the descriptive discourse, which should be used in the review articles. Pattern III is consistent with examples in all four textbooks. This confirms that the statements of objectives in research articles are more frequently written using *Pattern III*. However, the objectives in review articles make more frequent use of *Patterns I* and *II* (37.60% and 33.84% respectively) in the *ILAR* journal, which makes up this corpus. Moreover, though Patterns VII and VIII were found only once each, they are presented here for the consideration of EFL researchers and learners. Noticeably, four out of eight patterns use *to-infinitive* to present the objectives (Patterns III, IV, V and VII). They express the purposive discourse

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of the statement of objective. Meanwhile, the other patterns use phrases or clauses to present the objectives, which express the descriptive discourse. Spatial deixis also occurred to some extent in every pattern. *This ...* or *here ...* are used to refer to the current articles. When the pattern includes spatial deixis, personal subjects are frequently used instead of impersonal subjects, for example by using *"we"* (Swales & Feak, 2012).

Subjects Used in Statements of Objectives: Personal subjects used the most frequently were the first person plural pronoun (*we*) in Pattern I (Kuo, 1999; Harwood, 2005; LuzÓn, 2009). *"We"* refers to the writers as a team. All occurrences of *"we"* in this corpus have the same semantic reference. That is, the writers themselves stated the objectives of their review articles. *"We"* is also used to indicate the writers' intentions and provide an obvious structure for the texts. Another type of subject found in the statements of objectives in LAC was impersonal subjects, which were used more frequently than personal subjects. The writers used impersonal subjects to refer to the objective of the article as a whole. That is, the statements of objectives express what is covered in the whole article. This type of subject is used most often in Pattern II. Impersonal subjects used as words signaling objectives put the focus on the objectives of the study. They were found most frequently in Pattern III. In addition, impersonal nouns with *this* or *present* indicate that the writers are referring to recent texts or articles because of spatial deixis, the use of words like *"this"* or *"present"*.

Verb tenses: The present simple was the most frequently used tense (78.20%) to present the objectives in the LAC. These findings are contrary to the examples in the books *Writing Empirical Research Reports* (Pyrczak & Bruce, 1998) and *Effective Reading & Writing English Text* (Soranastaporn, 2013). The authors of both books stated that the past simple tense was used in all statements of objectives but the past tense in the current study was

used the third most frequently used tense. This is consistent with examples given in the book, *Educational Research: fundamentals for the consumer* by McMillion (2012), where examples of statements of objectives using the present simple tense, past simple tense, and future simple tense are shown. Three mentioned tenses of the statements of objectives in that book are also consistent with the results in the LAC. However, Swales and Feak (2012) explains that the purpose sentences use the 'present' or 'past' verbs depending upon the different situations, referring to the type of *text* and *investigation*. When referring to the type of *text*, the statements of objectives use 'the present tense'. The *ILAR* journal is the peer-review publication, which is the type of *text*, so the statements of objectives in the LAC use the present tense the most. Remarkably, the statements of objectives in the corpus include the spatial deixis (*this* or *here)*, which refer to the recent articles, so the present simple tense was used the most. If the sentences refer to an original purpose that has now changed, 'the past tense' is used. That is, some sentences used 'past simple tense' denote the original objective. Importantly, little evidence shows the use of 'present perfect' to present the objective. In brief, the present simple tense should be used to present the objectives in the review articles.

To conclude, the statements of objectives are formed by words, verb tenses, and patterns. Words used for the objectives should be words in the HFW list because of the basic words used in every article, both review and research articles. Moreover, Pattern I *personal subjects,* and Pattern II, *impersonal subjects,* are appropriate to form the statements of objectives in the review articles. This is because this corpus is also the representativeness of the review articles. The impersonal nouns without PP are also used to write the statements of objectives in the review articles. Furthermore, the first person plural pronoun (*We*) indicates that the writers themselves stated

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the goals or objectives of the review articles. Finally, the present simple tense is used to present the objectives in the majority of review articles because the results of the study are representative of the review articles, and they are consistent with the evidence according to Swales and Feak (2012). That is, the statements of objectives mentioning the type of *text* use the present tense.

Implications and Limitation of the Study

The results of this study of words and patterns signaling objective in laboratory animal review articles are the empirical inputs for EAP practitioners to use in developing academic writing courses or EAP program for laboratory animal science. EFL and novice researchers can also use the purpose words and forms to help them (1) to judge whether the articles meet their needs and (2) to write their objective statements. That is, they can analyze the patterns of the objective to form the sentences signaling the objective. EFL and novice researchers will become aware that objective statements can be written without signal words of purpose but by using main verb directly to show what the authors are going to do (See Pattern II). This study analyzed only one research genre, LAC, so different words signaling the objective and patterns of objective statements may be found in other research genres.

5. Conclusions

The findings for words and forms from the corpus which are used to signal objectives can be divided into two parts. Firstly, sixty-eight content words were used to present the objectives. Forty-five content words come from the HFW list, fifteen from the AWL, and eight from OWL. Most words used to signal objectives come from the HFW because the objectives are

used in every type of article. The following words from the HFW list were the ten most frequently used: *review, article, discuss, provide, focus, present, describe, goal, identify,* and *purpose*. The ten most frequently used words from the AWL were *aim, highlight, summarize, briefly, explore, paper, aid, illustrate objective,* and *detail.* The eight words from the OWL were *essay, text, concentrate, optimize, outline, sketch, underscore, and workshop*. In addition, eight patterns were used to express objectives in the LAC. Pattern III, *personal subject*s, was found the most frequently, while the Pattern VII, *It is + adjective + to-infinitive,* occurred the least frequently. Pattern III is the good pattern to form the statements of objectives in the review articles because this pattern is the representativeness of the LAC corpus. Additionally, one sentence signaling objectives used a combination of Patterns III and IV. Impersonal nouns without prepositional phrases are the most frequently used subjects in writing the statements of objectives in the review articles. However, in Pattern III, the most frequently used subject was the first person plural pronoun (*We*), referring to fact that the writers themselves were stating the objectives of the review articles. More importantly, the present simple tense appeared the most frequently in all Patterns, whereas the present perfect tense was used the least. The present simple tense is very likely to be used for the statements of objectives in review articles because the corpus is the representativeness of the review article and the results are consistent with the evidence of Swales and Feak (2012).

Recommendation for the future study

In the future study, the researchers can further study the frequency and word types (e.g., noun and verb) because it is benefit and accessed by EFL learners and teachers.

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