



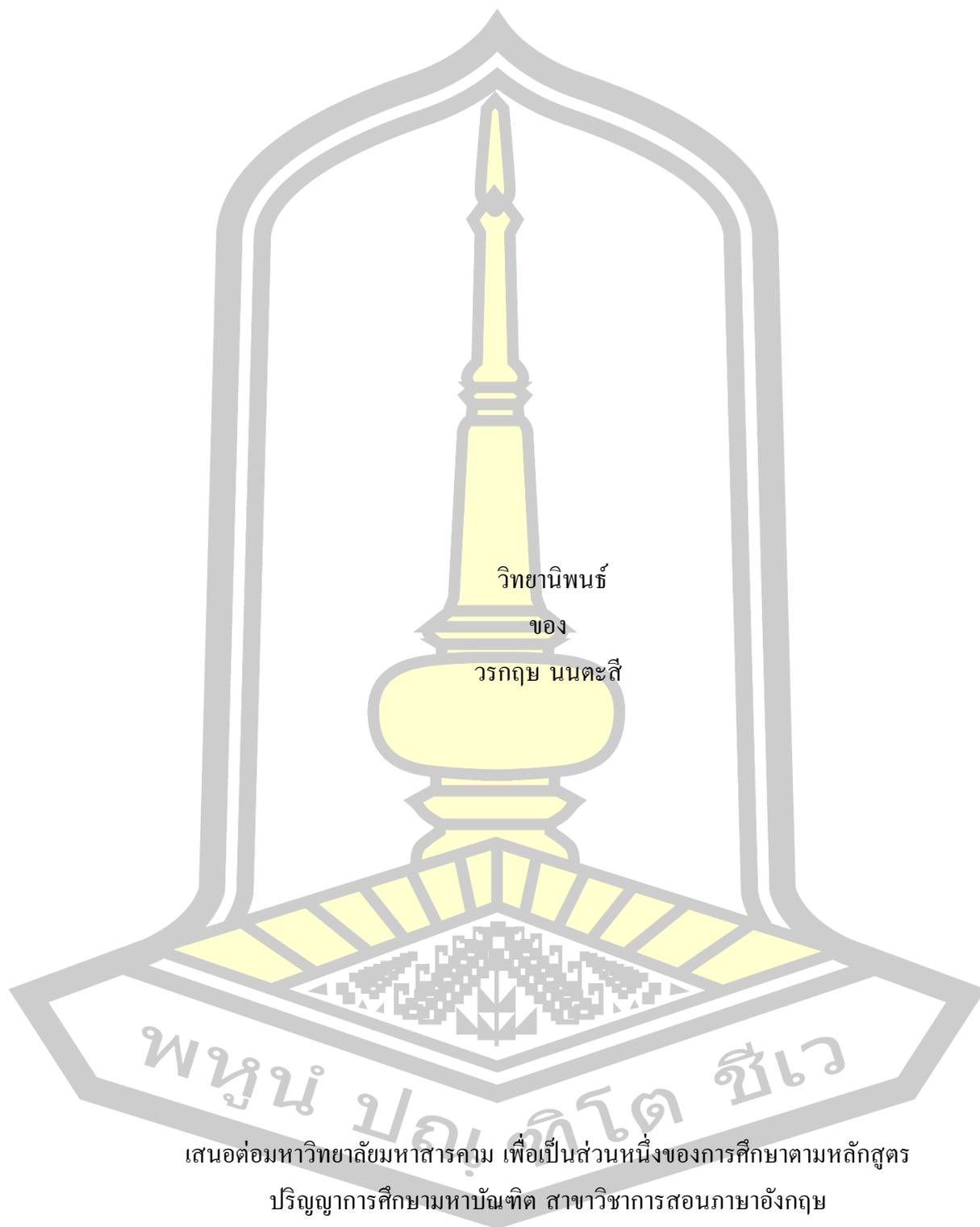
L2 Word Learnability in Thai High School Learners of English

Worakrit Nontasee

A Thesis Submitted in Partial Fulfillment of Requirements for  
degree of Master of Education in English Language Teaching  
August 2020

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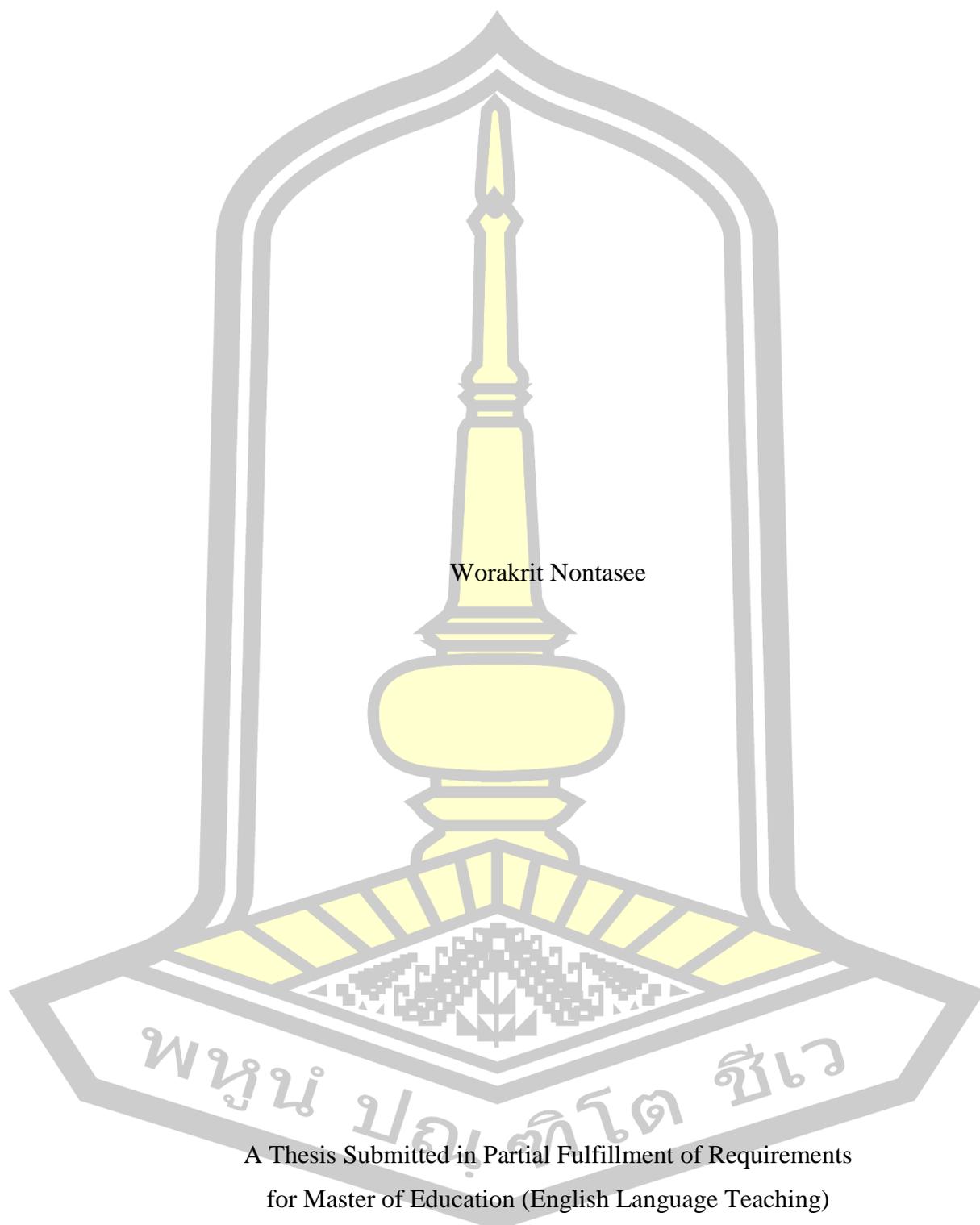
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August 2020

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The examining committee has unanimously approved this Thesis, submitted by Mr. Worakrit Nontasee , as a partial fulfillment of the requirements for the Master of Education English Language Teaching at Maharakham University

Examining Committee

Chairman

( Pilanut Phusawisot , Ph.D.)

Advisor

(Asst. Prof. Apisak Sukying , Ph.D.)

Committee

(Asst. Prof. Intisarn Chaiyasuk ,  
Ph.D.)

External Committee

(Asst. Prof. Chongrak Liangpanit ,  
Ph.D.)

Maharakham University has granted approval to accept this Thesis as a partial fulfillment of the requirements for the Master of Education English Language Teaching

(Assoc. Prof. Nittaya Wannakit , Ph.D.) (Assoc. Prof. Krit Chaimoon , Ph.D.)  
Dean of The Faculty of Humanities and Social Sciences      Dean of Graduate School

พหุบัณฑิต ชีวะ

**TITLE** L2 Word Learnability in Thai High School Learners of English  
**AUTHOR** Worakrit Nontasee  
**ADVISORS** Assistant Professor Apisak Sukying , Ph.D.  
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### ABSTRACT

Word knowledge is the result of a long and complex process of learning (e.g., Nation, 2013; Schmitt, 2008). Specifically, acquiring a word involves the amount of effort, and different word aspects have different learning burdens for learners. The ease or difficulty of learning a word depends on the nature of the aspects of the word. Therefore, this study aims to investigate L2 word learnability in order to understand the roles of word knowledge aspects (form, meaning, and use) both receptively and productively and their impact on the ease or difficulty of learning a second language vocabulary. Two hundred sixty-one Thai EFL high school learners were given a battery test, including the Word Segmentation Test (WST), Affix Elicitation Test (AET), L2 Translation Test (L2TT), L1 Translation Test (L1TT), Collocation Recognition Test (CRT), and Productive Collocation Recall Test (PCRT). The results of the study indicated the hierarchy of L2 word learnability in Thai high school participants. The form of a word is acquired first, followed by its meaning, and, at last, word use. Indeed, the current study highlighted the difficulty levels of word knowledge to be acquired. The findings also showed that word knowledge aspects are closely related. Overall, these findings indicated that learning a word is the result of a long and incremental process, starting from the recognition of a word to the ability to use it in a real context. To conclude, multiple aspects of word knowledge together are more useful in vocabulary acquisition than a single knowledge alone. Longitudinal research is needed to examine the pattern of word learning and changes in different education levels.

Keyword : L2 word learnability, The senior high school students, Receptive word knowledge, Productive word knowledge

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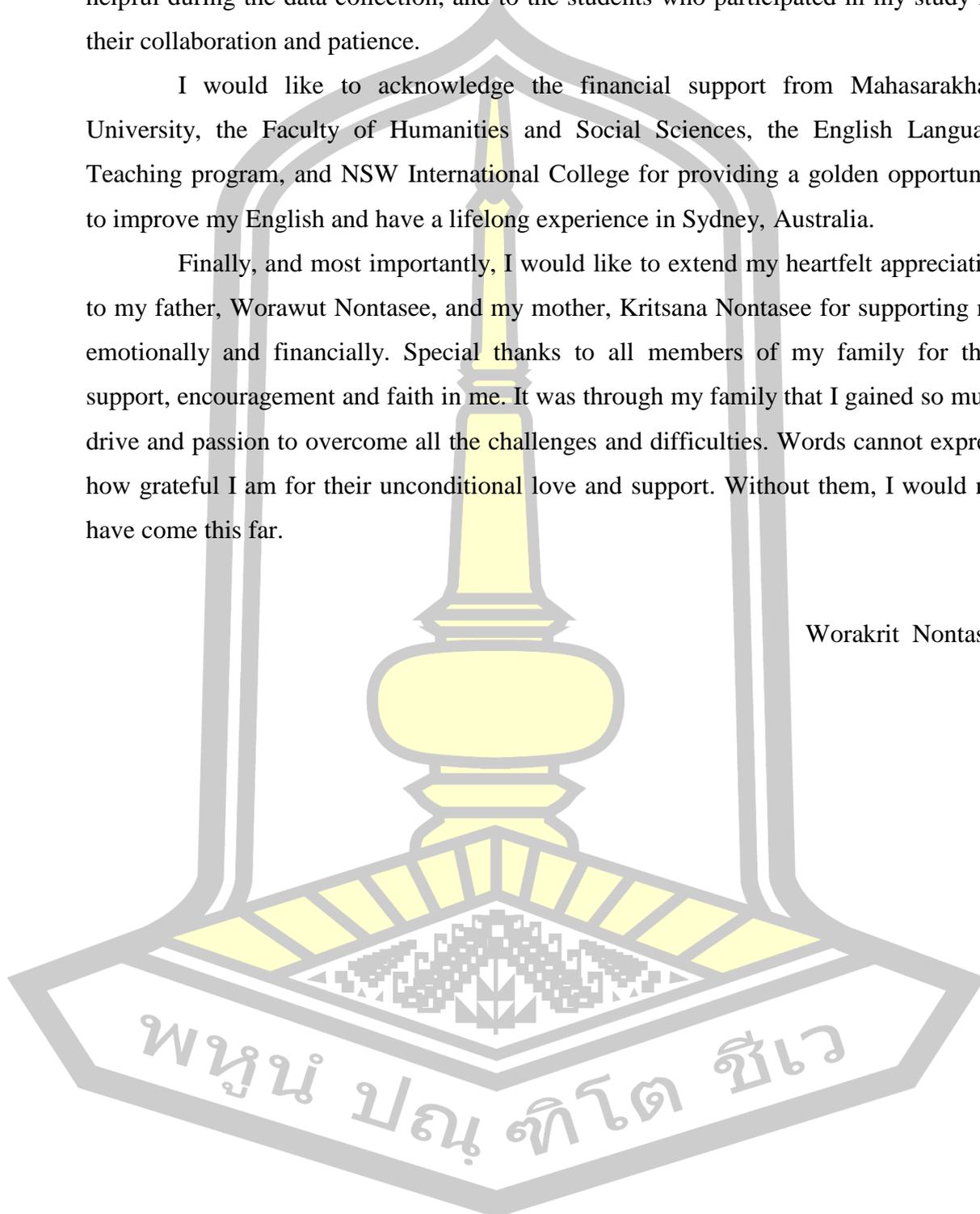
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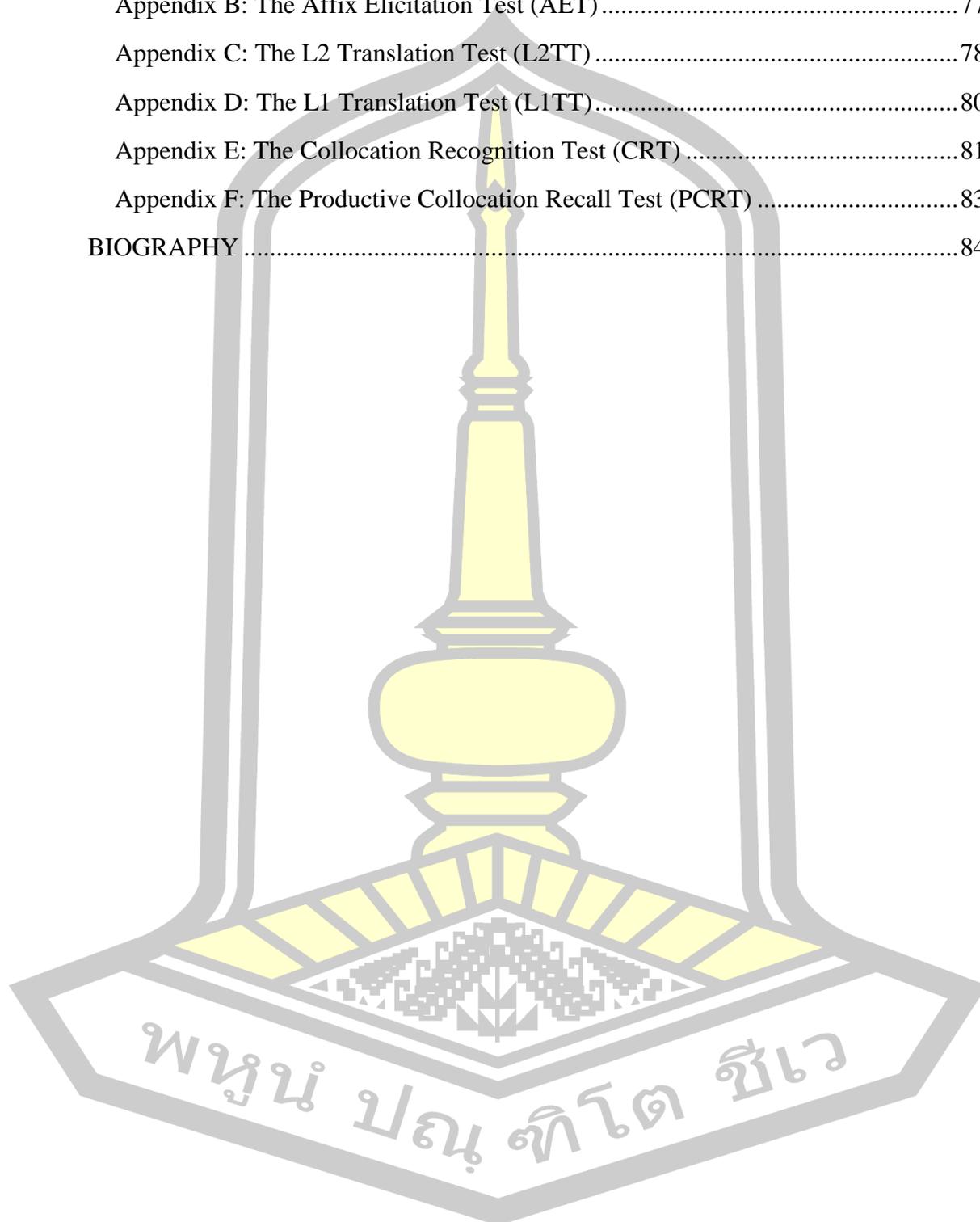


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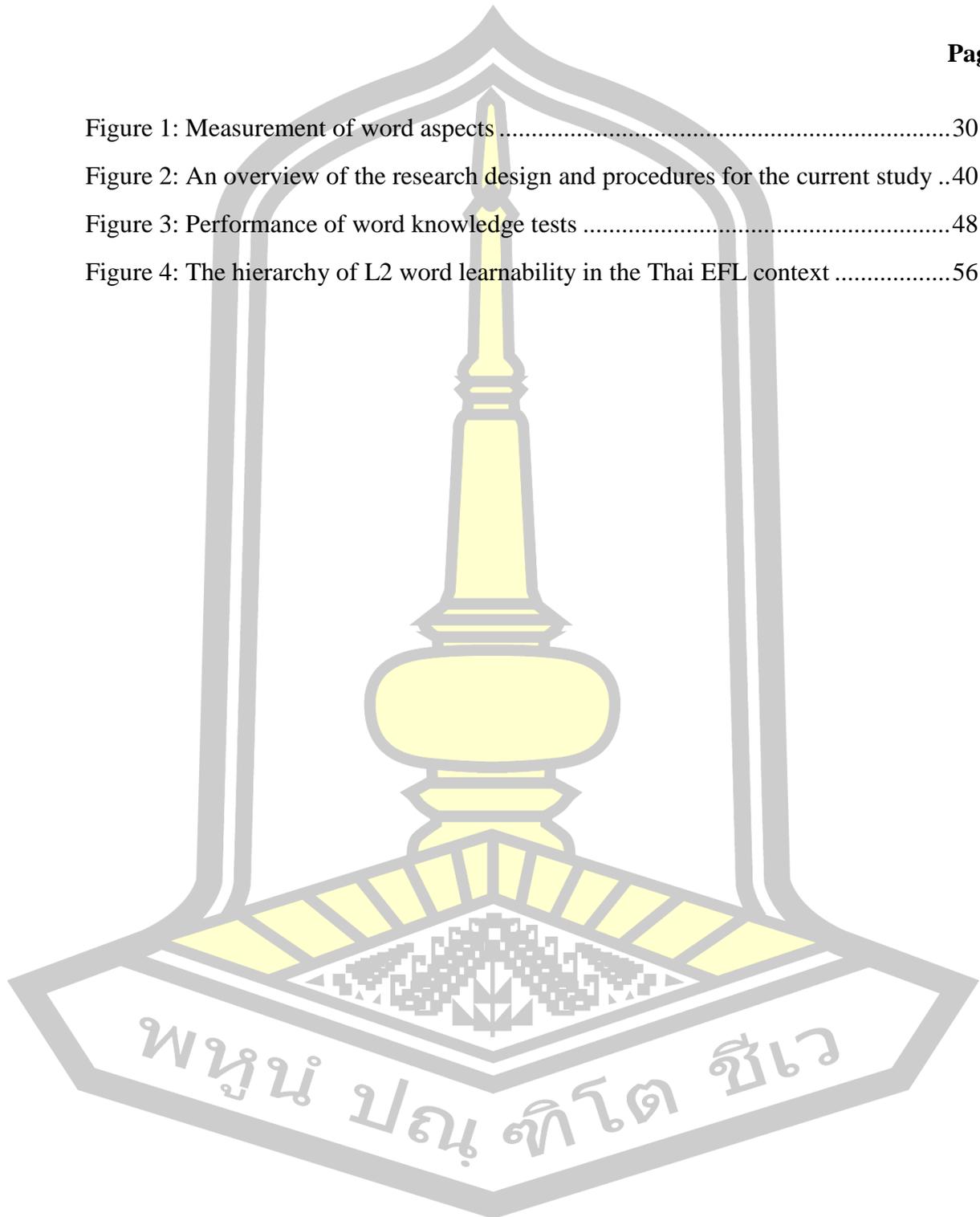
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# CHAPTER I

## INTRODUCTION

### 1.1 Background of the study

Word knowledge, also referred to as vocabulary knowledge (Laufer, 1989, 1992; Nation, 2013) or lexical knowledge (Laufer & Goldstein, 2004; Schmitt, 2014), has many definitions. For example, some have suggested that word knowledge involves various degrees of knowing, starting with a superficial familiarity with the word and ending with the ability to use it in context (Laufer & Goldstein, 2004). Others argue that knowing a word entails a receptive and productive distinction (Laufer & Paribakht, 1998). Receptive knowledge is the ability to recognize or remember a word, at least to some extent, whereas productive knowledge is the ability to recall a word and to use it correctly in context (Laufer & Paribakht, 1998; Nation, 2013). Indeed, knowing a word is crucial for second language (L2) comprehension and production and the acquisition of vocabulary (Ellis, 2013; Schmitt, 1998).

In the field of vocabulary learning, word knowledge is seen as the result of a long and complex process of learning (e.g., Ellis & Beaton, 1993; Nation, 2013; Schmitt, 2008; Schneider, Healy, & Bourne, 2002). This process involves the learnability of a word or the ease or difficulty of learning a word. Research on second language (L2) vocabulary acquisition shows that learning a word involves a developmental continuum of knowing different aspects of a word. Based on Richards' (1976) assumptions of word knowledge, Nation (2001; 2013) suggests the most comprehensive concepts of word knowledge, which include form, meaning, and use. Each aspect of word knowledge can be broken down into receptive and productive dimensions of knowing a word. Receptive vocabulary knowledge refers to the recognition of a word, whereas productive vocabulary knowledge is the ability to recall a word and produce it in context. Precisely, receptive and productive knowledge distinctions constitute a continuum as receptive knowledge represents the increasing degrees of word knowledge (Laufer & Goldstein, 2004). From these perspectives, word learnability is assumed to be acquired at different developmental stages and different rates (Nation, 2013; Schmitt, 2000). Indeed, the ease or difficulty of learning a word depends on the nature of the aspects of the word.

Measuring word knowledge in L2 learners is an essential component for teaching and learning an L2 (e.g., Anderson & Freebody, 1981; Palmberg, 1987; Stæhr, 2008; Vermeer, 2001). Words are the fundamental components of language, the units of meaning from which larger structures (e.g., sentences, paragraphs, and whole texts) are formed. For learners, vocabulary learning is often a more conscious and demanding process. Even at an advanced level, learners are aware of limitations in their knowledge of L2 words and learners often experience lexical gaps; that is, words they read which they simply do not understand, or concepts that they cannot express as adequately as they could in their native or first language (L1). Indeed, many learners view L2 acquisition as a matter of learning vocabulary. As such learners devote a large amount of time to memorizing lists of L2 words and rely heavily on the bilingual dictionary as a basic communicative resource. Furthermore, after a lengthy period focused on the development of grammatical competence, language teachers and researchers now realize the importance of vocabulary learning and have started exploring ways of improving vocabulary more effectively. From these perspectives, vocabulary can be seen as a priority area in language teaching and learning, requiring tests to monitor learners' progress in vocabulary learning and to assess how adequate their lexical knowledge is to meet their communication needs.

To date, there has been no consensus about which aspects of word knowledge a vocabulary test should actually measure. Bachman (1990) viewed language proficiency as a set of communicative skills and proposed a model of communicative language ability. This model made word knowledge more complicated as communicative functions are included in language competence, in addition to lexical knowledge. Read (2000) contended that the lexical model should incorporate lexical communicative competence in addition to the knowledge of discrete lexical items. Furthermore, Read and Chapelle (2001) argued that vocabulary assessment should estimate vocabulary size, also known as breadth of lexical knowledge (the number of words known), and most vocabulary tests do not give learners the incentive to deepen their knowledge of lexical items, also referred to as depth of lexical knowledge (how well a particular word is known or depth of knowledge). Nor do the tests encourage the development of effective communication strategies to deal with gaps in their vocabulary knowledge. Read and Chapelle suggested that vocabulary tests should go

beyond decontextualized word lists in order to generate positive washback on the teaching and learning process.

However, whether the breadth or depth of word knowledge is tested, the primary goal of vocabulary tests is to measure the vocabulary knowledge learners have gained. Vocabulary learning is incremental and mastery of different aspects of a word tends to vary on a continuum stretching from 'no knowledge' at one end to 'full knowledge' at the other (Wesche & Paribakht, 1996). This continuum affects test design and test items. Tests need to be designed to suit their purposes. For example, if the purpose of the test is to provide an overall picture of learners' vocabulary size and to give credit for partial knowledge, a test of breadth of lexical knowledge is required (Cameron, 2002). On the other hand, if the purpose is to determine if learners have gained 'full knowledge' of the word, a test to elicit such knowledge needs to be developed.

Most vocabulary tests aim to measure one aspect of word knowledge (e.g., knowing word meaning, form, or use). Yet, from the viewpoint of a receptive and productive continuum, previous studies seem to measure aspects of either receptive or productive knowledge (e.g., Harrington & Carey, 2009; Hilton, 2008; Laufer & Goldstein, 2004; Laufer & Paribakht, 1998; Lin, 2012; Nation, 2006; Schmitt & Meara, 1997; Sukying, 2017; Yu, 2010). Using only receptive or productive tests to capture such knowledge learning may produce misleading information (Read, 2000; Webb, 2005, 2008). As such, the current study will use various tests to measure different aspects of word knowledge, and each word aspect will be assessed both receptively and productively.

In Thailand, the school curriculum requires that all Thai learners take English as a compulsory subject by learning English as a foreign language (EFL) from primary school to university. Despite learning English for many years, many learners seem to have problems using all English skills and show poor sub-skills of English, including knowledge of vocabulary, grammar, and pronunciation (Mungkonwong, 2017). Additionally, the most significant difficulty in English language use faced by Thai learners is a lack of word knowledge (e.g., Chawwang, 2008; Jamtawee, 2000; Supatranont, 2005).

Senior high school learners have approximately 10 years of classroom English language instruction in an EFL context and are at a stage where they should be able to use high-frequency vocabulary and to continue studying English at a higher level of academic study. Based on the Ministry of Education of Thailand (2008), graduates in grade 12, should have a vocabulary size of around 3,600-3,750 words. However, it is not clear if they reach the requirement of Thailand's Basic Education Curriculum B.E. 2544 (A.D. 2001) after 12 years of English study. The earlier findings revealed the vocabulary needed for EFL learners: high-frequency words (86%), and academic words (10%). However, the requirement of vocabulary implies a more demanded degree because EFL learners seem not having adequately a comprehension of word knowledge for the production of a word (Hayashi & Murphy, 2011; Sukying, 2017).

Alternatively, Nation and Waring (1997) also suggest that ESL and EFL learners have a command of 2,000 words and concentrate on the high-frequency words of the language. This provides a convenient threshold for a sufficient understanding of a text. Accumulating high-frequency words is a critical stage that language learners must master to progress to basis daily English conversations, before moving on to academic studies. Laufer (1992) found that knowing a minimum of approximately 3,000 words is required for effective reading at the university level, whereas knowing 5,000 words indicates likely academic success. Furthermore, Nation (2006) suggested that learners would need to acquire a knowledge of 3,000 to 4,000-word families, plus marginal words, proper nouns, and transparent compounds to deal with a wide variety of texts. As such, this provides a convenient threshold for a sufficient understanding of a text. Accumulating high-frequency words is a critical stage that language learners must master to progress to basis daily English conversations, before moving on to academic studies.

Many studies have attempted to investigate the importance of vocabulary learning and word knowledge in a Thai context (e.g., Liangpanit, 2014; Kittigosin & Phoocharoensil, 2015; Phoocharoensil, 2013, 2014; Sukying, 2017; Supasiraprapa, 2019). For instance, one study investigated receptive and productive affix knowledge in Thai high school learners and found that their affix knowledge was rather low, both receptively and productively (Sukying, 2018, 2019). More recently, a study examined

receptive and productive vocabulary knowledge and found poor knowledge of English collocations in Thai university learners (Supasiraprapa, 2019). Furthermore, a study examining the receptive and productive vocabulary size of Thai EFL students demonstrated that students' receptive vocabulary size was almost double their productive vocabulary size (Kotchana & Tongpoon-Patanasorn, 2015; Srisawat & Poonpon, 2014) and low English proficiency (Noom-ura, 2013). Notably, Thai EFL learners had a smaller vocabulary size, both receptive and productive, than the requirements of the English curriculum in Thailand (Supatranont, 2005).

At present, it is difficult to explain the processes of acquisition for the different aspects of word knowledge and the mechanisms by which they interrelate. This is because there is no generally accepted model of how vocabulary is acquired (Meara, 1984). To illustrate, most tests capture only one single aspect of word knowledge in most studies (e.g., Laufer & Goldstein, 2004; Lin, 2015; Schmitt & Meara, 1997; Sukying, 2017). Additionally, little research has used the word knowledge framework to study vocabulary learning. The word knowledge framework (Nation, 2013) views learning on a developmental continuum and takes into account word learnability. There is still a need for more empirical research focusing on word learnability in the field of vocabulary acquisition, especially in a Thai context. From this respect, testing vocabulary knowledge is regarded as an essential component in a second or foreign language (L2) acquisition and development. The aim of the current study was to investigate word learnability (form, meaning, and use) and to examine the relationship between different aspects of word knowledge among Thai high school learners. Specifically, word parts knowledge, form-meaning knowledge, and collocations knowledge are assessed in the current study. Understanding L2 word learnability will provide a clearer picture of the different aspects of a word and their roles in vocabulary acquisition and development.

## **1.2 Purpose of the research**

The primary purpose of the current study is to examine L2 word learnability by measuring the three different aspects of a word: form, meaning, and use, both receptively and productively. The study will also investigate the relationship between different aspects of a word by adopting Nation's (2013) framework of word knowledge. Specifically, the current study aims to address the following research questions:

1. To what extent does knowledge of form, meaning, and use of a word affect L2 word learnability in Thai high school learners?
2. What is the relationship between word knowledge aspects in Thai high school learners?

## **1.3 Scope of the research**

Despite the importance of addressing the three-word knowledge aspects (i.e., form, meaning, and use), most previous studies have focused on a single aspect of word knowledge (Hayashi & Murphy, 2011; Mochizuki & Aizawa, 2000; Schmitt & Zimmerman, 2002; Schmitt & Meara, 1997; Sukying, 2017). Therefore, the current study focuses on investigating the interrelatedness of receptive and productive aspects of EFL learners' word knowledge and their impact on the learnability of a word, both receptively and productively. Specifically, the current study aims at measuring Thai high school learners' word knowledge aspects, form (word parts), meaning (form-meaning), and use (collocations), by using Nation's (2013) comprehensive list of word knowledge. Research tools for vocabulary testing are also developed. However, no attempts have been made to develop generic and practical receptive and productive word knowledge tests that might be used for other types of research or pedagogical purposes.

## **1.4 Significance of the study**

This study will provide a better understanding of the nature of different word aspects and its impact on L2 word learnability. More specifically, it will reveal the role of word knowledge and provide more in-depth insights into the nature of word knowledge and roles in vocabulary development, particularly in Thai EFL learners. Indeed, the implication in this study can be a beneficial evidence, the hierarchy of L2

word knowledge in the learnability, to vocabulary teaching and learning in English language instruction. More specifically, the implication of the current study is a beneficial option to be built on the policy for the area of English education in vocabulary acquisition and development. As such, the implication of the acquisition of L2 word knowledge can be promoted vocabulary teaching and learning, specifically a new designed activity for the English curriculum. This can possibly develop the comprehension and production of a word in Thai EFL learners.

### **1.5 Definitions of key terms**

#### *L2 word learnability*

L2 word learnability is defined as comprehension of the developmental process of learning a word by understanding the essential roles of word knowledge, which are interrelated.

#### *The senior high school students*

Upper high school students are learners who are at the stage of learning high-frequency words and are preparing for a higher level of academic education.

#### *Receptive word knowledge*

Receptive knowledge of a word refers to the ability to recognize a word.

#### *Productive word knowledge*

Productive knowledge of a word is the ability to produce a word.

### **1.6 Organization of the study**

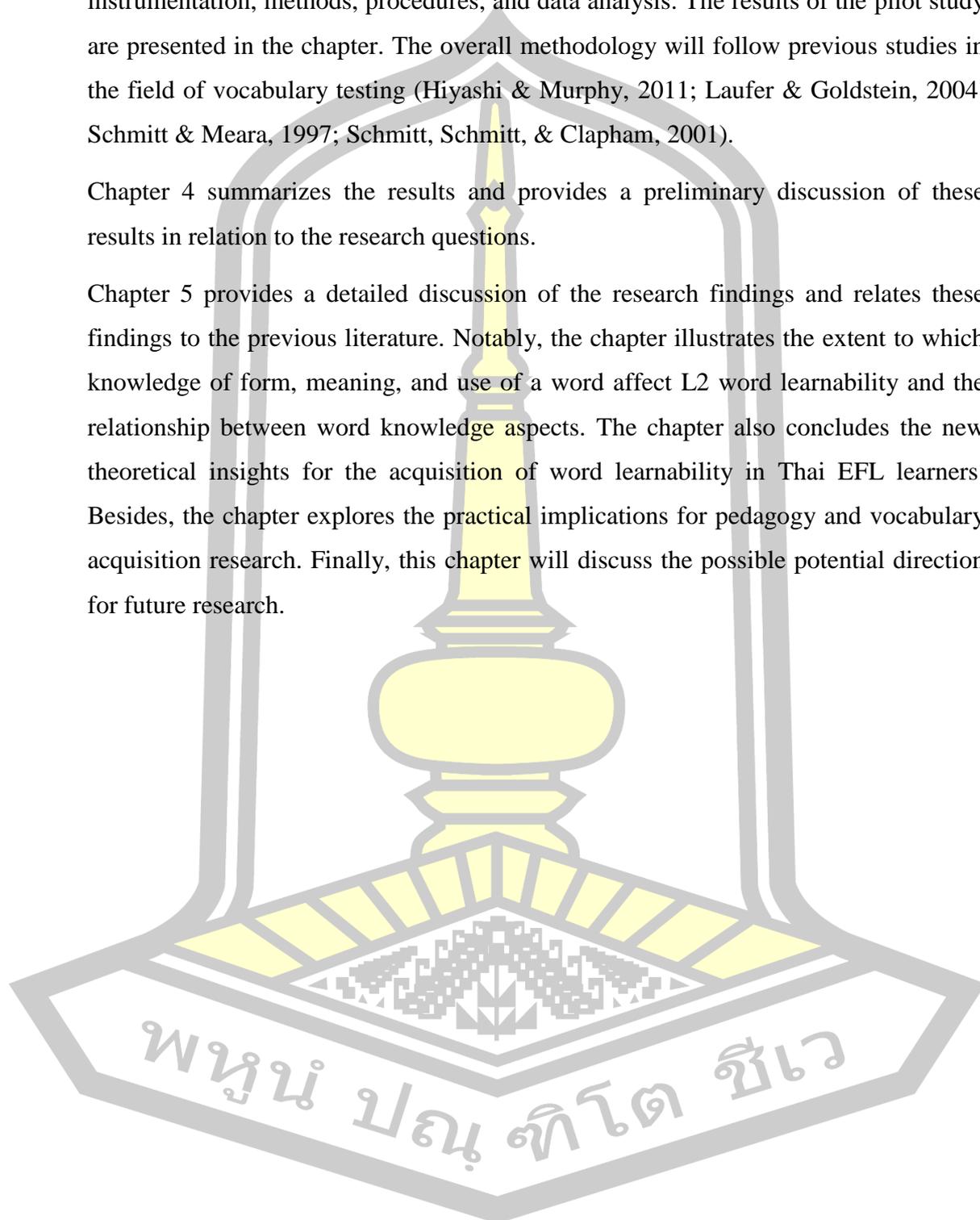
This thesis consists of five chapters. Chapter 1 introduces the reader to the field of vocabulary learning, as applied to an EFL setting. Specifically, it is focused on the word knowledge framework. The chapter outlines the summary and rationale for the current study, followed by the clarification of the aims, scope, and significance of the study.

Chapter 2 reviews the theoretical framework of word knowledge. The chapter also presents multidimensional measures of word knowledge. The linguistic and psycholinguistic factors and related empirical studies will be discussed in this chapter. Finally, the chapter provides a summary of the theoretical framework used in the current study.

Chapter 3 outlines the research methodology, including the participants, instrumentation, methods, procedures, and data analysis. The results of the pilot study are presented in the chapter. The overall methodology will follow previous studies in the field of vocabulary testing (Hiyashi & Murphy, 2011; Laufer & Goldstein, 2004; Schmitt & Meara, 1997; Schmitt, Schmitt, & Clapham, 2001).

Chapter 4 summarizes the results and provides a preliminary discussion of these results in relation to the research questions.

Chapter 5 provides a detailed discussion of the research findings and relates these findings to the previous literature. Notably, the chapter illustrates the extent to which knowledge of form, meaning, and use of a word affect L2 word learnability and the relationship between word knowledge aspects. The chapter also concludes the new theoretical insights for the acquisition of word learnability in Thai EFL learners. Besides, the chapter explores the practical implications for pedagogy and vocabulary acquisition research. Finally, this chapter will discuss the possible potential direction for future research.



## CHAPTER II

### LITERATURE REVIEW

This chapter will first define the theoretical frameworks of vocabulary knowledge, types of vocabulary knowledge, and the role of word learnability in second language vocabulary acquisition. An overview of the rationale and relevant studies will also be provided as well as the vocabulary assessments used in this study, including measuring vocabulary knowledge, rational measurement, measuring receptive and productive knowledge, and choices of measurement.

#### **2.1 Definition of word knowledge**

Word knowledge, also referred to as vocabulary knowledge (Laufer, 1998, 1992, 1997; Nation, 2013) or lexical knowledge (Laufer & Goldstein, 2004; Schmitt, 2014), has many definitions (e.g., Henriksen, 1999; Milton, 2009; Nation, 1990, 2001, 2013; Read, 1993, 2000; Schmitt, 2014). It can be defined as the words of a language, including a single item and phrase, or chunks of several words which convey a particular meaning. Word knowledge also incorporates both the comprehension and use of words and requires an understanding of concrete and abstract meanings (Nation, 2013).

The term “word” can also be further defined as types, tokens, lemmas, and word families (Milton, 2009). However, when investigating vocabulary, the most commonly used concept of word knowledge is breadth and depth (e.g., Meara, 1996; Nation, 2001; Schmitt & Meara, 1997). The breadth of word knowledge refers to the size or the number of words that learners know at a certain level of language competence (Nation, 2013). By contrast, depth of word knowledge constitutes how well learners know a word. The most common conceptualization of vocabulary depth is the degree to which L2 words are connected to related words in the mental lexicon, or the L2 learners' ability to connect an L2 word to, and distinguish it from, related words (e.g., Read, 2004; Schmitt, 2014).

Word knowledge can be multidimensional and complex. Indeed, knowing a word involves a multitude of linguistic knowledge, ranging from the word's pronunciation, spelling, and morphology, to awareness of its syntactic relationships with other words, including synonym, antonym, hyponym, and collocational meanings (Laufer, 1998, 1992). Richards (1976) proposed 8 aspects of word knowledge:

1. The spoken form of a word,
2. The written form of a word,
3. The grammatical behavior of the word,
4. The collocational behavior of the word,
5. The frequency of the word,
6. The stylistic register constraints of a word,
7. The conceptual meaning of a word, and
8. The associations a word has with other related words.

Based on these aspects, Nation (1990) outlined a comprehensive concept of word knowledge, including form, meaning, and use. The learners must possess this knowledge, both receptively and productively, in order to have complete command of a word. According to the three main aspects, word form refers to pronunciation, spelling, and part of speech, whereas word meaning refers to the connection between form and meaning, conceptual referents, and word associations. Finally, word use is the ability to use the word in the appropriate context (Nation, 2013). As such, understanding these three aspects for each word or phrase actually involves 18 different types of lexical knowledge, as summarized in Table 1.

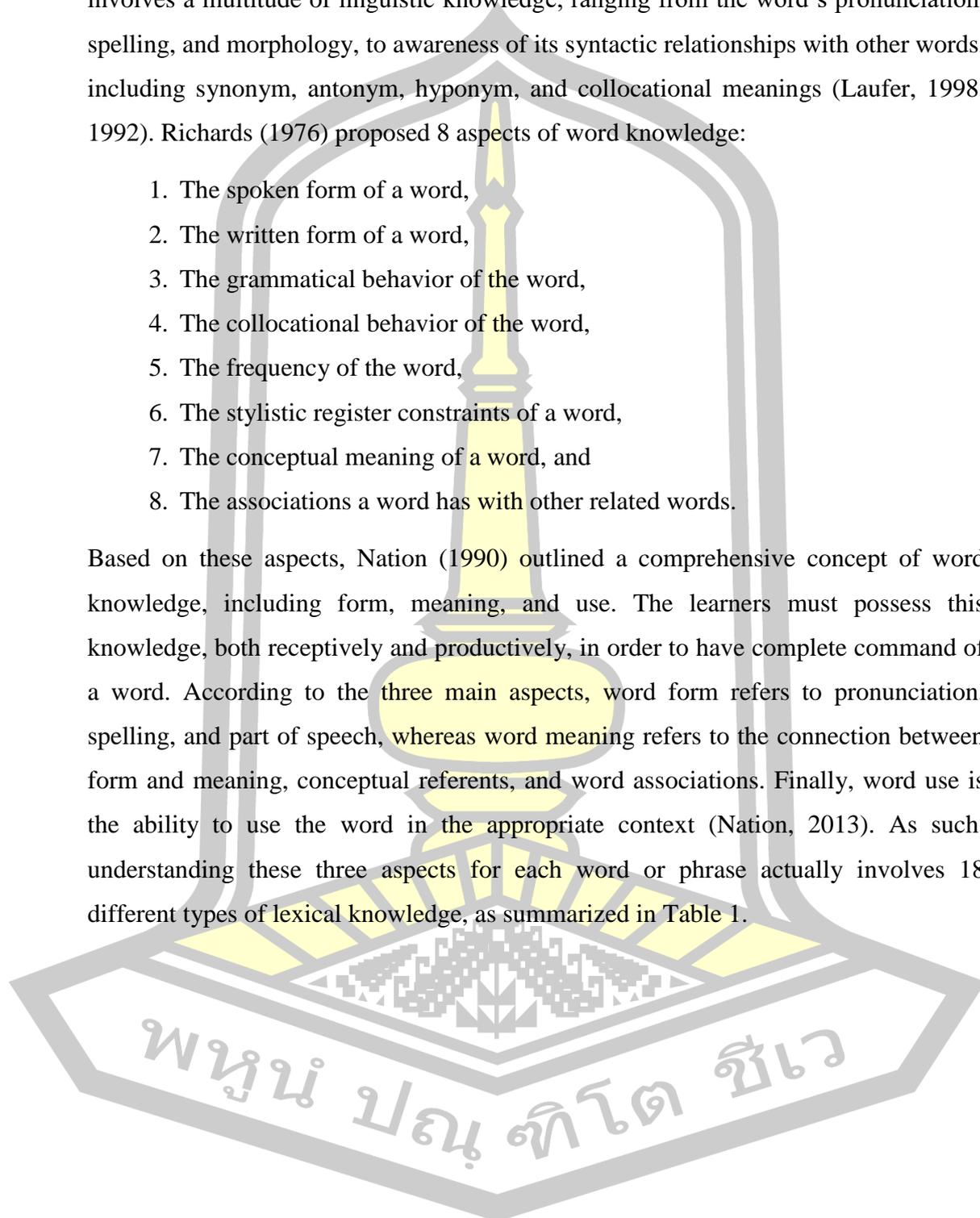


Table 1: Aspects of word knowledge (Nation, 2013)

<b>Form</b>	spoken	R	What does the word sound like?
		P	How is the word pronounced?
	written	R	What does the word look like?
		P	How is the word written and spelled?
	Word parts	R	What parts are recognizable in this word?
		P	What word parts are needed to express the meaning?
<b>Meaning</b>	Form and meaning	R	What meaning does this word form signal?
		P	What word form can be used to express this meaning?
	Concepts and referents	R	What is included in this concept?
		P	What items can the concept refer to?
	Associations	R	What other words does this make people think of?
		P	What other words could people use instead of this one?
<b>Use</b>	Grammatical functions	R	In what patterns does the word occur?
		P	In what patterns must people use this word?
	Collocations	R	What words or types of words occur with this one?
		P	What words or types of words must people use with this one?
	Constraints on use	R	Where, when, and how often would people expect to meet this word?
		P	Where, when, how often can people use this word?

*Note:* R = receptive knowledge, P = productive knowledge

All forms of word knowledge require both receptive and productive knowledge. Receptive knowledge of the spoken form refers to the ability to recognize the word when it is heard. By contrast, productive knowledge form refers to the ability to produce it in speech to express meaning. Recognizing a word separated from other words may not be easy in speech because the words are run together and are not obviously separated by gaps. Speech is usually heard once only, and there is little opportunity to go back and review the speech. Listeners may rely on the context and on the correct anticipation of meaning in the streams of sounds that may have several possible interpretations (Brown & McNeill, 1966).

Receptive knowledge of the written form of a word refers to the recognition of a word when it is met in reading, whereas productive knowledge is the ability to write a word correctly. Written word recognition is the ability of a reader to recognize words correctly and effortlessly. Nation (2013) focuses on spelling as the process of translating sounds into appropriate graphemes. But this can be quite demanding when more than one language is involved and when these languages do not share the same

alphabet. In addition, when the learner encounters a new word, they must be able to understand its meaning, including the context and morphology of the word.

Morphemes refer to the form of a word, and word parts refer to morphological knowledge comprised of several morphemes. Word parts in English can be defined as affixes, including prefixes and suffixes (Nation, 2013). Affixes attaching to a base form can contribute to the overall meaning of the word. Word parts are usually implicit to language learners but are seldom explicitly taught. Knowing what parts are recognizable in a word and what parts are needed to express a given meaning can contribute to word knowledge (Nation, 2001; Thornbury, 2002).

Knowledge of form-meaning links involves the recognition and production of a word. Knowing the linking knowledge of word form and word meaning is an early stage of learning a new word. L2 learners create this link partly depending on their morphological knowledge regarding the new word, as morphemes encode semantic information (Henderson, 1982). For example, before being able to produce a form of a word, learners first recognize the meaning of a word (Laufer & Goldstein, 2004). Receptive knowledge would involve linking an L2 form to the concept and meaning, while productive knowledge would require a link in the other direction; that is, the meaning or concept to its form in the L2.

Knowledge of conceptual references is also included in the word meaning. Concept and referents are networks of knowledge and meaning that are established in L1 and do not need to be re-established and recreated for L2 knowledge. However, the creation of concepts and referents in L1 takes considerable time. As such, learners may not have fully developed this capacity in L1 before trying to add this capacity in L2 (Nation, 2001). These words may share the same form and part of speech and are sometimes derived from different sources, Old Norse and Latin. Words that have the same form but have unrelated meanings are called homonyms (the same written and spoken forms), homographs (the same written form but different spoken form), and homophones (the same spoken form but different written form).

The last meaning aspect of a word is the associations of a word (Nation, 2013). Word associations can be described as the semantic relationships between the large numbers of English words (Miller & Fellbaum, 1991). It is necessary to differentiate between parts of speech to describe the organizational structure of the word. The most pervasive and vital relationship is synonymy, but nouns, adjectives, and verbs, each use preferred semantic relations and have their own kind of organization.

Finally, the function of a word is considered as the process of word learning, including knowledge of grammatical functions, collocations, and constraints on use. Knowledge of grammatical functions of a word often depends on parallels between L2 and L1 and similarities in the grammatical role between words with related meanings. If the grammatical patterns are similar between L1 and L2, the learning burden will be lighter. Likewise, if words with related meanings, such as run and walk, follow similar patterns, the learning burden of one of these words will be lighter because the previous learning of the other word will act as a guide.

Collocation can be typically viewed as an aspect of “idiomatic” English. L2 or EFL learners may produce some expressions that are described as “grammatical” but not necessarily as “idiomatic.” Word collocations consist of two or more words that frequently occur together. Such combinations sound “natural” to native English speakers and are judged as “correct.” However, other combinations sound “unnatural” and are assessed as “wrong.” Word collocations are divided into two categories: lexical and grammatical. Lexical collocations typically refer to the combination of two or more content words such as nouns, verbs, adjectives, and adverbs (for example, make mistakes, heavy smoker, deeply concerned, whisper softly), while grammatical collocations present the association of these words with a certain preposition, such as interest in, insist on, happy with, independently of. There are several factors that limit where and when certain words can be used (Nation, 2001). Constraints on use can arise from the way the word is translated into the first language or from the context in which the word is used. In some languages, there are severe constraints on the words used to refer to people, particularly in showing the relationship of the speaker to the person to whom they refer. Learners may anticipate

this and be particularly cautious in this area when using a second language (Henriksen, 2013).

In summary, multiple aspects of word knowledge need to be acquired before complete mastery is achieved (Nation, 2001; Schmitt, 2000). Obtaining comprehensive knowledge of a word requires an understanding of all nine aspects of knowledge, both receptively and productively. Nevertheless, learners may acquire the knowledge of some aspects, such as spoken and written forms of a word, before or after attaining the word meaning. For instance, learners may learn a single meaning in a context and then they will gradually learn other meanings. The function of a word may be the most difficult knowledge to be completed because the learner must first acquire other aspects of word knowledge. For instance, the deep understanding of word usage such as register or pragmatic constraints, and collocations may be learned relatively late because they demand knowledge of the lexis and grammar.

Overall, vocabulary learning is considered the constitution of mental lexicon (Laufer, 1998; Schmitt, 2000). The mental lexicon is a set of word knowledge that may be learned at different stages throughout the learners' language development. Word knowledge consists of word usage that can be further classified as a receptive and productive use of vocabulary. Thus, vocabulary acquisition is an on-going process, as learners gain deep and thorough lexical knowledge.

### **2.1.1 Receptive and productive knowledge of a word**

Word knowledge has been dissected into receptive and productive knowledge (Laufer & Goldstein, 2004; Nation, 2013), and vocabulary is the foundation of both these types of knowledge. In most cases, the validity of the receptive versus productive distinction depends on the contrast between the receptive skills of listening and reading, and the productive skills of speaking and writing (Crow, 1986). Receptive is defined as receiving language input from others through listening or reading and trying to comprehend it. Productive is defined as producing language forms by speaking and writing to convey messages to others.

Laufer and Paribakht (1998) argue that one of the essential aspects of vocabulary knowledge is the link between receptive and productive knowledge. Receptive vocabulary is used for comprehension, while productive vocabulary is used for

production (Henriksen, 1999; Zareva, Schwanenflugel, & Nikolova, 2005). Gairns and Redman (1986) defined receptive vocabulary as language items that can be recognized and understood in the context of reading and listening material, and productive vocabulary as language items that learners can recall and use appropriately in speech and writing. Nation (2001) clarifies that receptive knowledge is associated with listening and reading tasks that require the perception of the form of the word and its meaning, while productive knowledge is linked to speaking and writing. In addition, "knowing students' receptive vocabulary size provides teachers with a gauge as to whether those students will be able to comprehend a text or a listening task, whereas knowing their productive vocabulary size provides some indication as to the degree to which students will be able to speak or write" (Webb, 2008).

The terms passive (for listening and reading) and active (for speaking and writing) are sometimes used as synonyms for receptive and productive (Corson, 1995; Laufer, 1998; Meara, 1990). The terms 'meaning recognition' and 'meaning recall' are also used for receptive knowledge, and 'form recognition' and 'form recall' are used for productive knowledge (Schmitt, 2010). Indeed, receptive vocabulary use involves perceiving the form of a word while listening and reading and retrieving its meaning. Productive vocabulary use involves wanting to express meaning through speaking or writing and retrieving and producing the appropriate spoken and written word form.

Receptive and productive dimensions represent a continuum in word learning. Indeed, receptive and productive skills are interrelated; receptive skills can promote productive use while productive features can be fostered in receptive skills (Corson, 1995; Nation, 2013). Learners do not seem to acquire all aspects of word knowledge simultaneously. Instead, learners acquire each aspect of word knowledge at various levels at any point in time.

To summarize, receptive learning and use are generally acquired before productive learning and use. Productive learning is more difficult since learning new spoken or written output patterns is needed (Crow, 1986). Receptive use may only need learners to know a few distinctive features of the form of an item. Productive use of a word requires more precision in the knowledge of word form. Moreover, productive knowledge includes all the knowledge necessary for receptive use (DeKeyser &

Sokalski, 1996). There is some evidence that both receptive and productive learning require particular practice to be suitably learned (Laufer & Goldstein, 2004).

## **2.2 Definition of word learnability**

Words are a result of a long and incremental process of learning (e.g., Schneider, Healy, & Bourne, 2002). The process of learning a word occurs on a developmental continuum and word knowledge concerns different aspects of a word that are closely interrelated. Word knowledge involves different degrees of knowing, starting with a superficial familiarity with the word, and ending with the ability to use it in context (Laufer & Goldstein, 2004). As such, some aspects may be acquired before others. For example, L2 learners may achieve the spoken and written form of a word, and/or the meaning of a word, before the function of a word (Nation, 2013).

Word learnability is defined as the ability to learn a word by understanding the conceptual roles of a word. It also refers to the extent to which a word can be learned without difficulty. Word learnability is a crucial factor in L2 vocabulary acquisition because it represents the ease or difficulty with which a given word can be learned (Bogaards & Laufer, 2004). Laufer (2013) adds that in order to understand word difficulty, it is essential to know the specific construction of a word. Thus, an understanding of the crucial roles of word knowledge can enhance vocabulary development. Consequently, a variety of different kinds of interrelated knowledge of a word may cause the word to be learned with difficulty and incompletely, particularly for L2 learners. The ease or difficulty of learning a word, therefore, depends on the roles of the word itself. Understanding the roles of word knowledge can help to effectively recognize and/or recall a word.

## **2.3 Measuring word knowledge**

Measuring word knowledge is essential for evaluating learners' overall language proficiency, and indicates learners' language performance of word knowledge (Anderson & Freebody, 1981; Nation, 2001; Palmberg, 1987; Staehr, 2008; Vermeer, 2001). There are many different measures to capture learners' abilities of different aspects of a word depending on the purpose. Different researchers recommend different vocabulary tests, depending on their view of vocabulary knowledge.

In the area of vocabulary testing, most tests of word knowledge capture one aspect of a word depending on the test designer's definition of lexical knowledge (Laufer & Goldstein, 2004). However, some tests aim to simultaneously measure several aspects of knowledge (Read, 1988; Schmitt, 1999) and some tests attempt to assess the learners' progress along a continuum of knowledge (Wesche & Paribakht, 1996).

Vocabulary assessment includes three dimensions (Read, 2000). In the first dimension, a discrete design necessitates an individual item, whereas an embedded feature implies a broader construct (e.g., reading). More specifically, discrete is a measure of vocabulary knowledge or use as an independent construct, and embedded is a measure of vocabulary that forms part of the assessment of some other larger construct. In the second dimension, a selective design accentuates particular words by measuring learners' knowledge of connotation and use of the words in an appropriate text. A selective design is used to measure which specific vocabulary items are the focus of the assessment. By contrast, a comprehensive design is a measure that takes account of the whole vocabulary content of the input material. In the final dimension, a lexical item refers to a multiple-choice question without context; that is, learners must use the contextual information of the provided passage to select the correct response to the test item. A lexical item dimension includes a context-dependent and context-independent design. A context-dependent design is used to assess learners who are capable of speaking and writing, while contextual information is needed for learners' production of language communication. Context-independent is a vocabulary measure in which the test-taker can produce the expected response without referring to any context; whereas, context-dependent is a vocabulary measure that assesses the test-taker's ability to explain contextual information in order to produce the expected response.

Read (2000) also suggests that word knowledge can be captured differently by distinguishing receptive and productive knowledge scales. Discrete-selective and contextualized-decontextualized formats center on recognition and recall of the form and meaning of words. Recognition refers to the ability to demonstrate comprehension of the sense of a word by choosing another word with the same connotation. In contrast, recall refers to the ability to mentally retrieve a stimulus.

Both recognition and recall formats are presented in L1-L2 translation. Recognition is the ability of identification in the L2 form, while recall is the ability of production in the form of L2. However, recognition and recall are often separated from comprehension and use (Read, 2000). Comprehension and use are often measured with embedded comprehensive vocabulary tests. Within the context of vocabulary tests, comprehension refers to reading comprehension. Learners are tested on how well they understand the target word in the context. Use can be captured by analyzing the item produced in a task in response to the target word.

Vocabulary batteries focus on testing word meanings, using the word base as a basic unit of recognition (Laufer & Goldstein, 2004). To illustrate, learners may know the meaning of the word 'sugar,' but may not realize that it is used as an uncountable noun. They may write: I put many sugars into my coffee. This sentence may be understood despite the syntactic mistake. Following Nation's (2001, 2013) vocabulary knowledge criteria, word knowledge includes form, meaning, and use. The facets of form and meaning empower learners to produce a word correctly in context. Nation also notes that receptive and productive knowledge of vocabulary must cover all facets of a word to produce a deep understanding of words. Test designers appear to tap into different facets of vocabulary depending on the primary purpose of vocabulary batteries and the context. For example, vocabulary tests are likely to be employed by a classroom language teacher in order to measure students' learning progress in individual lexical items and identify their areas of weakness. By contrast, researchers may use vocabulary measurement to develop testing instruments that capture learners' overall language proficiency and achievement. Therefore, prior to vocabulary testing, one must use suitable means for selecting the sampling words used to test learners' vocabulary.

พหุ ประถมศึกษา

### 2.3.1 Measures of word knowledge

Receptive knowledge of vocabulary can be measured through matching, multiple-choice, and yes/no formats. Commonly used tests include the Vocabulary Levels Test (VLT), the Vocabulary Size Test (VST), and the Eurocentres Vocabulary Size Test (EVST).

The Vocabulary Levels Test (VLT) was designed by Nation (1983, 1990) and involves matching word definitions. Test-takers are required to match target words with the given connotations. All of the target words in each set of vocabulary batteries should be presented in the same part of speech to avoid providing any suggestions on the association of the word category. The VLT is simple to administer, score, and analyze and provides an idea of the size of individual frequency levels, including high-frequency and academic words. The information gained from the VLT is beneficial to those in pedagogical settings and reveals whether students meet the lexical thresholds of comprehension that are necessary to deal with specific language production, such as speaking and reading comprehension. The tests should be validated for specific purposes (Beglar & Hunt, 1999; Schmitt, Schmitt, & Clapham, 2001). As such, the prompt words are considered a key factor for measurement and should be appropriate to the capability of learners. With the advent of computers, words are now classified in terms of bands, based on the frequency with which they occur. The VLT retains words from five-word frequency bands and academic vocabulary. The VLT test words are taken from the 2,000-word, 3,000-word, 5,000-word, 10,000-word bands and the University Word List (Guoyi & Nation, 1984) or the Academic Word List (Coxhead, 2000). Examples are shown below (Schmitt, Schmitt, & Clapham, 2001, pp. 82-83):

- |   |          |                              |
|---|----------|------------------------------|
| 1 | business |                              |
| 2 | clock    | 6 part of a house            |
| 3 | horse    | 3 animal with four legs      |
| 4 | pencil   | 4 something used for writing |
| 5 | shoe     |                              |
| 6 | wall     |                              |

The Vocabulary Size Test (VST) was designed by Nation and Beglar (2007) and validated by Beglar (2010). It is presented as a multiple-choice format with target words embedded in a non-defining context. The multiple-choice format test of vocabulary presents a decontextualized or contextualized group of a word and a group of different meanings. The test requires that participants choose the correct meaning from four options, one correct meaning, and three distractors. It is presented in both written and spoken forms and is most frequently used in assessing lexical knowledge (Anderson & Freebody, 1981; Read, 2000) and is also simple to administer, score and analyze. However, it should be noted that multiple-choice vocabulary tests can be unreliable because there is a risk of guessing the accurate response in a four-choice response. The word selection criteria are the same as the VLT except that the VST uses 14-word bands from Nation's (2006) word list. Nation (2006) classified groups of words in frequency bands of 1,000 words each. The initial frequency list comprised 14 bands, but it was later updated to 25 bands. An example question from the VST is shown below (Nation & Beglar, 2007, p.75):

1. poor: we are poor.
  - a. have no money
  - b. feel happy
  - c. are very interested
  - d. do not like to work hard

The Eurocentres Vocabulary Size Test (EVST) was designed as a yes-no test or as a checklist test (Read, 2000; Schmitt, 1994). The test presents a representative sample of words in a range of frequency levels. The test-taker is required to tick or mark Yes or No to indicate whether the given words are known or not. The Yes/No vocabulary test is attractive because it presents a large number of lexical items in the test battery (Meara & Buxton, 1987; Read, 1988; Wesche & Paribakht, 1996). Previous studies using the EVST have shown that test-takers have a tendency to overrate their knowledge with the words that were not truly known by selecting uncertain words (Schmitt & Meara, 1997; Schmitt, 1994; Sukying, 2017) As such, the list of target words contains non-words such as one non-word item for every two real words. The EVST was validated in different versions by Meara and Buxton (1987), Meara and

Jones (1988), and Meara (1996). An example is illustrated below (Meara & Buxton, 1987, p. 154):

(Tick the words you know the meaning of, e.g., forecast)

1. gathering
2. strap
3. untamed
4. royalment
5. flane
6. article
7. risent
8. instructness

All of the tests above have been standardized as placement indicators. With empirical evidence establishing an association between the number of words known and overall linguistic proficiency, the tests can be used to assign students to different language proficiency levels. The VLT is the most widely used in research and pedagogical purposes (Ishii & Schmitt, 2009; Read, 2007a; Schmitt et al., 2001).

The tests can also be used to make estimates of receptive knowledge needed for different activities. For example, receptive knowledge of the most frequent 3,000 word families may allow students to understand complicated texts, which could account for 95% of a running text (Laufer, 1992). The concept of “word families” refers to headwords and their family members, which include their inflections and derivations, such as the members of “Accept”: accepted, accepts, acceptability, acceptable, accepting, and unacceptable.

In addition, the Word Segmentation (WS) Task, created by Hayashi and Murphy (2011) is used to measure receptive knowledge of morphological awareness. It involves breaking down word components into morphemic parts. The WS task consists of 34 target words and aims to elicit both class-changing and class-maintaining derivational affixes and inflectional suffixes. The lexical items are comprised of different numbers of affixes, depending on the internal morphological structure of the word. For example, unkind has one prefix (un- + kind), while unkindly has two affixes (un- + kind + -ly). All the target affixed elements, including their frequency bands, are examined with the frequency data from Francis and Kucera (1982).

Productive knowledge consists of controlled productive knowledge and free productive knowledge. Controlled productive knowledge can be measured via the Productive Vocabulary Levels Test (PVLТ). The PVLТ was designed by Laufer and Nation (1995, 1999). The test measures productive knowledge of vocabulary as a sentence-writing task or in a controlled context ('fill-in-task') in which the missing word within a prearranged sentence needs to be provided. The first few letters of the prompt word are provided to avoid non-target words that may fit semantically in the allocated sentence. Examples are shown below (Laufer & Nation, 1995, pp. 320):

1. They will restore the house to its orig\_\_\_\_\_state.
2. The tot\_\_\_\_\_ number of students at the university is 12,347.

The free productive knowledge can be measured through lexical richness and association tasks. Based on Schmitt (2010) and Laufer and Nation (1995), the Lexical Frequency Profile (LFP) is one of the most widely used frequency-based, free productive knowledge tests of vocabulary. The LFP is a measure of lexical richness in writing that counts the numbers of word tokens in a text and distributes these word tokens among four frequency levels, which are derived from standardized word frequency lists. The LFP is used to measure the related proportion of words that a learner can use in free production. The four frequency lists by Laufer and Nation are:

1. Band 1 the most common 1,000 words in English,
2. Band 2 the next most common 1,000 words in English,
3. AWL the Academic Word List, an updated version (Coxhead, 2000), and
4. Not in the lists less frequent words.

Test-takers are required to write an essay and calculate it in a computerized system. The latter weighs a number of words in each frequency level against the total word families in the piece of writing. The more words from infrequent bands that are used, the more proficient the learner.

Lex30, created by Meara and Fitzpatrick (2000), can be used to measure productive knowledge of word associations. The test requires a set of word associations to be produced. Lex30 consists of 30 words, all from the first 1,000 most frequent words of Nation's list (1984). Test-takers are required to provide at least three associates

according to the target word. The associated words produced by test-takers are lemmatized through a computerized system that reports the frequency of each word. Meara and Fitzpatrick noted that although the Lex30 test appeared to be measuring the recall dimension of productive vocabulary (Read, 2000), it provided no information regarding learners' ability to use that vocabulary. The Lex30 test is a useful test for providing information about one aspect (productive recall) of vocabulary knowledge and is appropriate for using alongside other tests of vocabulary knowledge.

With regard to the LFP and Lex30, the frequency of the words is a crucial scoring criterion and only words from the 2,000-word band and beyond are given credit. Both tests were validated and proved to discriminate the linguistic proficiency levels (Laufer, 2005 for the LFP and Fitzpatrick & Clenton, 2010; Walters, 2012 for Lex30). However, they have not been evaluated in their ability to assess collocations, which are an important aspect of production knowledge. Neither of the tests have been standardized because of the limit of the breadth of the generalizability of their results (Nizonkiza & Van de Poel, 2014).

Building on Nation's (2001) morphological task, the Affix Elicitation (AE) Task was designed by Hayashi and Murphy (2011) to measure productive knowledge. The format of the test includes 34 items consisting of 10 inflectional suffixes, 12 class-changing derivational affixes, and 12 class-remaining derivational affixes. An equal number of grammatical functions consisted of six adjectives, six adverbs, six verbs, and six nouns. Examples are shown below (Hayashi & Murphy, 2011, pp. 119):

1. I went to the doctor for a consultation. (consult)
2. Normally she intensifies the effect by turning off the lights. (intensify)

Additionally, the translation test can be provided in receptive and productive formats and can focus specifically on measuring meaning. Translating L1 to L2 is productive knowledge, while L2 to L1 can be receptive knowledge of learning. The L1-to-L2 Productive Translation Test, based on Barcroft and Rott (2010), requires test-takers to recall a word whereas the L2-to-L1 Receptive Translation Test requires test-takers to provide an L1 translation of a word. The main objective of the test is to translate

language from L1 to L2 or L2 to L1 depending on the purpose. Test-takers are required to think of a word receptively (L2 to L1) or productively (L1 to L2).

#### **2.4 Previous research on word knowledge**

Many researchers have studied vocabulary acquisition to improve vocabulary learning. This section will outline previous studies in vocabulary knowledge, including studies in an EFL context in a Thai context and other countries.

Research has been conducted on understanding the multiple aspects of a word and their contribution to L2 vocabulary acquisition. For instance, Lin (2015) conducted L2 word processing to determine the assumption of L2 word learnability that much-related knowledge of a word affected positively the learnability of a word. The perspective of a word was reviewed in qualitative data. The findings revealed that orthographical and morphological knowledge was closely related to English vocabulary development. This suggests that knowledge of multiple aspects of a word influence L2 vocabulary learning. Lin (2015) also studied L2 word learnability, focusing on the written form of words. The study attempted to test the hypothesized relationships between multiple aspects of a lexical item and their impact on acquiring the L2 words by using participants across diverse linguistic groups. The tests were designed to measure the extent of metalinguistic knowledge and morphology and orthography affecting L2 word learnability, the extent of learners' L1 affecting L2 word learnability, and the extent of word length affecting L2 word learnability. The data were collected from 141 participants, including Chinese-speaking, Japanese-speaking, and Spanish-speaking university students. The findings showed that the familiarity of L1 and L2 could contribute to the learning of L2 words. It also revealed that L2 learners could acquire a word by related lexical knowledge components; for example, affix knowledge may enhance the processing of new words with a prefix-base-suffix structure and also facilitate word decoding skills and spelling. As such, different knowledge components of a word together affected the ability to learn a word.

Laufer and Goldstein (2004) studied vocabulary knowledge testing. The study focused on the aspect of word meaning to check a combination of four aspects, including passive recognition, active recognition, passive recall, and active recall. It

was conducted with 435 L2 learners and investigated whether the hierarchy was valid and which strength modality best correlated with classroom language performance. The results showed that passive recall was the best predictor of classroom language performance and that growth in vocabulary knowledge was different for each strength modality. It was also revealed that the different four aspects of knowledge were closely related and can promote the capability of learning a word. Therefore, there is a relatively positive relationship between receptive and productive knowledge of a word.

Schmitt and Meara (1997) investigated the relationship between different aspects of a word by focusing on how word association and grammatical suffix knowledge changed over time, both receptively and productively. There were three groups of participants, first-year and last-year university students, and last-year high school students. The participants' vocabulary knowledge was measured by assessing word associations and inflectional and derivational suffixes for the verbs. Students demonstrated rather poor knowledge of the word derivation, even for words rated as known, and poor word production, even if they had known the meanings. It was also found that the vocabulary components correlated with the overall size of students' receptive and productive vocabulary and general language proficiency. This indicates that there were relationships between different aspects of word knowledge and their influence on vocabulary learning.

Nizonkiza (2016) studied the receptive and productive use of academic vocabulary by using the Academic Word List (Coxhead, 2000). Participants were 204 first-year university students, and they were given a test battery, including the PVLTL, to assess the productive ability of collocations and the VLT to measure receptive knowledge of vocabulary. The results showed that receptive vocabulary knowledge was readily obtained, but productive knowledge lagged behind and remained problematic. The findings revealed that the relationship between receptive and productive knowledge was slightly above 50%, which lent empirical support to previous findings that the relationship between the two aspects of vocabulary knowledge is positively correlated (Milton, 2009).

Despite this research, there are only a few studies that have investigated L2 word learnability and/or L2 word processing and the effect on vocabulary acquisition in a Thai EFL context. For example, Sukying (2017) studied the relationship between receptive and productive affix knowledge and vocabulary size in an EFL context. The study examined the strength of the relationship between affix knowledge and vocabulary size in Thai EFL learners (high school students). Specifically, the study aimed to quantitatively investigate the connection between receptive affix knowledge and receptive vocabulary size, productive affix knowledge and productive vocabulary size, and combined affix knowledge and overall vocabulary size. Three measures were administered to assess subjects including a receptive affix knowledge (RAK) task, a more-controlled productive affix knowledge (MPAK) task, and a less-controlled productive affix knowledge (LPAK) task. Correlational and multiple regression analyses were used to examine the relationship between different dimensions of affix knowledge and vocabulary and to determine the statistical contribution of variance in affix knowledge to vocabulary. The results revealed a relatively positive relationship between Thai EFL learners' receptive and productive affix knowledge and their receptive and productive vocabulary size. Furthermore, Thai EFL participants' affix learning followed a five-stage taxonomy of affix acquisition: inflections, prefixes, verbs, nouns, and adjectives, and adverbs.

Furthermore, Sukying (2019) also conducted a follow-up study focusing on receptive and productive affix knowledge in EFL learners. The study examined 486 students in grades eight to eleven at a public school under a university administration in northeastern Thailand. The study investigated the extent to which receptive and productive affix knowledge contributes to vocabulary size in the EFL context. Three measures were used, including the RAK, MPAK, and LPAK. Students demonstrated varying degrees of affix knowledge, and there was a close relationship between receptive and productive affix knowledge.

In addition, Sukying (2018) studied the acquisition of English affix knowledge in L2 learners. This study focused on productive affix knowledge of 32-word families and the relationship between L2 learners' productive affix knowledge and their vocabulary in a Thai university context. Participants were 62 English major students, and two

tests were administered sequentially: 1) The Vocabulary knowledge Scale and Productive Vocabulary Levels Test, and 2) the Productive Affix Knowledge Task. The results revealed that the participants rarely recalled all forms of the word family. The participants also showed incomplete knowledge of word families, and this knowledge appeared to be incremental. Overall, the study provided evidence that morphological knowledge can promote the learnability of a word.

In conclusion, the findings of the previous studies provide empirical evidence that many related aspects of word knowledge can facilitate vocabulary acquisition and language development. These findings support previous claims that the development of the L2 lexicon is complex and incremental. Future research should focus on longitudinal studies designed to more precisely examine this mechanism, including internal and external factors, to provide additional important pedagogical and theoretical implications. Future studies should also attempt to capture partial word knowledge and explore the wide variations in vocabulary. Indeed, at present, most studies have focused only on one or two aspects of word knowledge. As such, these studies are unable to explain the process of vocabulary acquisition or the mechanisms by which multiple aspects of a word interrelate. Word learnability is required to investigate the conceptual process of learning a word, including form, meaning, and use, in order to understand the roles of word knowledge in developing learners' vocabulary. L2 word learnability in a Thai EFL context may, therefore, provide useful information for developing Thai EFL learners' vocabulary learning and use.

### **2.5 Rationale for selecting the aspects of a word for the current study**

The various aspects of word knowledge are interrelated. Indeed, learning a word occurs on a continuum, starting with a superficial familiarity with the word and ending with the ability to use it in context (Laufer & Goldstein, 2004). Using a word knowledge framework, it is desirable to observe all 18 components of lexical knowledge. However, this will increase the number of words to be dealt with, possibly leading to a heavy learning burden. The current study will focus on knowledge of word parts, form-meaning, and collocations. Together, these attributes include the three main aspects of learning a word: form, meaning, and use. These three aspects are acquired by incidental learning. For native speakers, these can be

naturally attained, while non-native speakers learn through experience. The environment and the opportunity to expose a language are, therefore, critical for learning.

Knowledge of word parts can also be referred to as affixation. Affix knowledge can be used to measure the receptive and productive performance of learners. Based on Schmitt and Meara (1997), learners may know a root word and understand the meaning of a word, but they may not recognize a derived word. Word meaning also needs to be measured when assessing the process of learning a word. Knowledge of form-meaning is the links that connect or relate words in the form and meaning of a word. Linking knowledge of word form and word meaning is an initial stage of learning a new word. Before the production of a word, learners first recognize the comprehensive meaning of a word (Laufer & Goldstein, 2004). For example, receptive knowledge would involve linking an L2 form to the concept and meaning, while productive knowledge would require a link in the other direction, such as the meaning or concept to its form in the L2.

Knowledge of word collocations can also be used to measure the ability to use a word and is the final stage of learning a word. This category is difficult to acquire and sometimes is never mastered. Adjective-noun collocations are frequently used in the literature (Nizonkiza & Van de Poel, 2014; Skory & Eskenazi, 2010) as this type of collocation is more common for learners in basic instruction.

To summarize, a word knowledge framework can be used to better understand the roles of different aspects of a word. Learning a word is a developmental continuum process. It starts with comprehensive knowledge and ends with the ability to use the word. Therefore, investigating the relationships between word knowledge can provide critical information as to how words are acquired.

## **2.6 Summary of the current study**

Vocabulary is essential for mastering a language and words are a critical component of vocabulary learning. Research on vocabulary acquisition has shown that learning a word involves various aspects and each of these aspects represents a different burden for learners. All the aspects of a word can contribute to the word learnability; that is,

the ease or difficulty with which the word is learned, both receptively and productively.

Based on Nation's (2013) framework of a word, the current study defines receptive knowledge of a word as the recognition of a word, whereas productive knowledge of a word is the ability to recall and produce a word in context. The list of word knowledge is considered a taxonomy of word knowledge. It uses a difficult level of morphological complexity to capture one's knowledge of a word. The notion that eighteen different tests (each aspect may require separate receptive and productive measures) are required to measure a learner's knowledge of a word is daunting. Thus, Nation suggests that it is necessary to use test items that are equivalent in all features that affect difficulty. Given the distinction between receptive and productive knowledge scale, there should be separate scales for each type of knowledge. The test should conform to what is being measured, and the definition of receptive and productive vocabulary knowledge should be clear and concise. Also, each aspect of word knowledge should be measured both receptively and productively (Webb, 2005).

The current study aims to investigate the receptive and productive word learnability with different aspects of a word. It seeks to understand the effect of these aspects on the ease or difficulty of learning the vocabulary of a second language (L2). Specifically, the aim of this study is to examine the relationship between different aspects of a word, both receptively and productively. Therefore, the current study will measure learners' word knowledge (form, meaning, and use) to understand the relationship between word knowledge and its impact on the word learnability in vocabulary development. The three aspects of a word are assessed by different measures, as shown in Figure 1. Receptive knowledge of word form is assessed by the Word Segmentation Test (WST), while productive knowledge of word form is measured by the Affix Elicitation Test (AET). Receptive knowledge of word meaning is assessed by the L2 Translation Test (L2TT), and productive knowledge of word meaning is measured by the L1 Translation Test (L1TT). Finally, receptive knowledge of word use is assessed by the Collocation Recognition Test (CRT),

whereas productive knowledge of word use is measured by the Productive Collocation Recall Test (PCRT).

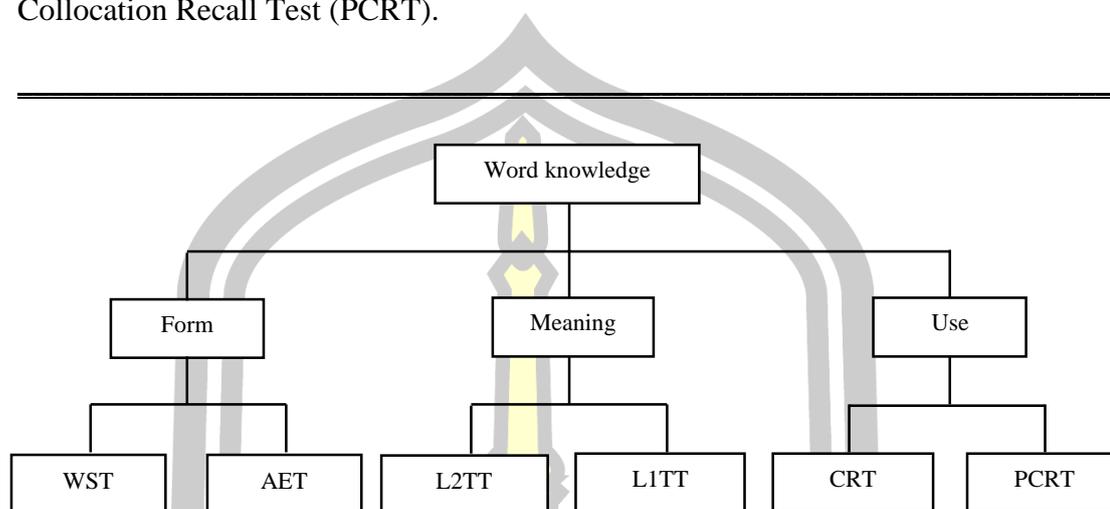


Figure 1: Measurement of word aspects

To operationalize word knowledge and to develop test instruments that can measure EFL learners' receptive and productive word knowledge within the context of research design, the current study uses concepts from testing theory and language testing research. However, this study will limit itself to primarily drawing on research within the field of vocabulary testing and, in particular, will emphasize the assessment of receptive and productive lexical knowledge. It is noted that receptive and productive knowledge of a word is often conceptualized with regard to what is made possible by test instruments, and the construct often becomes an artifact of the test instruments implemented to measure it (Webb, 2005). As such, an essential aspect of reviewing how this construct is defined in a different research context is to investigate the way in which it is operationalized. In view of this, concepts associated with lexical testing will be used in the current study. Additionally, the measures of word knowledge developed and piloted in the current study are intended as research tools that can be used for the investigation of learners' receptive and productive word knowledge within the context of research design. No attempts have been made to develop generic and practical receptive and productive word knowledge tests that might be used for other types of research or pedagogical purposes. The next chapter will discuss the research methodology used in the current study.

## CHAPTER III

### RESEARCH METHODS

The rationale of the current study was to investigate English as a Foreign Language (EFL) learners' word knowledge. Word learnability is the ease or difficulty of learning a word based on the positive correlation between receptive and productive word knowledge, including the three aspects of a word, form, meaning, and use (Nation, 2013). This chapter outlines the research methodology of the current study, including the participants, instrumentation, methods, procedures, and data analysis for both the pilot study and the main study. Generally, the methodology follows previous studies in the domain of receptive and productive word knowledge testing (e.g., Bogaards & Laufer, 2004; Harrington & Carey, 2009; Hayashi & Murphy, 2011; Laufer & Nation, 1995, 1999; Lin, 2012; Nation, 2013; Sukying, 2017; Supasiraprapa, 2019).

#### **3.1 Participants and setting**

The current study was conducted at a typical semi-urban, provincial high school under the administration of a government university in the northeast of Thailand. The high school was selected on the basis that students had a range of English language abilities varying from advanced beginners to upper-intermediate. Additionally, their families also represented a range of socioeconomic and vocational backgrounds. The class size at this school varied from 30 to 50 students.

The participants were 261 Thai students in tenth, eleventh, or twelfth-grade high school, who had studied English for more than 10 years. All participants were EFL students and ranged between 16 to 18 years of age at the time of data collection. Participants were given a battery of tests before the study to measure their ability to learn a word. The participants had not received any training in the types of tasks used in the current study.

With regard to three different English proficiency levels, the senior high school students were grouped as the intermediate level. These students were all able to use high-frequency vocabulary and were capable of continuing their English studies at a higher level of academic education. The word knowledge of this group was considered consistent with their education level. Indeed, the earlier findings revealed

the requirement of vocabulary for the EFL learners: high frequency words (86%) and academic words (10%) (Hayashi & Murphy, 2011; Sukying, 2017).

All participants were Thai native speakers using their L1 to communicate with their friends or classmates at school, and none had studied English in an English-speaking country. The participants received an average of four hours of English instruction per week, including four 50-minute English sessions with EFL teachers and one 50-minute session with native English speakers. Consistent with the Office of the Basic Education Commission (Ministry of Education in Thailand), all participants had been enrolled in EFL classes for a minimum of ten years as a mandatory subject. In addition, while they had access to English language media, including internet, news articles, movies, radio, and television, they might rarely avail themselves of such sources due to their inability to autonomously understand them. Therefore, Thai students' level of exposure to the English language was assumed to be restricted to their classroom instruction.

The rationale for recruiting Thai participants is to investigate L2 word learnability in a Thai EFL context. Thai students have experience learning English for many years, but they need more opportunities for exposure to the English language. It is, therefore, interesting to examine their comprehension and production of English, and specifically, their experienced ease or difficulty in learning English words.

### **3.2 Research instruments**

Six research instruments were used in this study. The three aspects of a word, including form (word parts), meaning (form-meaning), and use (word collocations), were measured on both receptive and productive dimensions. Before the main study, all six tests were piloted with 120 senior high school students to examine the validity and reliability of tests. Content validity was also assessed by five experts in the area of English education, who have taught English in Thai EFL contexts for more than 10 years, including one native speaker, one university teacher, and three high school teachers.

The receptive test includes 40 items, and the productive test includes 20 items. Both receptive and productive learning require particular practice to be properly learned.

### 3.2.1 The Word Segmentation Test (WST)

The WST was designed and developed based on Hayashi and Murphy (2011). It is presented as a receptive measure of word form. More specifically, this test is used to measure receptive knowledge of word parts. The test includes 40 items, with one verb, twenty-three nouns, six adverbs, and ten adjectives. Participants are required to break down word components into smaller morphemes, the smallest meaningful part of a language. The morphemes used in the current study are based on Bauer and Nation's (1993) word family criteria. Regarding scoring, one morpheme is awarded one point. No points are awarded for no answer or an incorrect answer, such as an incorrect root word. The scoring criteria of the word segmentation task are shown in Table 2.

Table 2: The Word Segmentation test scores

**Instructions:** Break down a word into the smallest parts

Examples	Point
unhappiness = un+happy+ness	3
happily = happy+ly	2
unhappiness = unhappy+ness	2
happily = happily	0
happily = happi + ly	0

### 3.2.2 The Affix Elicitation Test (AET)

The AET was also designed and developed based on the work of Hayashi and Murphy (2011). The test was specifically designed to measure learners' productive knowledge of word parts. The test includes 20 items. Participants are asked to supply a correct form of a word for each blank in the sentence and also give a part of speech for the derived word. No points are awarded for no answer or an incorrect answer. One point is awarded for each correct response, including a correct form in context and one for giving a correct type of a derived word. The scoring criteria of this task are shown in Table 3.

Table 3: The Affix Elicitation test scores

**Instructions:** Choose an appropriate part of speech in part B to complete the sentence in part A

Part A	Point	Part B				Point	Total
		N.	V.	Adj.	Adv.		
He is a <u>manager</u> (manage).	1	X				1	2
He is a <u>manager</u> (manage).	1		X			0	1
He is a <u>manage</u> (manage).	0	X				1	1
He is a <u>manages</u> (manage).	0			X		0	0

According to Bauer and Nation's (1993), Affix Levels, levels 2 to 7 of a word family are as follows:

Level 2: inflectional suffixes

Level 3: the most frequent and regular derivational affixes

Level 4: frequent orthographically regular affixes

Level 5: regular but infrequent affixes

Level 6: frequent but irregular affixes

Level 7: classical roots and affixes

Levels 2 to 7 were used in the current study because these affixes, which are a widely accepted description of word-building devices, provide a basis for the methodical learning and teaching of English affixes at different levels of morphological awareness. Furthermore, all target affixes used in the current study were sufficiently common and, therefore, it was reasonable to expect that these affixes were known to secondary school students in an EFL context. The current study excluded Level 1 because of the assumption that the learner is likely to consider "book" and "books" to be morphologically connected and members of the same word family (Bauer & Nation, 1993).

### 3.2.3 The L2 Translation Test (L2TT)

The L2TT was designed and developed based on previous studies (Nation and Beglar, 2007; Nation, 1983, 1990). The test is a receptive measure of word meaning and is used to measure receptive knowledge of the form-meaning aspect. It is formatted as a

multiple-choice test, and the participant is presented with four options and must select the answer with the same definition as the prompt word. The test included 40 items. To avoid providing any suggestions on the association of the word category, all of the words in each set of the vocabulary battery are presented in the same part of speech. No points were awarded for a blank or an incorrect answer. One point was awarded for each correct response. An example of this test is shown below as Table 4:

Table 4: The L2 Translation test scores

<b>Instructions:</b> Choose the word with similar meaning	<b>Answer</b>	<b>Point</b>
<b>1. book</b>		
a) reserve	correct	1
b) revenge	incorrect	0
c) remove	incorrect	0
d) restore	incorrect	0

### 3.2.4 The L1 Translation Test (L1TT)

The L1TT was developed based on Laufer and Goldstein (2004). This test is a productive measure of word meaning and is primarily used to measure the ability to recall a word in the knowledge of the form-meaning aspect. The test is comprised of 20 lines with one line for each prompt word. The instructions encourage the participants to recall the meaning for each prompt word. Participants are given the Thai words and required to supply the definition of a word in English by following a given letter. A correct word definition is awarded one point, and no points are given for no answer or an incorrect answer. An example of this test is shown in Table 5.

Table 5: The L1 Translation test Scores

**Instructions:** Read the meaning of the following words in Thai and complete the English words with the first letter given

<b>Word questions</b>	<b>Answer</b>	<b>Correct Answer</b>	<b>Point</b>
1. นาฬิกา	<b>W</b> <u>atch</u>	Watch	1
2. การอ่าน	<b>R</b> <u>ead</u>	Reading	0.5
3. อย่างมีความสุข	<b>H</b> <u>appy</u>	Happily	0.5

### 3.2.5 The Collocation Recognition Test (CRT)

The CRT was designed and developed based on Schmitt, Schmitt, and Clapham (2001) as a receptive measure of word use. This test is used to assess learners' receptive knowledge of word collocations and included 40 collocational items. Participants are asked to match the correct word collocation to the appropriate context by selecting among the given words. No points are given for incorrect or blank answers, and one correct match is awarded one point. An example of this test is shown in Table 6.

Table 6: The collocation Recognition test scores

**Instructions:** Choose the best word choice in the first column to describe the noun in the second

Adjective	Noun	Correct Answer	Point
big			
external	1. <u>flip</u> chart	1. flip	1
large	2. <u>large</u> success	2. big	0
flip			

### 3.2.6 The Productive Collocation Recall Test (PCRT)

The PCRT was developed based on previous studies in the field (Begagić, 2016; Laufer & Nation, 1995; 1999) as a productive measure of word use. The test was designed as a gap-filling test to measure learners' productive knowledge of word collocations. Only one correct answer is allowed. The initial letters of the target collocations were provided to avoid non-target words that may fit in the allocated sentence. This was done to prevent guessing and to ensure that the participants will select only the prompt word. The test included 20 collocational items. The correct answer is awarded one point and no points are given for incorrect or blank answers. Examples from the collocation recall test are shown in Table 7.

Table 7: The Productive Collocation Recall test

Instructions: Complete the sentence below with an appropriate word	Correct Answer	Point
1. The Beatles is a <b>fa</b> <u>mous</u> <b>band</b> in Thailand	famous	1
2. Do you want to hear the good or <b>ba</b> <u>d</u> <b>news</b> first?	bad	1

### 3.3 Selecting the prompt words for the current study

The prompt words were chosen based on the suggestions of Morgan and Bonham (1944) and Meara (1983). Prompt words should be neutral in terms of difficulty, being neither the easiest nor the most difficult grammatical class of words. To ensure that the prompt words are sufficiently familiar, words were selected that are common in daily life and in the area of academic study. The prompt words were selected from the Academic Word List (AWL) (Coxhead, 2000) and the New General Service List (NGSL) (Browne, Culligan, & Phillips, 2013). Indeed, the previous findings revealed the amount of vocabulary needed for language learners: high frequency words (86%) and academic words (10%) (Hayashi & Murphy, 2011; Sukying, 2017).

The Academic Word List (AWL) was created by Coxhead (2000) and lists 570-word families by analyzing a corpus of millions of words from over 400 academic texts. The words are relevant to all areas of academic study. The list of 570 words is divided into ten sub-lists; the most frequent 60 words are allocated to Sub-list 1 and the least frequent words to Sub-list 10. Given its relevance to all fields of study, the AWL can be used by teachers as part of a program preparing learners for tertiary-level education or used by students working alone to learn the words most needed to study at tertiary institutions.

The New General Service List (NGSL) was created by Browne, Culligan, and Phillips (2013). The NGSL provides core high-frequency words for ESL learners (L2). The list includes the most essential high-frequency words and provides over 92% coverage for most general English texts. Additionally, it includes a list of approximately 2,800 high-frequency words by combining the objective scientific principles of the corpus and the vocabulary list creation with useful pedagogic insights. The generalizability and validity of the list have been updated, and the size of the corpus expanded by comparing the 273 million words to the 2.5 million word corpus in the original GSL by West (1953).

To determine the familiarity of each word, a pilot study was run with 50 senior high school students who completed the VLT test based on Nation (1983, 1990). Students were required to select the definition of prompt words. Forty words with neutral (or average) scores were selected as the prompt words (Morgan & Bonham, 1944).

Unknown and well-known words, based on participants' scores, were not chosen. The prompt words were also derived as a word family to meet the concept of L2 word learnability in word knowledge.

Moreover, the forty prompt words have also checked the familiarity for the high school level by comparing them with the Preliminary for Schools Vocabulary List. The Preliminary for Schools Vocabulary List was originally developed by Cambridge English. The vocabulary includes the Council of Europe's Threshold (1990) specification and high-frequency vocabulary based on corpus evidence. The list covers the vocabulary of the B1 level on the Common European Framework of Reference (CEFR), including receptive and productive vocabulary. The Cambridge Learner Corpus is a collection of over 44 million English words and is based on the language used by learners from all over the world and from the development of the English Vocabulary Profile. The English Vocabulary Profile contains the most common words and phrases that learners of English need to know in British or American English.

More specifically, they have checked the appropriateness of the vocabulary in a Thai EFL context again based on the Ministry of Education of Thailand (2008), which reached the requirement of Thailand's Basic Education Curriculum B.E. 2544 (A.D. 2001). Notably, the collocational words were checked on the websites, including Longman Dictionary of Contemporary English and Online Oxford Dictionary. After all, the prompt words were examined the appropriateness for a Thai high school context, as such, the content of the tests was typically familiar to the senior high school students.

### **3.4 Data collection procedure**

After permission from the high school was obtained, the experiment was presented to the participants as part of their normal classwork. The experiment was conducted over 3 weeks during different class sessions. The measures of word form were tested in the first week, followed by the measures of word meaning in the second week and, finally, the measures of word used in the third week. Six types of tests were used to evaluate receptive and productive knowledge of different aspects of a word, including form, meaning, and use. It is necessary to ensure that participants will not transfer

knowledge from a receptive test to a productive test. As such, productive knowledge tests will be conducted before the receptive knowledge tests. Likewise, to minimize the possibility that participants may draw a connection between different aspects of word knowledge, the measures of word use will be administered first. The ability to supply the word form as productive knowledge can be transferred to the ability to supply the word meaning as receptive knowledge (Laufer & Goldstein, 2004). Thus, the measures of word meaning must be conducted before the measures of word form. Therefore, the six tests will be administered as follows: 1) the productive collocation recall test (PCRT), 2) the collocation recognition test (CRT), 3) the L1 translation test (L1TT), 4) the L2 translation test (L2TT), 5) the affix elicitation test (AET), and 6) the word segmentation test (WST). Before the tests were administered, the instructions, together with a few illustrations of the tasks, were provided to participants in their native Thai language. Participants were not allowed to use any tools to assist their responses and were not allowed to ask questions or observe the responses of other participants. A summary of the data collection procedure is shown in Table 8.

Table 8: Summary of the data collection procedure

Week	Productive knowledge	Time	Receptive knowledge	Time	N=261
1	1) PCRT		2) CRT		
2	3) L1TT	20 minutes	4) L2TT	40 minutes	
3	5) AET		6) WST		

### 3.5 Data analysis

The test scores obtained from each experimental instrument were analyzed with the Statistical Package for the Social Sciences (SPSS) (Larson-Hall, 2016; Larson-Hall & Herrington, 2010; Field, 2009). The probability coefficient ( $p$ ), which can range from 0 to =1, was calculated, and the significance level was set at 0.05 to reject the null hypothesis (Dörnyei, 2007). According to Mackey and Gass (2005), reliability is the consistency of a test or a score, involving Cronbach's Alpha is a measure of internal consistency and reliability. Based on DeVellis (2003), the Cronbach's Alpha coefficient of a scale should be above 0.70, and internal consistency indicators for a

well-developed test need to approach 0.80 (Dörnyei, 2007). Descriptive statistics, including means and standard deviations, were collated to describe participants' test performance on word knowledge. Means refer to average scores, and standard deviations indicate how scores are spread around the mean (Mackey & Gass, 2005). Correlations was calculated to reveal the relationship between different word tests based on Cohen's (1988) guidelines: small,  $r = 0.10$  to  $0.29$ ; medium,  $r = 0.30$  to  $0.49$ ; large,  $r = 0.50$  to  $1.0$ . Additionally, a  $t$ -test and  $F$ -test analysis were conducted to detect any significant differences in word learnability. Cohen's  $d$  was used to calculate the effect size of any differences, with an effect size of  $0.30$  considered small,  $0.50$  considered medium, and  $0.80$  considered large (Cohen, 1992).

### 3.6 Summary

This chapter outlines the methodology of the current study, including the research context, participants, instruments of assessment, and data collection procedures. Reliability and validity assessments of the new tests have also been established, and the practical applications and ease of use of the tests have been highlighted. Specifically, the research design procedures for the current study are summarized into three steps: The pilot study is conducted first, then followed by the data collection and, finally, the data analysis. A summary of the research design procedures for the current study is shown in Figure 2.

Phase	Procedure	Product
1. Pilot Study	<ul style="list-style-type: none"> <li>• N = 120</li> <li>• Examining reliability and validity</li> </ul>	<ul style="list-style-type: none"> <li>• 6 tests</li> </ul>
2. Data Collection	<ul style="list-style-type: none"> <li>• N = 261</li> <li>• Testing receptive and productive word knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Numeric data (test scores)</li> </ul>
3. Data Analysis	<ul style="list-style-type: none"> <li>• SPSS software</li> </ul>	<ul style="list-style-type: none"> <li>• Conclusions</li> </ul>

Figure 2: An overview of the research design and procedures for the current study

More specifically, the data analysis, broken down into two sections, is examined to answer Research Question 1 and Research Question 2. The next chapter will present the results of the current study.

Table 9: A summary of data analysis

Word Aspects		Test Instruments	RQ	Data Analysis
R	Form	WST	1	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• <i>t</i>-test analysis</li> <li>• A repeated-measure ANOVA</li> <li>• Effect-size analysis</li> </ul>
P	Form	AET		
R	Meaning	L2TT		
P	Meaning	L1TT	2	<ul style="list-style-type: none"> <li>• Correlation analysis</li> </ul>
R	Use	CRT		
P	Use	PCRT		

Note: R = receptive knowledge, P = productive knowledge

### 3.7 Results of the pilot test

The reliability and validity of the tests were piloted with 120 senior high school students that were not participating in the main study. The tests, including the Word Segmentation Test (WST), the Affix Elicitation Test (AET), the L2 Translation Test (L2TT), the L1 Translation Test (L1TT), the Collocation Recognition Test (CRT), the Productive Collocation Recall Test (PCRT), were examined for normality. The tests scored 0.746 on Cronbach's Alpha, which indicates an acceptable level of internal consistency (George & Mallery, 2003; DeVellis, 2003). Table 10 shows the summary descriptive statistics for the word knowledge performance on the six tests.

Table 10: Descriptive statistics of word knowledge performance from the pilot test (n = 120)

Word Aspects		Tests	Mean	SD
Form	R	WST	75.30	9.35
	P	AET	22.91	9.00
Meaning	R	L2TT	30.79	5.11
	P	L1TT	15.46	2.58
Use	R	CRT	26.45	5.91
	P	PCRT	11.58	2.36

Note: R = receptive knowledge, P = productive knowledge

The average score for the WST, a measure of receptive knowledge of word form, was 75.30% (SD = 9.35), and the mean performance of the AET, measuring productive knowledge of word form, was 22.91% (SD = 9.00). The mean score for the L2TT, a measure of receptive knowledge, was 30.79% (SD = 5.11), and 15.46% (SD = 2.58) for the L1TT, a measure of productive knowledge. The average scores for receptive knowledge was 26.45% (SD = 5.91) on the CRT. Finally, the mean score for the PCRT of productive knowledge was 11.58% (SD = 2.3).

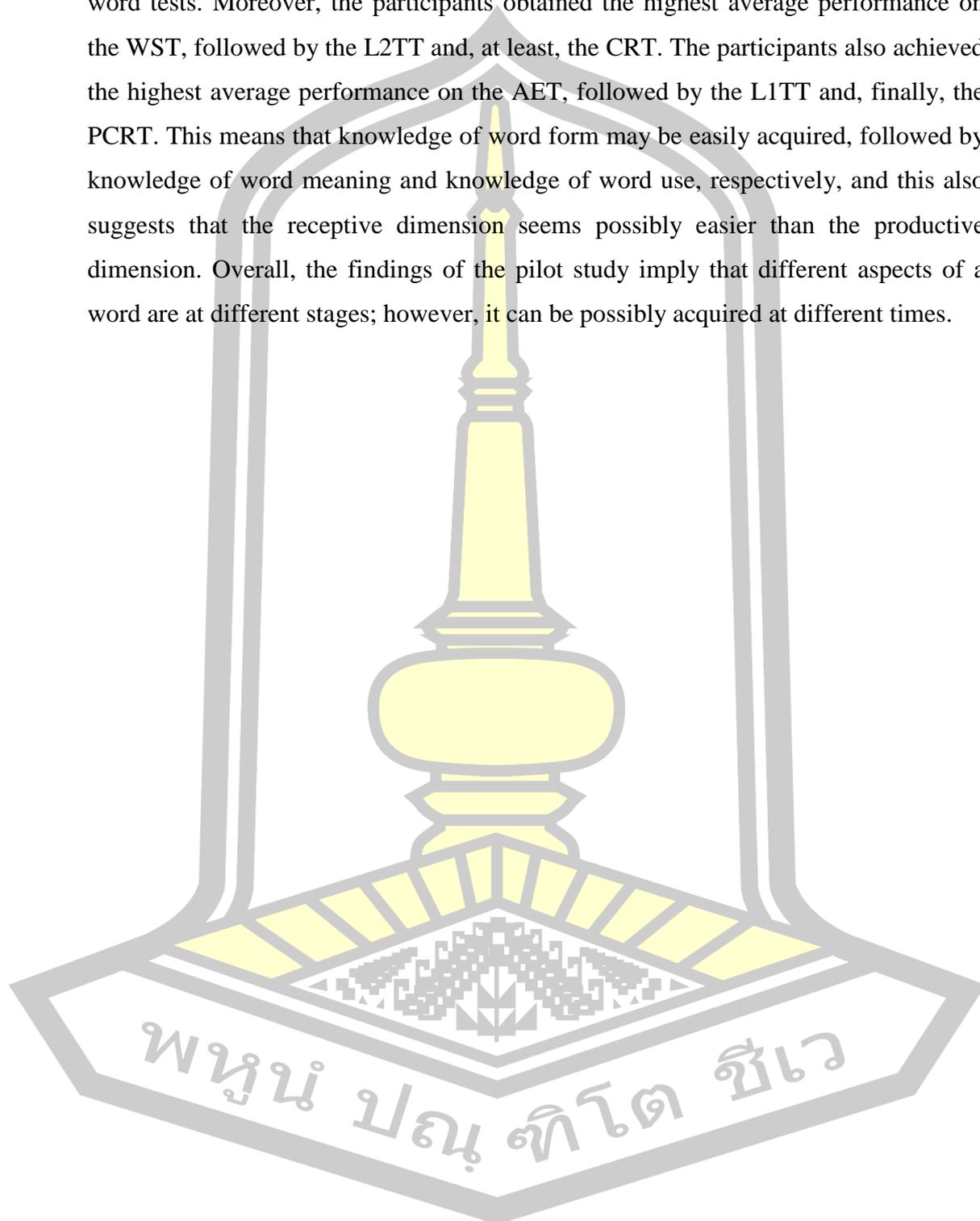
Table 11: The findings of the correlation value for the pilot test

Tests	WST	AET	L2TT	L1TT	CRT	PCRT
WST	1	0.53	0.47	0.54	0.35	0.12
AET	0.53	1	0.45	0.44	0.39	0.20
L2TT	0.47	0.45	1	0.37	0.71	0.22
L1TT	0.54	0.44	0.37	1	0.33	0.20
CRT	0.35	0.39	0.71	0.33	1	0.26
PCRT	0.12	0.20	0.22	0.20	0.26	1

As shown in Table 11, correlations were calculated between different tests in order to examine the relationships between different aspects of a word. The correlation analysis revealed that there were large relationships between the WST and the AET ( $r = 0.53$ ), the WST and the L1TT ( $r = 0.54$ ), and the L2TT and the CRT ( $r = 0.71$ ). In following, there were medium relationships between the WST and the L2TT ( $r = 0.47$ ), the WST and the CRT ( $r = 0.35$ ), the AET and the L2TT ( $r = 0.45$ ), the AET and the L1TT ( $r = 0.44$ ), the AET and the CRT ( $r = 0.39$ ), the L2TT and the L1TT ( $r = 0.37$ ), and the L1TT and the CRT ( $r = 0.33$ ). Finally, there were small relationships between the WST and the PCRT ( $r = 0.12$ ), the AET and the PCRT ( $r = 0.20$ ), the L2TT and the PCRT ( $r = 0.22$ ), the L1TT and the PCRT ( $r = 0.20$ ), and the CRT and the PCRT ( $r = 0.26$ ).

In conclusion, the results of the correlations analysis on the pilot study revealed that the six different measures were positively related. This is because different types of word knowledge are interrelated. However, the descriptive statistics for the word knowledge performance on the six different tests showed that the participants

achieved higher average performance on the receptive word tests than the productive word tests. Moreover, the participants obtained the highest average performance on the WST, followed by the L2TT and, at least, the CRT. The participants also achieved the highest average performance on the AET, followed by the L1TT and, finally, the PCRT. This means that knowledge of word form may be easily acquired, followed by knowledge of word meaning and knowledge of word use, respectively, and this also suggests that the receptive dimension seems possibly easier than the productive dimension. Overall, the findings of the pilot study imply that different aspects of a word are at different stages; however, it can be possibly acquired at different times.



## CHAPTER IV

### RESULTS

The previous chapter described the techniques used for the analysis of the data required for answering the Research Questions in the current study. This chapter provides the preliminary results presenting the descriptive statistics for an experimental measure to address L2 word learnability in the Thai EFL context and the interrelatedness of word knowledge aspects. The related methods, including a repeated-measures ANOVA, effect size, and correlation analysis, are used to examine the data.

#### 4.1 L2 word knowledge in Thai EFL learners

This section answers Research Question 1: To what extent does knowledge of form, meaning, and use of a word affect L2 word learnability in Thai EFL learners?

Receptive and productive word knowledge tests were used to examine the overall word knowledge of the participants. A *t*-test and repeated-measure ANOVA analysis were used to reveal any significant difference between the different six tests, and effect sizes were also calculated. The raw test scores were then converted into percentages to compare across word knowledge tests. Then, a correlation analysis was used to carry out tests of normality. The six measures [the Word Segmentation Test (WST), the Affix Elicitation Test (AET), the L2 Translation Test (L2TT), the L1 Translation Test (L1TT), the Collocation Recognition Test (CRT), and the Collocation Productive Recall Test (CPRT)] were conducted to measure the participants' word knowledge. The tests scored 0.78 on Cronbach's Alpha for normality, indicating acceptable reliability in measuring word knowledge. The summary descriptive statistics for senior high school students' performance on the word tests are presented in Table 12.

Table 12: Descriptive Statistics of the senior high school students' performance on the word measures (n = 261)

Word aspects		Tests	Mean	SD
Form	R	WST	71.49	13.07
	P	AET	19.98	9.38
Meaning	R	L2TT	28.15	6.54
	P	L1TT	14.84	2.80
Use	R	CRT	22.57	7.76
	P	PCRT	8.18	3.96

Note: R = receptive knowledge, P = productive knowledge

The average score for the WST, a measure of receptive knowledge of word form, was 71.49% (SD = 13.07), and the mean performance of the AET, measuring productive knowledge of word form, was 19.98% (SD = 9.38). The mean score for the L2TT, a measure of receptive knowledge, was 28.15% (SD = 6.54), and 14.84% (SD = 2.80) for the L1TT, a measure of productive knowledge. The average scores for receptive knowledge were 22.57% (SD = 7.76) on the CRT. Finally, the mean score for the PCRT of productive knowledge was 8.18% (SD = 3.96). Overall, the results show that participants performed better on receptive word measures, indicated by higher average scores, than on productive word measures on all aspects. Specifically, the WST performance (71.49%) was higher than the AET performance (19.98%) in the knowledge of word form. In the knowledge of word meaning, the L2TT performance (28.15%) was higher than the L1TT performance (14.84%). Finally, knowledge of word use was higher in CRT (22.57%) than in the PCRT (8.18%).

This may indicate that different aspects of a word reflect different difficulty levels. Therefore, a *t*-test and *F*-test analysis were conducted to detect any significant differences for the six different tests. The effect size was also calculated to identify the relationship between receptive knowledge and productive knowledge. The analysis revealed that there was a significant difference between receptive and productive measures, with a large effect size. Table 13 presents the results of the ANOVA and effect size calculation.

Table 13: Descriptive statistics for receptive and productive knowledge of three different aspects

Word aspects	Tests	Mean	SD	<i>t</i> -value	Effect-size	
Form	R	WST	71.49	13.07	70.51	$\eta^2 = 4.590$
	P	AET	19.98	9.38		
Meaning	R	L2TT	28.15	6.54	38.87	$\eta^2 = 2.850$
	P	L1TT	14.84	2.80		
Use	R	CRT	22.57	7.76	35.60	$\eta^2 = 2.451$
	P	PCRT	8.18	3.96		

Note: R = receptive knowledge, P = productive knowledge

A repeated-measures ANOVA with a Greenhouse-Geisser correction showed that the mean scores for receptive and productive knowledge of word form on the WST and AET performance were significantly different ( $t(1, 260) = 70.514, p < 0.001$ ), with a large effect-size ( $\eta^2 = 4.590$ ). Additionally, there was a significant difference between receptive and productive knowledge of word meaning on the L2TT versus the L1TT ( $t(1, 260) = 38.877, p < 0.001$ ), with a large effect-size ( $\eta^2 = 2.850$ ). Finally, there was a significant difference between receptive and productive knowledge of word use on the CRT and PCRT ( $t(1, 260) = 35.605, p < 0.001$ ), with a large effect-size ( $\eta^2 = 2.451$ ). This analysis also revealed significant differences in test performance between the different word measures, as shown in Table 14. The WST, AET, L2TT, L1TT, CRT, and PCRT were compared the degrees of understanding.

Table 14 illustrates that performance on the WST, a receptive measure of word form, was significantly different to performance on the L2TT, a receptive measure of word meaning ( $t(1, 260) = 59.961, p < 0.001, \eta^2 = 13.26$ ), the CRT, a productive measure of word use ( $t(1, 260) = 63.117, p < 0.001, \eta^2 = 18.46$ ), the L1TT, a productive measure of word meaning ( $t(1, 260) = 77.368, p < 0.001, \eta^2 = 11.04$ ), and the PCRT, a productive measure of word use ( $t(1.000, 260.000) = 83.410, p < 0.001, \eta^2 = 13.91$ ). The effect size for all of these differences was large.

Similarly, performance on the L2TT, a receptive measure of word meaning, was significantly different to performance on the CRT, a productive measure of word use ( $t(1.000, 260.000) = 15.926, p < 0.001, \eta^2 = 9.14$ ) the AET, a productive measure of

word form ( $t(1.000, 260.000) = 17.054, p < 0.001, \eta^2 = 5.75$ ), and the PCRT, a productive measure of word use ( $t(1.000, 260.000) = 55.013, p < 0.001, \eta^2 = 15.48$ ). Again, the effect sizes were large for each comparison.

Table 14: Descriptive statistics for the three different aspects of word knowledge on the different measures

Word aspects		Tests	Mean	SD	t-value	Effect-size
Form	R	WST	71.49	13.07	59.96	$\eta^2 = 13.26$
Meaning	R	L2TT	28.15	6.54		
Form	R	WST	71.49	13.07	63.11	$\eta^2 = 18.46$
Use	R	CRT	22.57	7.76		
Form	R	WST	71.49	13.07	77.36	$\eta^2 = 11.04$
Meaning	P	L1TT	14.84	2.80		
Form	R	WST	71.49	13.07	83.41	$\eta^2 = 13.91$
Use	P	PCRT	8.18	3.96		
Meaning	R	L2TT	28.15	6.54	15.92	$\eta^2 = 9.14$
Use	R	CRT	22.57	7.76		
Meaning	R	L2TT	28.15	6.54	17.05	$\eta^2 = 5.75$
Form	P	AET	19.98	9.38		
Meaning	R	L2TT	28.15	6.54	55.01	$\eta^2 = 15.48$
Use	P	PCRT	8.18	3.96		
Use	R	CRT	22.57	7.76	4.75	$\eta^2 = 1.59$
Form	P	AET	19.98	9.38		
Use	R	CRT	22.57	7.76	17.71	$\eta^2 = 3.11$
Meaning	P	L1TT	14.84	2.80		
Form	P	AET	19.98	9.38	9.83	$\eta^2 = 1.56$
Meaning	P	L1TT	14.84	2.80		
Form	P	AET	19.98	9.38	21.88	$\eta^2 = 4.35$
Use	P	PCRT	8.18	3.96		
Meaning	P	L1TT	14.84	2.80	26.91	$\eta^2 = 11.48$
Use	P	PCRT	8.18	3.96		

Note: R = receptive knowledge, P = productive knowledge

Performance on the CRT, a receptive measure of word use, also significantly differed from performance on the AET, a productive measure of word form ( $t(1,000, 260.000) = 4.754, p < 0.001, \eta^2 = 1.59$ ) and the L1TT, a productive measure of word meaning ( $t(1,000, 260.000) = 17.716, p < 0.001, \eta^2 = 3.11$ ). The AET performance, which is a productive measure of word form, also differed from L1TT performance, a productive measure of word meaning ( $t(1,000, 260.000) = 9.834, p < 0.001, \eta^2 = 1.56$ ), PCRT performance, a productive measure of word use ( $t(1,000, 260.000) = 21.884, p < 0.001, \eta^2 = 4.35$ ). Finally, the L1TT performance, a productive measure of word meaning was also significantly different to the PCRT performance, a productive measure of word use ( $t(1,000, 260.000) = 26.915, p < 0.001, \eta^2 = 11.48$ ). All comparisons revealed a large effect size.

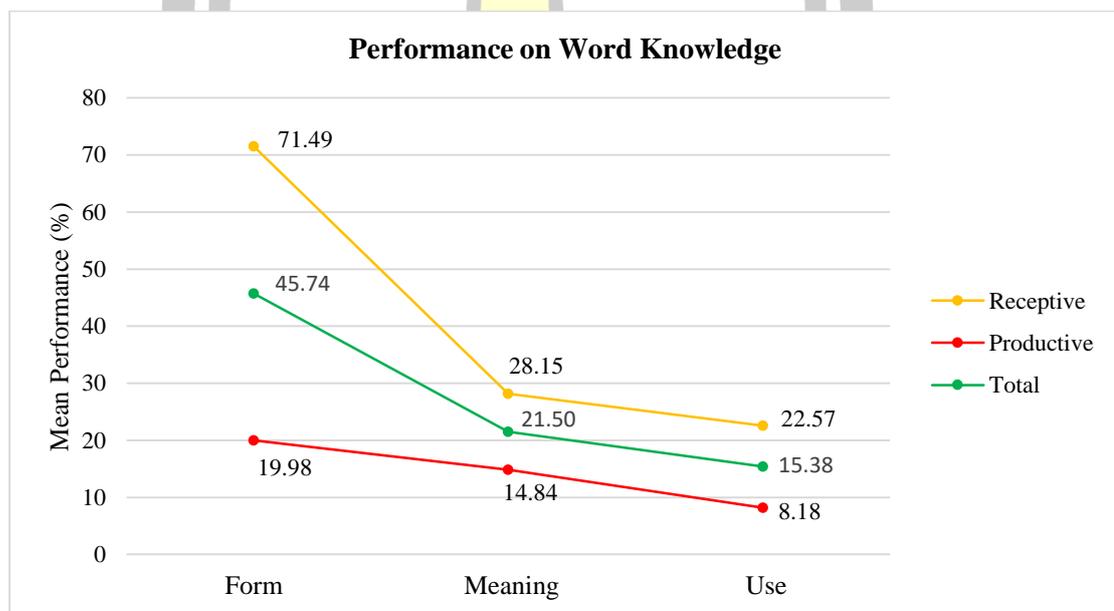


Figure 3: Performance of word knowledge tests

In addition, a repeated-measures ANOVA also indicated that the mean scores for receptive knowledge on the WST, the L2TT, and CRT performance were significantly different, ( $F(1.327, 344.987) = 3.453, p < 0.001$ ), and there was a significant difference between the test performance on the productive word measures ( $F(1.332, 346.369) = 335.861, p < 0.001$ ). Finally, the mean scores on the WST, AET, L2TT, L1TT, CRT, and PCRT performance were significantly different ( $F(2.810, 730.612) = 3.294, p < 0.001$ ).

The analysis revealed that there were significant differences between all different word measures, suggesting varying difficulties for different aspects of a word. Overall, the participants achieved higher average performance on the receptive measures of a word than the productive measures of word knowledge. This suggests that productive knowledge of a word is more difficult to acquire than receptive knowledge of a word. These findings reveal that learning a word is a result of a long and incremental process.

#### 4.2 Relationship between word knowledge aspects

This section shows the correlation of multiple different aspects of a word to answer Research Question 2: What is the relationship between word knowledge aspects in Thai EFL learners? A correlation analysis was conducted to examine the relationships between different word tests, including the associations between the aspects of a word: form (word parts), meaning (form-meaning link), and use (word collocation). Pearson correlations were calculated to explore the strength and the direction (positive and negative) of the relationship between the participants' performance of word knowledge, both receptively and productively. The correlations are shown in Table 15.

Table 15: Correlations between word knowledge measures (Pearson correlations, r)

Tests	WST	AET	L2TT	L1TT	CRT	PCRT
WST	1					
AET	0.48	1				
L2TT	0.45	0.57	1			
L1TT	0.53	0.46	0.54	1		
CRT	0.36	0.48	0.69	0.42	1	
PCRT	0.35	0.37	0.46	0.34	0.54	1

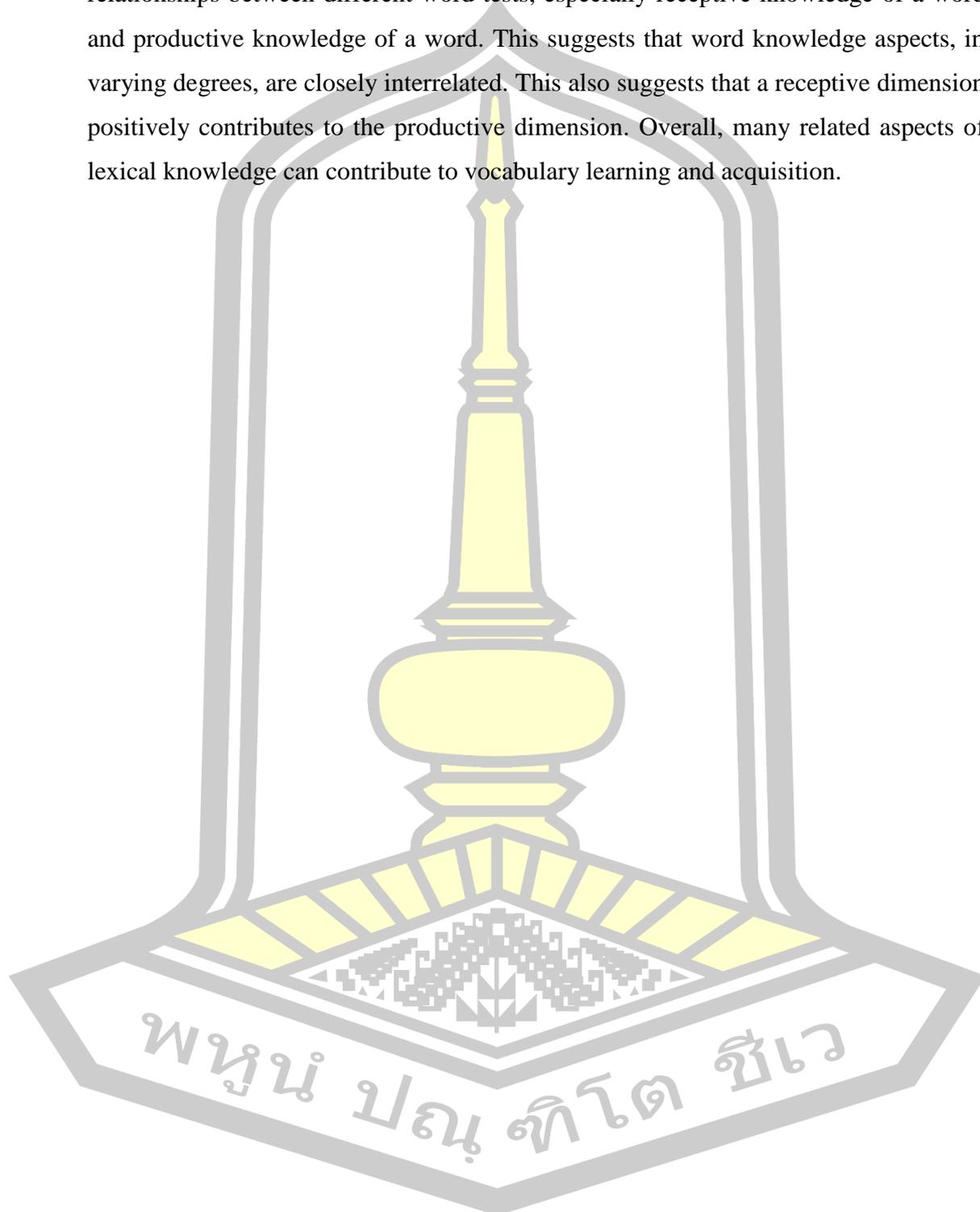
The results of the correlations analysis revealed that the tests were highly correlated, revealing medium to high correlations between all six tests. Specifically, there was a high correlation between the WST and the L1TT ( $r = 0.53$ ), the AET and the L2TT ( $r = 0.57$ ), the L2TT and the L1TT ( $r = 0.54$ ), the L2TT and the CRT ( $r = 0.69$ ), and the CRT and the PCRT ( $r = 0.54$ ). The relationships between the WST and the AET ( $r = 0.48$ ), the WST and the L2TT ( $r = 0.45$ ), the WST and the CRT ( $r = 0.36$ ), the WST and the PCRT ( $r = 0.35$ ), the AET and the L1TT ( $r = 0.46$ ), the AET and the CRT ( $r = 0.48$ ), the AET and the PCRT ( $r = 0.37$ ), the L2TT and the PCRT ( $r = 0.46$ ), the L1TT and the CRT ( $r = 0.42$ ), and the L1TT and the PCRT ( $r = 0.34$ ), were considered medium relationships. At last, there was no small relationship.

The correlations analysis revealed significant relationships between the different aspects of a word: form, meaning, and use. It is also clear that receptive and productive word knowledge is associated. The correlation value for the WST and the AET was medium ( $r = 0.48$ ). Indeed, the average correlation for the L2TT and the L1TT was large ( $r = 0.54$ ), as was the correlation between the CRT and the PCRT ( $r = 0.54$ ). The results of participants' performance from the word knowledge measures showed that the correlation between receptive and productive word knowledge approached  $r=0.30$  on every measure. This suggests that different aspects of a word are positively correlated. Notably, there was also a relatively positive relationship between receptive and productive knowledge of a word, suggesting that receptive knowledge can promote productive knowledge in learning a word. These findings confirm that vocabulary learning is a developmental continuum.

### 4.3 Summary

The results reveal that there are varying degrees of word knowledge. Participants achieved higher average performance on receptive tasks than productive tasks. Specifically, the word aspect 'form' received the highest average performance, followed by the meaning of the word and, finally, the use of word knowledge. Furthermore, a repeated-measures ANOVA also demonstrated a significant difference between the receptive and productive word measures with a large effect size. The results showed that the most difficult aspect of word knowledge to acquire is use and the aspects of form and meaning were achieved early in the learning process.

Nevertheless, the correlation analysis of word knowledge indicated positive relationships between different word tests, especially receptive knowledge of a word and productive knowledge of a word. This suggests that word knowledge aspects, in varying degrees, are closely interrelated. This also suggests that a receptive dimension positively contributes to the productive dimension. Overall, many related aspects of lexical knowledge can contribute to vocabulary learning and acquisition.



## CHAPTER V

### DISCUSSION AND CONCLUSION

The previous chapter presented the results of the data analysis and provided preliminary results in relation to the research question. This chapter will discuss the research findings in the context of the current literature. Notably, the findings of the current study increase our understanding of the roles of L2 word learnability in vocabulary acquisition among L2 and EFL learners, especially in a Thai context. New insights were gained from the findings with regard to L2 word learnability with a specific focus on the word knowledge framework. This chapter also provides a discussion of these insights as well as the contribution of this research to current pedagogy and second language acquisition research, especially vocabulary acquisition. Implications for vocabulary learning as well as limitations and future research directions are also included in this chapter.

#### **5.1 Discussion of the current study**

##### **5.1.1 Introduction**

Knowing a word, considered a priority area of English language learning, is a crucial mechanism in vocabulary acquisition. Research on vocabulary learning has shown that the process of learning a word occurs on a developmental continuum (e.g., Laufer & Paribakht, 1998; Nation, 2013; Schneider, Healy, & Bourne, 2002) and entails learning different aspects of word knowledge, including form, meaning, and use (Nation, 2013), both receptively and productively. Understanding of the roles of word knowledge can affect the ease or difficulty of learning a word (e.g., Laufer & Goldstein, 2004; Lin, 2015; Sukying, 2017). Therefore, the current study investigated L2 word learnability to have a better comprehension of the relationship between word knowledge aspects and their impact on the ease or difficulty in the learnability of a word in Thai EFL learners.

Two research questions were formulated for this study. Research Question 1 examined the extent to which knowledge of form, meaning, and use of a word affect L2 word learnability in Thai high school learners. Research Question 2 examined the relationship between different word knowledge aspects. Specifically, the form, meaning, and use of a word were assessed by six measures, including word part

knowledge, form-meaning knowledge, and collocations. In this chapter, the data will be discussed within Nation's (2013) framework of word knowledge, together with the developmental continuum of learning a word, both receptively and productively (Henriksen, 1999).

### **5.1.2 Word learnability in Thai EFL learners**

The results of the current study showed that, overall, Thai EFL participants had poor word knowledge and showed better receptive knowledge than productive knowledge. The results also revealed that word knowledge involved many related aspects and varying degrees of understanding. The participants performed best in word form, followed by word meaning and word use. This phenomenon can be accounted for by the incremental development of word knowledge and suggests that the learnability of a word is acquired in different stages and at different rates. These findings are consistent with previous studies (Cobb, 2000; Henriksen, 1999; Laufer & Goldstein, 2004; Laufer & Nation, 1999; Laufer & Paribakht, 1998; Lin, 2015; Schmitt & Meara, 1997; Meara & Buxton, 1987; Nation, 2013; Schmitt, Schmitt, & Clapham, 2001; Sukying, 2017, 2018).

The six measures used in the current study reveal varying degrees of word knowledge. The results showed that there was a significant difference between the receptive and productive performance, which indicated that the receptive measures, including the WST, L2TT, and CRT, were a higher performance than the productive measures, including the AET, L1TT, and PCRT. Indeed, Thai high school participants performed better on receptive knowledge than productive knowledge. The WST reflects a learner's ability to recognize morphological knowledge of a word. Conversely, the AET reflects a learner's ability to recall and retrieve the form of a word and a learner's ability to produce correct affixation. The L2TT reflects a learner's ability to recognize the meaning of a word from their L1. In contrast, the L1TT measures a learner's ability to recall and retrieve the meaning of a word and a learner's ability to produce a correct meaning of a word. The CRT assesses a learner's ability to recognize the collocational knowledge whereas, the PCRT reflects a learner's ability to recall and retrieve the function of a word, and a learner's ability to produce correct word collocations. The productive measures were likely a heavier

burden on the participants because productive measures require a higher degree of mastery than receptive measures. In the WST, L2TT, and CRT, the participants needed to use their ability to recognize a word; in contrast, the AET, L1TT, and PCRT required that participants produce a word. This is consistent with the earlier findings that productive measures are more difficult than receptive measures because a productive measure requires that the learner produces a correct answer in a spontaneous context, which generates a greater processing demand than being asked to complete or recognize an answer (Hayashi & Murphy, 2011; Laufer & Goldstein, 2004; Lin, 2012; Sukying, 2017). This may explain the degrees of learning in L2 contexts (Henriksen, 1999). That is, the AET, L1TT, and PCRT possibly inflict a heavier processing demand on Thai EFL participants than the WST, L2TT, and CRT.

The results of the current study provide clear evidence that receptive and productive performance differs in Thai EFL learners. Thai high school participants performed better on receptive knowledge (WST, L2TT, and CRT) measures than productive knowledge measures (AET, L1TT, and PCRT), with a large effect size. Indeed, correctly producing a word demands the comprehension of a word and, therefore, receptive knowledge is often prioritized in English learning before mastering the production of a word. Overall, the distinction between receptive and productive measures may indicate that receptive knowledge of a word advances productive knowledge of a word. Indeed, receptive knowledge may also be acquired at a primary stage, and productive knowledge is then built upon the receptive knowledge. In the current study, Thai high school participants performed a low performance of word knowledge, both receptively and productively, and receptive performance was two times greater than productive performance. This is because the ability to recognize a word was possibly easier acquired than the ability to recall and produce a word. It is likely that the students' word knowledge was not sufficient to promote their ability to use a word (Hayashi & Murphy, 2011). It may also be the case that the participants' vocabulary size was not yet adequate for dealing with complexly lexical words in L2 acquisition (Sukying, 2017).

These findings support the assumption that some aspects of word knowledge are acquired before other aspects (Henriksen, 1999; Laufer & Goldstein, 2004; Nation,

2013; Schmitt, 2000; Schmitt & Zimmerman, 2002; Zimmerman, 2009; Sukying, 2017, 2018, 2019). The results are consistent with previous literature that the receptive and productive dimensions represent a developmental continuum in learning a word. For example, receptive skills facilitate productive use, while productive skills are fostered in these receptive skills (Corson, 1995; Nation, 2013), and productive knowledge includes all the knowledge necessary for receptive use (DeKeyser & Sokalski, 1996).

More specifically, the results of the current study also demonstrated that there was a significant difference between different aspects of a word because the mean scores for the WST, AET, L2TT, L1TT, CRT, and PCRT performance were significantly different. The analysis also showed a large effect size for the different measures. Thai high school participants performed best on the aspect of form, followed by meaning, and use. That is, they showed a stronger recognition and recall of form and meaning than the ability to use a word. The students' performance revealed that the function of word knowledge was the most difficult level to achieve. These results suggest that the acquisition of vocabulary knowledge among EFL participants follows a particular sequence. Learners first gain receptive word knowledge, which requires the ability to recognize the meaning and/or form of a word, then they acquire the ability to retrieve the production from lexical storage. As such, the results suggest that word knowledge has different degrees of comprehension, and this is consistent with earlier findings (Henriksen, 1999; Nation, 2013; Schmitt, 2010). Indeed, the ability to effectively use a word may require differing degrees of cognitive knowledge and metacognitive strategies (Hayashi & Murphy, 2011). For example, semantic and grammatical knowledge may facilitate producing a word. Indeed, previous literature has shown that the function of a word involves perceiving the form and/or meaning of lexical items (Nation, 2013).

The current study showed different difficulty levels of word knowledge. This suggests that word knowledge may be acquired in the different stages, and different rates and Thai EFL learners do not seem to acquire all aspects of word knowledge simultaneously. The form of word knowledge seems to be the easiest to be achieved, followed by the meaning and use. While comprehensive knowledge of a word

requires understanding all nine aspects of knowledge, both receptively and productively, learners may acquire knowledge of some aspects, such as spoken and written forms of a word before or after attaining the word meaning and learners may learn a single meaning in a context and, with increasing exposure to the word, they will acquire other meanings. The word usage, such as register or pragmatic constraints and collocations, may be learned relatively late because these aspects demand a deep understanding, a high level of lexical and grammatical knowledge. Indeed, mastery of a word depends on the exposure of a word, which requires embedding the word according to the contexts.

The findings reveal the hierarchy of L2 word learnability from Thai high school participants. The form of a word will be achieved first, followed by meaning and, at last, use. The hierarchy of L2 word learnability is illustrated in Figure 4.

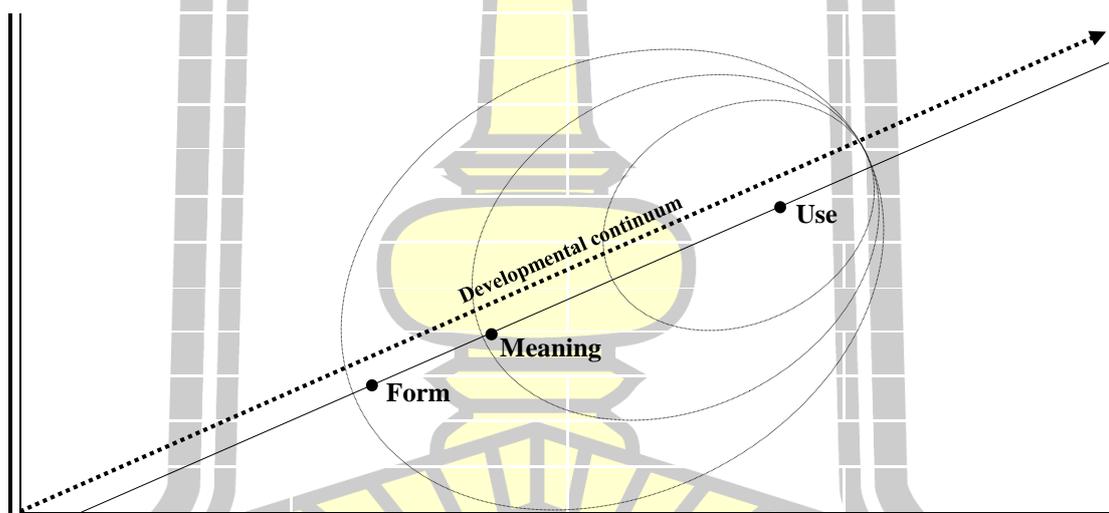


Figure 4: The hierarchy of L2 word learnability in the Thai EFL context

Note that the hierarchy of word knowledge learning is complicated when comparing form and meaning. Learning a word may start with either the definition or the grammatical form of a word. The meaning of a word may require an understanding of the lexical components to recognize the definition of the word. However, the meaning of a word may be needed to understand the sentence more than the morphemes. Indeed, mastery of a word depends on the exposure of a word, which requires embedding the word according to the contexts.

### 5.1.3 The relationship between word knowledge aspects

The correlational analysis also revealed a significantly positive relationship between multiple aspects of word knowledge, both receptively and productively. As illustrated, the WST, AET, L2TT, L1TT, CRT, and PCRT presented medium to high correlation. Specifically, the results showed that receptive and productive tasks were highly correlated. This indicates that the relationship between different aspects of a word is beneficial to L2 word learnability. This is congruent with the claim that the process of learning a word occurs on a developmental continuum (Lin, 2012, 2015; Nation, 2013; Schmitt & Meara, 1997) and is also similar to previous reports that receptive and productive word knowledge are positively correlated and facilitate vocabulary acquisition in a Thai EFL context (Sukyong, 2017).

The findings of the current study showed that L2 word learnability required different types of comprehensive knowledge of a word. This suggests that a combination of different interrelated knowledge of a word is required to enhance English word learnability. Multiple closely related aspects of word knowledge positively influence L2 learners in the development of vocabulary learning. That is, multiple aspects of word knowledge contribute to word learnability. For example, if learners are capable of various lexical knowledge components, they may easily recognize and produce a word. This suggests that the ease or difficulty of learning depends on word knowledge. That is, if Thai EFL participants understand the roles of word knowledge, they can learn a word without difficulty. For instance, the WST, which assesses morphological knowledge, can contribute to AET performance in identifying a lexical item's word base and promoting recall. The L2TT semantic and grammatical knowledge can facilitate understanding the definition and structure of a contextual word in the L1TT. Finally, the collocational knowledge measured via the CRT may promote appropriate English word use in the PCRT. This is congruent with earlier findings that receptive and productive word knowledge is a valuable tool for L2 and/or EFL learners while learning new words (e.g., Lin, 2012, 2015).

Understanding the roles of word knowledge will facilitate vocabulary acquisition and development. This is congruent with previous literature stated by Lin (2015) that

learners cannot only apply a single lexical processing approach, either top-down or bottom-up approaches, when learning a new word. Instead, both approaches are necessary to flexibly process new words. This can be accounted for word knowledge, which requires varying cognitive and metacognitive loads (Bauer & Nation, 1993).

In summary, the results reveal that learning a word is the result of a long and incremental process. The findings of the current study showed that the receptive and productive aspects of a word are positively related. Word learnability facilitates vocabulary acquisition and development and, therefore, is beneficial to English language learning. Thus, if learners are capable of producing lexical components and understanding the roles of word knowledge, they will learn a word without difficulty. Nevertheless, word learnability is acquired at different developmental stages and different rates (Nation, 2001; Schmitt, 2000). Thus, vocabulary acquisition is an on-going process as learners gain deep and thorough lexical knowledge.

## **5.2 Conclusion of the current study**

The current study investigated the impact on the ease or difficulty of learning L2 word knowledge (form, meaning, and use) in Thai high school learners and the relationship between word knowledge aspects. The analysis of the current findings revealed that there were different difficulty levels of word knowledge to be acquired. Specifically, these findings indicated that acquiring a word is an incremental learning process. That is, the word form is easier to be acquired than word meaning, while word use is the most difficult aspect to be learned. The current results also highlighted the close link between different word knowledge aspects, both receptively and productively. These findings confirmed the interrelated knowledge of word aspects and previous claims that learning a word occurs on a developmental continuum (Henriksen, 1999; Lin, 2015; Nation, 2013; Schmitt & Meara, 1997; Sukying, 2017). In conclusion, each aspect of word knowledge contributes to word learnability; therefore, understanding the roles of word knowledge aspects can facilitate vocabulary acquisition and development.

### **5.3 Implications for vocabulary learning**

#### **5.3.1 Theoretical contribution**

The current study provides quantitative confirmation of the L2 Word Learnability Hypothesis. A repeated-measures ANOVA indicated that word knowledge had varying degrees of understanding. The correlative analysis revealed a positive interrelatedness of word knowledge. The findings reconfirm that the process of vocabulary learning occurs on a developmental continuum. As such, some aspects of a word may be mastered before acquiring other aspects. This suggests that word knowledge is a crucial intermediary for vocabulary acquisition such that deeper word knowledge across different modes of learning is more useful in developing overall vocabulary and English language learning among EFL learners rather than any single learning mode alone.

#### **5.3.2 Methodological contribution**

Word knowledge should be assessed using both receptive and productive measures and should include the process of learning a word to gain effective data for word learnability. Each type of word knowledge requires a different measure (Schmitt, 2010, Nation, 2013). As such, six distinct measures of word knowledge were developed: 1) the Word Segmentation Test (WST), designed as a receptive measure of word form, required participants to break down the word component into morphemes, 2) the Affix Elicitation Test (AET), designed as a productive measure of word form, asked participants to recall and produce the appropriate form of a word in the context, 3) the L2 Translation Test (L2TT), designed as a receptive measure of word meaning, required the recognition of the word definition in L1, 4) the L1 Translation Test (L1TT), designed as a productive measure of word meaning, asked participants to produce the word definition in English, 5) the Collocation Recall Test (CRT), designed as a receptive measure of word use, required participants to recognize the collocational word, and 6) the Productive Collocation Recall Test (PCRT), designed as a productive measure of word use, asked participants to recall the collocational words.

Therefore, the current study provides an innovative methodology for practitioners, test developers, and researchers. A pioneering battery of word knowledge tests was developed to account for the aspect of word parts, the aspect of form-meaning link, and the aspect of word collocations. Given that the battery was shown to be reliable and valid, researchers and test developers should examine how to expand its possible research applications.

### **5.3.3 Pedagogical contributions**

The results reveal an empirical principle for teaching and learning word knowledge. Specifically, L2 word learnability is useful in developing learners' vocabulary and facilitating effective English language learning. The instruction should explicitly teach the comprehensive concept of word knowledge in order to improve the depth and breadth of word knowledge. Also, word knowledge, referred to as the foundation of English language learning, can positively affect other sub-skills of the English language. Alternatively, the implication of the current study can possibly promote the policy in the English pedagogy. L2 word learnability is one of the effectively alternative options in developing Thai EFL learners in vocabulary acquisition. It will be better if there is vocabulary teaching and learning in Thai EFL learners, such as, creating a course of word knowledge in the English curriculum. Indeed, understanding the roles of word knowledge is going to facilitate the comprehension and production of word knowledge (form, meaning, use). Specifically, it has been already taught the knowledge of form and meaning in the English educational context. However, there is no teaching and learning the use of a word yet. As such, it will be useful in promoting the aspect of use in vocabulary teaching and learning.

### **5.4 Limitations for the current research**

It is difficult to capture the eighteen aspects of a word using the word knowledge framework. This is because these will increase the number of words to learn, possibly leading to a heavy learning burden. Furthermore, there is a gap in the appropriateness of words. The prompt words were selected by comparing the Academic Word List (AWL) (Coxhead, 2000) and the New General Service List (NGSL) (Browne, Culligan, & Phillips, 2013). The word lists may not suit a Thai EFL context, which is on the lower standard of the English education system. Additionally, it should be

noted that the findings may not be generalizable beyond the Thai culture of participants in the current study. Similarly, the education level was restricted to senior high school; hence, the results cannot be generalized to other educational levels.

### **5.5 Recommendations for future research**

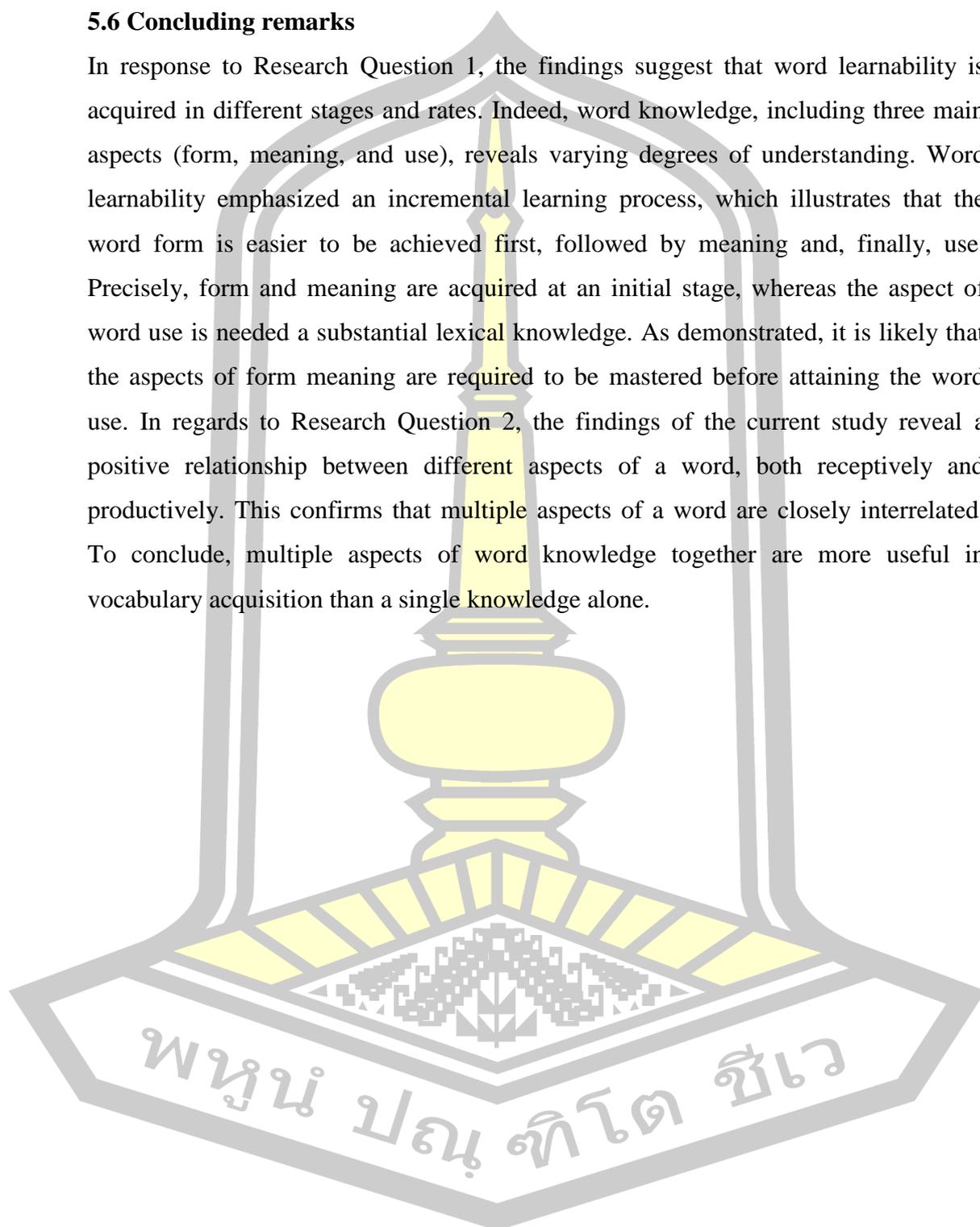
Longitudinal research is required to investigate the pattern of vocabulary acquisition and provide a better understanding of word learnability in the Thai EFL learners. Furthermore, a follow-up study should be planned to explore the longitudinal changes in the different educational levels, such as primary school, junior high school, and university. The administration of the word knowledge tests was time-consuming; hence, using a time-saving mode of testing, such as an adaptive computer test, may benefit future research. Other instruments, such as observation, questionnaires, and interviews, for qualitative methodology, should also be used to ensure the reliability and validity of the target information and gain additional information. The study content and/or measures should be directly related to the context, and larger sample size would also be beneficial.

In particular, the targeted group is supposed to be a group of good students, interested in English language and/or moving on to a higher level of education. This is because they need to focus on English language in further. Specifically, one of the problems happened obviously in the current study that should be aware of. To illustrate, in general, the Thai EFL participants were a low performance of word knowledge and, particularly, the content in the tests was a heavier degree. The results might be failed because the student skill of English language can possibly impact on and the word tests contained a lot of contents that seemed to take too long and overwhelming to the students.

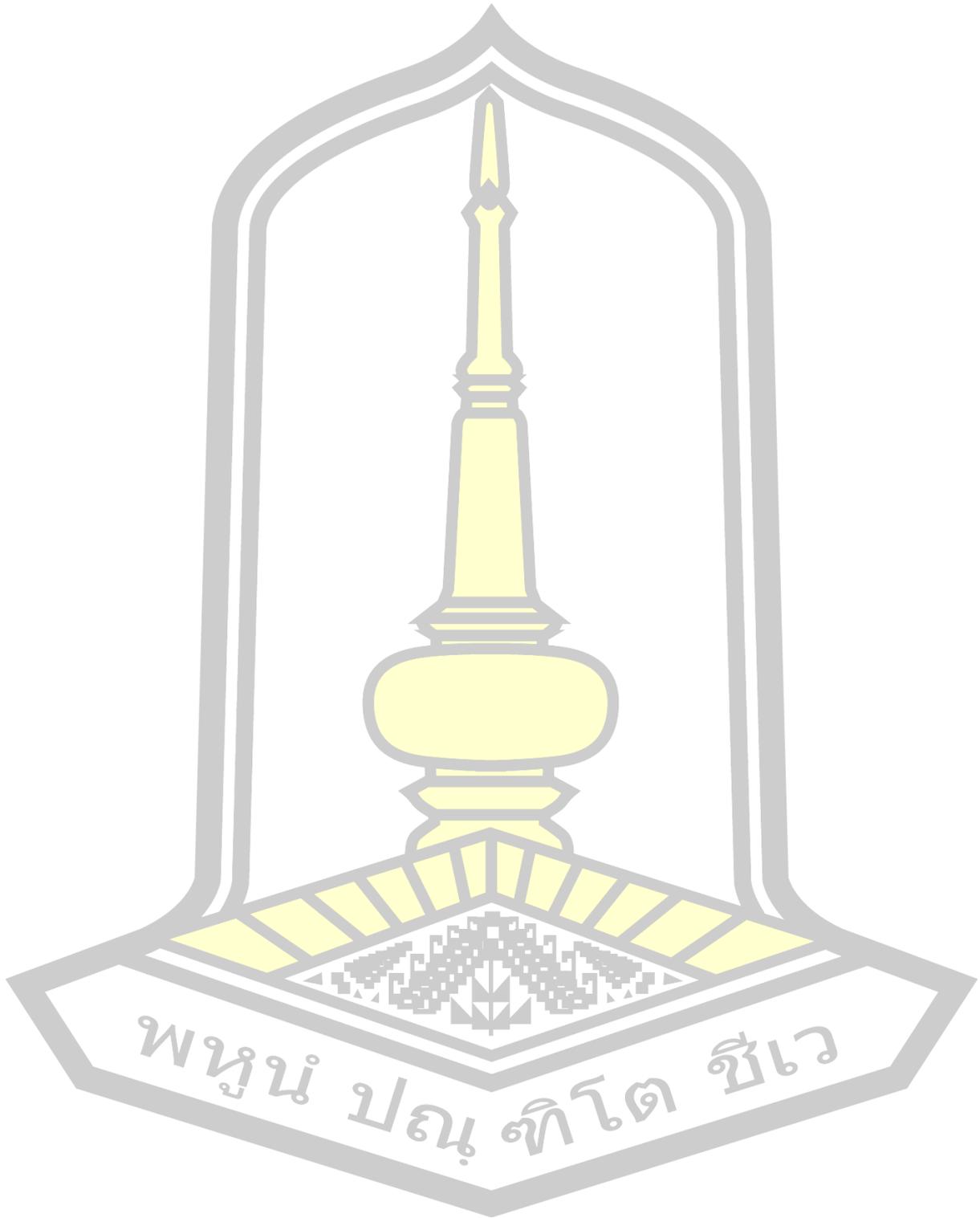
Alternatively, the implication of the current study, the hierarchy of L2 word knowledge, can be a beneficial model for the further research in the area of vocabulary acquisition and development. Indeed, it will provide a clearer picture of L2 word learnability. Finally, there is a pressing need to measure the 18 aspects of word knowledge to explore the developmental process of vocabulary learning and varying perspectives of word knowledge.

### 5.6 Concluding remarks

In response to Research Question 1, the findings suggest that word learnability is acquired in different stages and rates. Indeed, word knowledge, including three main aspects (form, meaning, and use), reveals varying degrees of understanding. Word learnability emphasized an incremental learning process, which illustrates that the word form is easier to be achieved first, followed by meaning and, finally, use. Precisely, form and meaning are acquired at an initial stage, whereas the aspect of word use is needed a substantial lexical knowledge. As demonstrated, it is likely that the aspects of form meaning are required to be mastered before attaining the word use. In regards to Research Question 2, the findings of the current study reveal a positive relationship between different aspects of a word, both receptively and productively. This confirms that multiple aspects of a word are closely interrelated. To conclude, multiple aspects of word knowledge together are more useful in vocabulary acquisition than a single knowledge alone.



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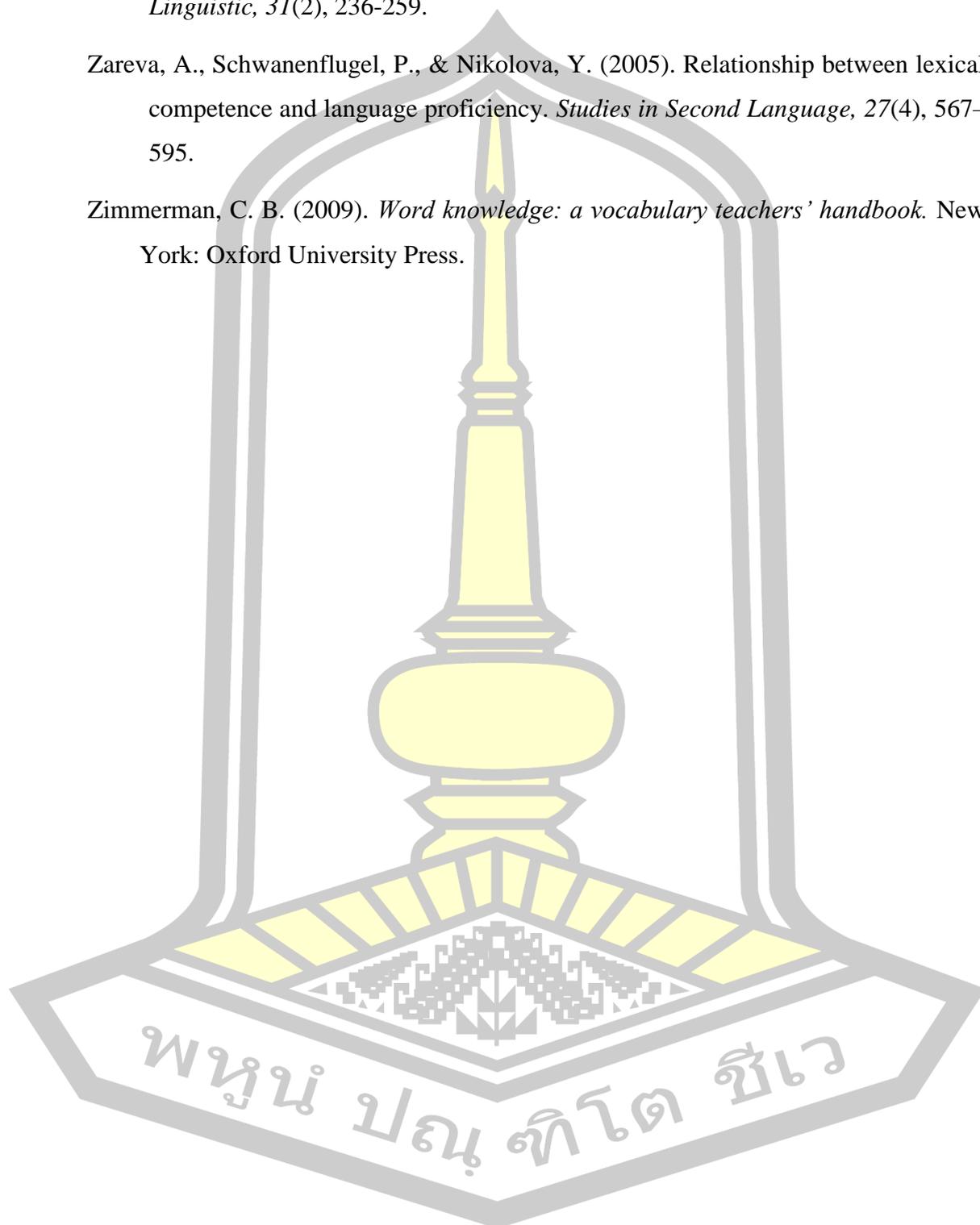
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## APPENDIXES

### Appendix A: The Word Segmentation Test (WST)

**Instructions:** Break down a word into the smallest parts (จงแยกหน่วยคำของคำศัพท์ที่กำหนดมาให้)

*E.g.,* students = student + s  
 happiness = happy + ness  
 abnormal = ab + normal

- |                    |   |
|--------------------|---|
| 1. availability    | = |
| 2. financial       | = |
| 3. methodize       | = |
| 4. requirement     | = |
| 5. sectioning      | = |
| 6. non-traditional | = |
| 7. deregistration  | = |
| 8. unpublished     | = |
| 9. communicatively | = |
| 10. summation      | = |
| 11. attachment     | = |
| 12. authorship     | = |
| 13. uncultured     | = |
| 14. transporter    | = |
| 15. differently    | = |
| 16. indefinitely   | = |
| 17. equipment      | = |
| 18. publication    | = |
| 19. successfully   | = |
| 20. uncharted      | = |
| 21. summarization  | = |
| 22. researcher     | = |
| 23. cultural       | = |
| 24. designer       | = |
| 25. injury         | = |
| 26. contacted      | = |

27. reconsideration

=

28. inaccessible

=

29. expertly

=

30. stressful

=

31. challenged

=

32. adulthood

=

33. survivor

=

34. revision

=

35. teaming

=

36. approachable

=

37. accessibility

=

38. briefly

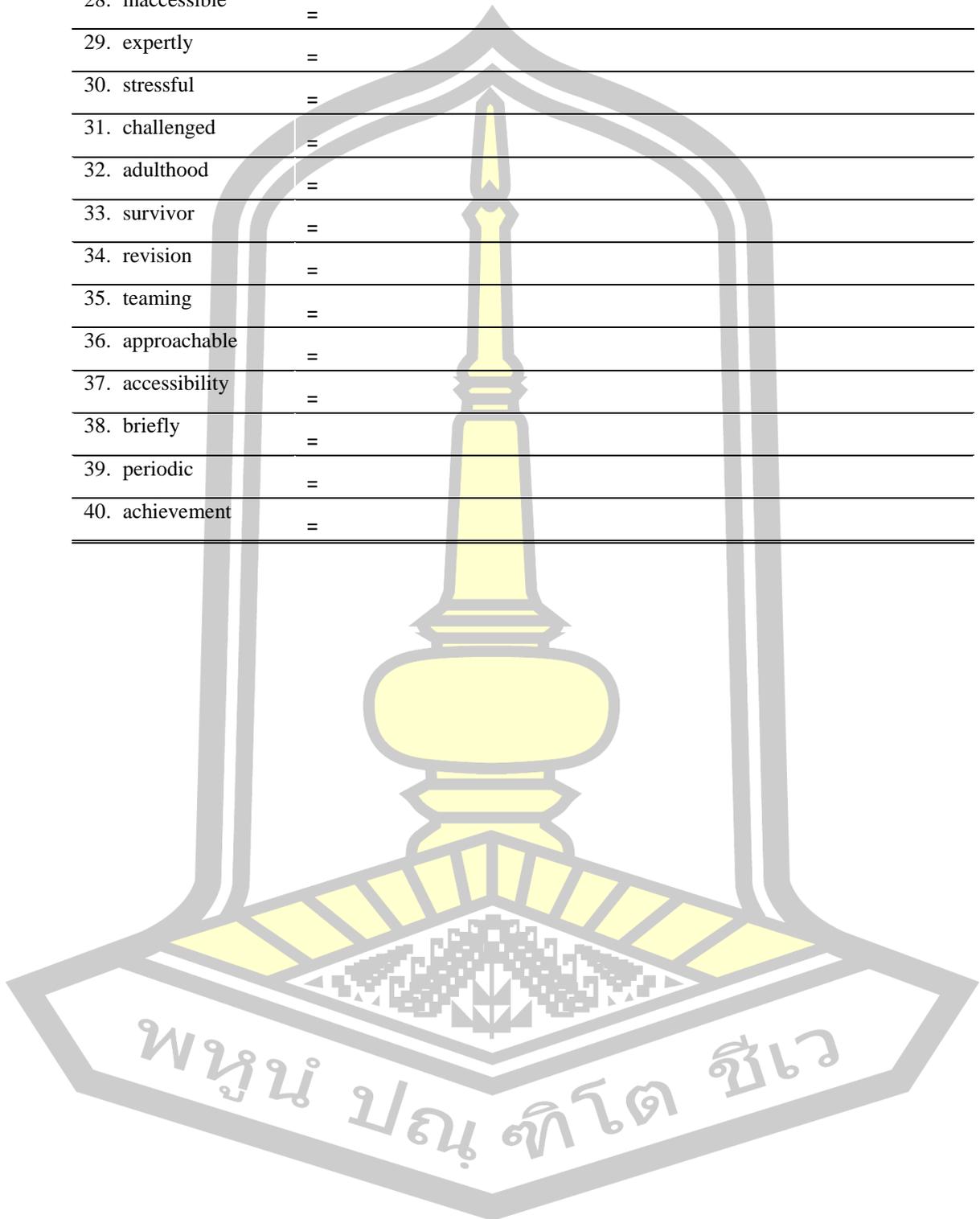
=

39. periodic

=

40. achievement

=



## Appendix B: The Affix Elicitation Test (AET)

**Instructions:** Choose an appropriate part of speech in part B to complete the sentence in part A.

Part A: จงเติมคำศัพท์ที่กำหนดมาให้ลงในช่องว่างให้เหมาะสมกับรูปประโยค

Part B: จงกาบาทเลือกชนิดของคำจากคำที่เติมลงในช่องว่างในประโยค

E.G., A: Fill in the blank

Tam has worked in Mahasarakham Hospital for 2 years. (work)

I cannot see the board clearly. (clear)

**B: Missing part of speech**

N	V	Adj.	Adv
	X		
			X

### A. Fill in the blank

### **B. Missing part of speech**

	N	V	Adj.	Adv
1. I am not _____ tonight because I need to study for an English exam. (avail)				
2. Mr. Wicks wants to apply for a _____ position. (finance)				
3. Many _____ are used in the Thai educational system. (method)				
4. Students are _____ to bring a dictionary to the translation's exam. (require)				
5. There is only one _____ of English Writing class. (section)				
6. A group of children will perform _____ dances next week. (tradition)				
7. How many students have _____ for English class so far? (register)				
8. Mr. Kevin Scholes is an editor and _____ for the Magazine Center Company. (publish)				
9. He is a skilled _____. (communicate)				
10. The teacher _____ up the lessons at the end of class yesterday. (sum)				
11. Please see the _____ file. (attach)				
12. Tom and Jim are the most famous _____ of children's books. (author)				
13. Can you summarize for me chapter 4's lesson _____? (brief)				
14. The plane will _____ us from Bangkok to Sydney. (transport)				
15. My brother and I have _____ lifestyles. (differ)				
16. I _____ need a holiday. (definite)				
17. We must _____ young teachers to deal with difficult children (equip)				
18. The president is going to give a _____ speech next Monday. (public)				
19. Mark Zuckerberg is a highly _____ businessman. (success)				
20. This _____ showed the number of road accidents that happened last year. (chart)				

พหุ ประถมศึกษา

## Appendix C: The L2 Translation Test (L2TT)

**Instructions:** Choose the word with similar meaning (จงกากบาทเลือกคำศัพท์ที่มีความหมายคล้ายกับคำศัพท์ที่กำหนด)

E.g., Book

- a) reserve = correct
- b) revenge
- c) remove
- d) restore

1. **team**

- a) squad
- b) singer
- c) player
- d) person

2. **stressed**

- a) relax
- b) pressure
- c) generous
- d) good

3. **equipment**

- a) mathematics
- b) punishment
- c) material
- d) movement

4. **access**

- a) existing
- b) emotion
- c) entrance
- d) email

5. **research**

- a) teach
- b) instruct
- c) study
- d) teach and study

6. **achieve**

- a) pain
- b) gain
- c) fill
- d) go

7. **available**

- a) benefit
- b) helpful
- c) usable
- d) understandable

8. **challenge**

- a) dare
- b) dread
- c) fear
- d) horridness

9. **period**

- a) perspective
- b) edge
- c) emergency
- d) time

10. **author**

- a) reader
- b) writer
- c) listener
- d) speaker

11. **design**

- a) insert
- b) create
- c) collapse
- d) insect

12. **survive**

- a) lose
- b) decrease
- c) live
- d) rate

13. **transportation**

- a) vehicle
- b) translator
- c) transformer
- d) vitamin

14. **contact**

- a) complete
- b) connect
- c) calculate
- d) a and b correct

15. **revise**

- a) update
- b) remove
- c) reverse
- d) retire

16. **adult**

- a) teen
- b) grown
- c) old
- d) bold

17. **register**

- a) empower
- b) improve
- c) enroll
- d) enter

18. **culture**

- a) drawing
- b) public
- c) society
- d) picture

19. **expert**

- a) strong
- b) pressure
- c) harm
- d) skillful

20. **consider**

- a) think over
- b) sleep over
- c) stay over
- d) look over

21. **injury**

- a) pang
- b) kindness
- c) strength
- d) street

22. **site**

- a) location
- b) situation
- c) limitation
- d) length

23. **summary**

- a) outlet
- b) outfit
- c) conclusion
- d) construction

24. **trend**

- a) comment
- b) movement
- c) retirement
- d) document

25. **emerge**

- a) disappear
- b) appear
- c) lose
- d) pair

26. **finance**

- a) fund
- b) foundation
- c) found
- d) fertilizer

27. **method**

- a) margin
- b) process
- c) profession
- d) profit

28. **requirement**

- a) development
- b) necessary
- c) nephew
- d) destruction

29. **section**

- a) animation
- b) amazon
- c) area
- d) air

30. **tradition**

- a) belief
- b) butterfly
- c) bill
- d) bravery

31. **publish**

- a) print
- b) summarize
- c) prepare
- d) avoid

32. **communicate**

- a) conduct
- b) consume
- c) contact
- d) control

33. **sum**

- a) all
- b) little
- c) many
- d) enough

34. **attach**

- a) delete
- b) remove
- c) add
- d) addict

35. **brief**

- a) explain
- b) expire
- c) expend
- d) exact

36. **difference**

- a) separation
- b) generation
- c) together
- d) addition

37. **definite**

- a) unquestionable
- b) grounded
- c) enormous
- d) popular

38. **public**

- a) computer
- b) community
- c) communication
- d) conflict

39. **success**

- a) achievement
- b) accomplishment
- c) successfulness
- d) all correct

40. **chart**

- a) table
- b) chair
- c) closet
- d) bed

## Appendix D: The L1 Translation Test (L1TT)

**Instructions:** Read the meaning of the following words in Thai and complete the English words with the first letter given (จงเขียนคำศัพท์ภาษาอังกฤษที่มีความหมายตรงกับคำศัพท์ในภาษาไทยโดยเขียนตามตัวอักษรที่กำหนดมาให้)

E.g., 1. นาฬิกา = \_\_\_\_\_ watch \_\_\_\_\_.

2. การอ่าน = \_\_\_\_\_ reading \_\_\_\_\_.

1. ที่สามารถเข้าได้	= a
2. วิจัย	= r
3. การพิจารณา	= c
4. ความท้าทาย	= c
5. ใช้ประโยชน์ได้	= a
6. ขนส่ง	= t
7. ระยะเวลา	= p
8. ที่เกี่ยวกับการสื่อสาร	= c
9. นักเขียน	= a
10. ลงทะเบียน	= r
11. ตรวจสอบ	= r
12. ผู้เชี่ยวชาญ	= e
13. อย่างประสบความสำเร็จ	= s
14. ผู้ใหญ่	= a
15. วัฒนธรรม	= c
16. การอยู่รอด	= s
17. ความเครียด	= s
18. กลุ่มคนทำงานหรือเล่นกีฬาในกลุ่มเดียวกัน	= t
19. อุปกรณ์	= e
20. นักร้องแบบ	= d

พูน ปณ ทิโต ชเว

## Appendix E: The Collocation Recognition Test (CRT)

**Instructions:** Choose the best word choice in the first column to describe the noun in the second.

(จงเลือกคำคุณศัพท์ที่เหมาะสมที่สุดกับคำนาม)

E.g., large  
big  
mini

big news

### Adjective

thirsty  
professional  
smelled  
conventional  
communicative  
good  
opposing  
industrial

large  
new  
beautiful  
well-known

quick  
local  
small  
forthcoming

strong  
huge  
tiny  
informal

large  
tiny  
special  
enormous

effective  
little  
emotional  
small

enormous  
personal  
obvious  
ancient

big  
external  
large  
flip  
rural

### Noun

1. \_\_\_\_\_ expert  
2. \_\_\_\_\_ approach

3. \_\_\_\_\_ design  
4. \_\_\_\_\_ site

5. \_\_\_\_\_ trend  
6. \_\_\_\_\_ author

7. \_\_\_\_\_ transport  
8. \_\_\_\_\_ publication

9. \_\_\_\_\_ team  
10. \_\_\_\_\_ register

11. \_\_\_\_\_ requirement  
12. \_\_\_\_\_ publisher

13. \_\_\_\_\_ method  
14. \_\_\_\_\_ section

15. \_\_\_\_\_ tradition  
16. \_\_\_\_\_ finance

17. \_\_\_\_\_ chart  
18. \_\_\_\_\_ success

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short  
handed  
quick

19. \_\_\_\_\_ period  
20. \_\_\_\_\_ culture

great  
cool  
high  
careful

21. \_\_\_\_\_ challenge  
22. \_\_\_\_\_ stress

interested  
careful  
young  
destructible

23. \_\_\_\_\_ adult  
24. \_\_\_\_\_ consideration

effective  
famous  
big  
cheap

25. \_\_\_\_\_ communication  
26. \_\_\_\_\_ difference

maximized  
tall  
local  
academic

27. \_\_\_\_\_ research  
28. \_\_\_\_\_ culture

sure  
limited  
clear  
obvious

29. \_\_\_\_\_ brief  
30. \_\_\_\_\_ period

sudden  
good  
national  
well

31. \_\_\_\_\_ register  
32. \_\_\_\_\_ emergence

affixed  
short  
messy  
standard

33. \_\_\_\_\_ summary  
34. \_\_\_\_\_ equipment

neutral  
free  
day-to-day  
up-to-date

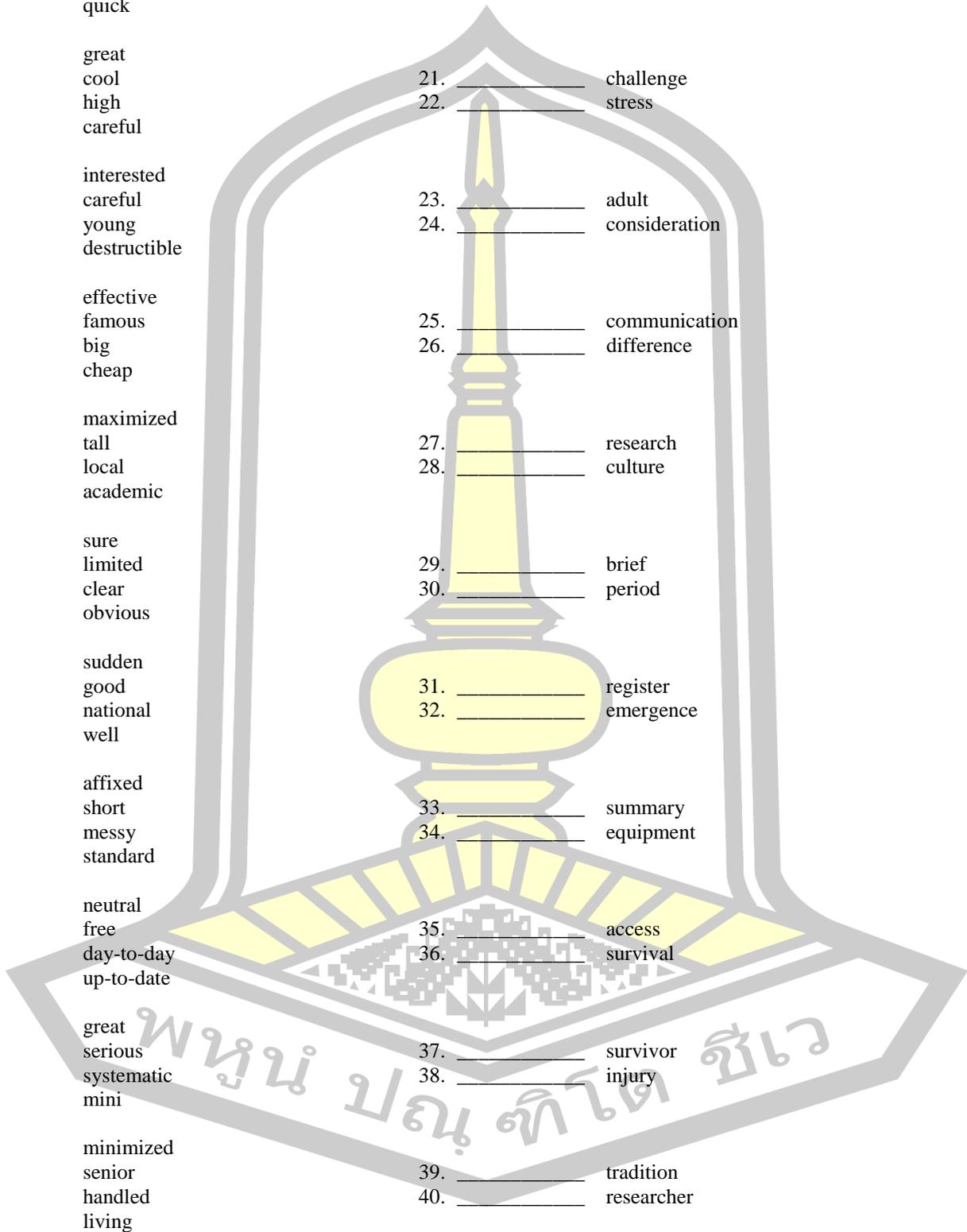
35. \_\_\_\_\_ access  
36. \_\_\_\_\_ survival

great  
serious  
systematic  
mini

37. \_\_\_\_\_ survivor  
38. \_\_\_\_\_ injury

minimized  
senior  
handled  
living

39. \_\_\_\_\_ tradition  
40. \_\_\_\_\_ researcher



### Appendix F: The Productive Collocation Recall Test (PCRT)

**Instructions:** Complete the sentence below with an appropriate word. The first two letters are provided. (จงเติมคำคุณศัพท์ที่เหมาะสมกับคำนามในประโยค โดยเติมคำให้สมบูรณ์จากอักษรที่กำหนดมาให้)

E.g., Bodyslam is the *fa mous* **band** in Thailand

Do you want to hear the good or *ba d* **news** first?

1. Taking the IELTS is my first *re* \_\_\_\_\_ **challenge** of my student's life.
2. A *ne* \_\_\_\_\_ **approach** of learning is aimed to focus more on learner-centered.
3. Many people are against such a *mo* \_\_\_\_\_ **design** in the old city center.
4. Many *an* \_\_\_\_\_ **sites** were destroyed in 1898.
5. A *re* \_\_\_\_\_ **trend** in outfits is a colorful style.
6. J.K. Rowling is a *we* \_\_\_\_\_ **author** of the Harry Potter series.
7. Mr. Smith often travels by *pu* \_\_\_\_\_ **transport**.
8. She spent her holiday writing book reviews for a *ne* \_\_\_\_\_ **publication**.
9. Mr. Koke Zidane coached the Australian *na* \_\_\_\_\_ **team** in 2002.
10. This car was a *fo* \_\_\_\_\_ **register** under my name.
11. If you have any *spe* \_\_\_\_\_ **requirements**, you can directly inform my manager in the office.
12. Oxford University Press is one of the *bi* \_\_\_\_\_ **book publishers** in England.
13. Would you mind if I ask you a *pe* \_\_\_\_\_ **question**?
14. All information is summarized as a *pi* \_\_\_\_\_ **chart**.
15. David Beckham suffered a *se* \_\_\_\_\_ **injury** in 2002.
16. Lastly, what is your *fi* \_\_\_\_\_ **answer**?
17. *Go* \_\_\_\_\_ **communication** is necessary in business.
18. The policeman explained a *cl* \_\_\_\_\_ **summary** of the situation to the victims.
19. Apple Inc. announces that a *ne* \_\_\_\_\_ **computer equipment** is going to be launched soon.
20. The Lion King movie achieved a *gr* \_\_\_\_\_ **success** last year.

พหุ ประถมศึกษา

## BIOGRAPHY

<b>NAME</b>	Mr. Worakrit Nontasee
<b>DATE OF BIRTH</b>	July 26, 1993
<b>PLACE OF BIRTH</b>	Loei, Thailand
<b>ADDRESS</b>	242 Village No. 4, Bua Kho Sub-district, Mueang Maha Sarakham District, Maha Sarakham Province, 44000
<b>EDUCATION</b>	2009 Junior High School in Mahasarakham University Demonstration (Secondary) School 2012 Senior High School in Mahasarakham University Demonstration (Secondary) School 2015 Bachelor of Arts (B.A.) in English, Khon Kaen University 2020 Master of Education in English Language Teaching (M.Ed), Mahasarakham University

