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Morphological Analysis as a Strategy for Thai Students' Vocabulary Development

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ABSTRACT

This study aimed to show the efficacy of morphological analysis as a vocabulary-developing strategy that enables students to decode or determine the meanings of vocabulary, to enlarge vocabulary and to retain vocabulary in long-term memory. The study was a one-group pre-test-post-test experiment and investigated the effect of morphological analysis on the vocabulary-developing ability of 40 Bangkok University students and explored their attitudes towards the use of morphological analysis. The instruments were a vocabulary test and a questionnaire exploring their attitudes toward morphological analysis. The pre-test and post-test scores of the experimental group were calculated by descriptive statistics and compared using a dependent t-test measure. It was found that the students obtained higher scores on the post-test than on the pre-test at 0.05 level of significance. In addition, their attitudes towards using morphological analysis were enthusiastic. Moreover, the results of this study suggested that using morphological analysis assisted the students in decoding the meanings of vocabulary and enlarging vocabulary, helped them to retain vocabulary in long-term memory, motivated them to learn the English language and gave them pleasure in learning vocabulary. Pedagogical implications for vocabulary learning are suggested in the conclusion.

Keywords: vocabulary building strategies, vocabulary retention techniques

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INTRODUCTION

Research and theory reveal three particularly crucial facts about English vocabulary. First, vocabulary knowledge is crucial to reading comprehension and to general success in school. Second, the task of learning vocabulary faced by students is enormous.

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Third, there is substantial and increasing evidence that many poor children enter school with a vocabulary much smaller than that of their middle-class counterparts and that having a small vocabulary is a huge obstacle to success in reading. Given these facts, finding effective and efficient ways to bolster students' vocabulary is essential (Baumann & Kame'enui, 2004). As Sorbi (2010) stated, it now seems clear that vocabulary acquisition does not happen by itself to any satisfactory degree, particularly to a level that is generally needed for first-language literacy or second-language acquisition. Lexical growth must therefore be provided in language instruction. It is widely accepted that vocabulary plays an important part in language learning and should be at the centre of language teaching. Without a sufficient vocabulary, one cannot communicate effectively or express ideas. Having a limited vocabulary is also a barrier that prevents students from learning a foreign language. If students do not know how to expand their vocabulary, they gradually lose interest in learning.

What's more, Nation (2006) suggested that there are three main ways in which a learner's vocabulary increases: through being taught or deliberately learning new words, through learning new words by meeting them in context and through recognising and building new words by gaining control of roots, prefixes and suffixes. However, this study focuses on Nation's (2006) third way to increase learners' vocabulary i.e, morphological analysis.

Morphological analysis, also known as morphology analysis, morphemic analysis or word-part or word-element analysis, examines how words are constructed with roots or stems and affixes (prefixes and suffixes). It is a vocabulary-learning strategy that can resolve the aforementioned problem because morphology can contribute to expanding and elaborating learners' vocabulary knowledge. Indeed, learners who are familiar with English morphology are able to recognise more of the words that they encounter in reading passages (Sorbi, 2010). Mountain (2007) proposed that research supports the morphemic analysis of prefixes, suffixes and roots as an effective way to build vocabulary as well. In addition, using morphological analysis to help remember new words is a major vocabulary-learning strategy. This method deserves time and repeated attention because it can involve such a large proportion of English vocabulary (Nation, 2006). Mountain (2007) stated that 65% of English words are made up partly or entirely of prefixes, suffixes and roots derived from Latin and Greek. Similarly, Bromley (2007)) affirmed that the meanings of 60% of multisyllabic words can be inferred by analysing morphology. Knowing the meaning of a root, prefix and suffix often gives clues to what a word means. Because much of the English language comes from Greek and Latin, we would do well to teach students the common derivatives. This is especially true for the study of science, which contains many multisyllabic terms. Knowing just a few roots makes it much easier to figure out other

words that contain these roots. For example, archeology consists of the root *archeo/ archi/arch* meaning "ancient" and the suffix *logy* meaning "the science or the study of". Therefore, archeology is the study of history from the remains of ancient buildings, tools and other objects. Another example is the word *disaster*, which is assembled with the prefix *dis*- meaning "negative" and the root *aster*- meaning "star". Thus, disaster means that the stars were in a bad position, resulting in the occurrence of a catastrophic event. The last example is the suffix *ify*-, which indicates the function of the word as a verb and means "to make something become the thing or have the specified quality"; if students knew this, they would be able to guess the meaning of many words such as *intensify, magnify, simplify* and *rectify* that use this suffix even if they were meeting the words for the first time.

According to Mountain (2007), spending class time on frequently-used Latin roots is an exceedingly worthwhile practice because it helps students establish connections. Consider the root *mort* (meaning death). Familiarity with this root helps students determine the meanings of such words as *mortuary* (connected with death or funerals) and *mortality* (the number of deaths during a certain period of time). Nation (2006) suggested that if learners had special purposes for learning English, it would be worth investigating whether there were affixes and stems that were important in their areas of specialisation. Students of medicine, botany and zoology, for example, will find that knowing the meaning of affixes and roots such as *itis, hemo* and *photo* can give them access to the many technical words in their fields that use affixes.

In the light of vocabulary teaching, teachers should instruct students to roots and affixes and lead students to realise the importance of roots and affixes. Almost 50% of English words are complex and they can be more easily understood through the study of the root and affix of each word (Chatzisavvas, 2005). Aside from teaching students about roots and affixes, teachers should encourage students to practise using roots and affixes by doing vocabulary exercises so that they can recycle vocabulary; this can lead to improved vocabulary (Thornbury, 2008). One such exercise could be the breaking of words into root, prefix and suffix to help figure out the meaning of the word (Hiebert & Kamil, 2005). Nist and Simpson (2001) also noted that many individuals believe that the knowledge of a word element can significantly increase vocabulary because learners can figure out unknown words by examining the parts of words such as their prefixes, suffixes and roots. Understanding the meanings of the root and the affix of a word is an important step in independently determining the meaning of an unknown word.

As stated by Nation (2008), and as with all vocabulary-learning strategies, morphological analysis can be used with both high- and low-frequency words. It is, of course, more suited to words that contain useful word parts. Note that word-part analysis is a rather risky way of guessing

the meanings of unknown words and is best regarded as a mnemonic trick for remembering word parts that have already been understood. Therefore, teaching roots and affixes is beneficial to students because this method gives students a strategy for decoding the meanings of unknown words. (Buddingh, 2009).

To gain an insight into morphological analysis, the various perspectives of some scholars are presented as follows:

1. Nist and Simpson (2001) noted that the most important word element is a word's root. The root is the word element from which most of the meaning is derived, and thus the root carries most of the denotative or dictionary meaning. Word elements cannot be broken down any further than a root and still carry meaning. However, two roots can be put together to form a word, such as the word *cinematography*, which is a combination of the roots *cinema* and *graph*. Additionally, a root can be combined with either a prefix or suffix, as in the case of gynecology (the suffix *–ology*, meaning "the study of" + the root *gyneco-*, meaning "women"). A list of common roots taken from Latin and Greek and examples of their use is shown in Table 1.

TABLE 1
A List of Common Roots Taken from Latin and Greek

Root	Meaning	Example
acer, acr	sharp, bitter	acerbic, acrimony
amor	love	amorous
annu, enni	year	annual, centennial
aud	hear	audio
auto	self	autocrat
bell(e)	beautiful	embellishing
bene	well, good	benefactor
bio	life	biosphere
cap	take, hold	captivate
carn	flesh	carnal
clam, claim	shout, cry	exclaim
cogn	to learn	cognitive
corp, corpo	body, flesh	corpse
cred	believe	credibility
de, div	god	deity
duc, duct	lead	conduct
ideo	one's own peculiar style	idiosyncrasies
mania	madness	egomania
mis, mit	send	mission, emits
mne	memory	mnemonic
mort	death	moribund
polis	city, state	cosmopolitan
rupt	break, burst	rupture
scrib, script	write	transcribe
spec, spect, spi	look, look at	spectacle
sym, syn	same, together	sympathy, synthesis
vit, viv	life, live	vivacious

(Chatzisavvas, K, 2003; Nist-Olejnik, S. L., & Simpson, M. L., 2001)

The next most important word element is the prefix. Although prefixes do not add as much information as roots do, they bring more meaning than suffixes do. Prefixes are elements added to roots at the beginning of the word. Sometimes prefixes can be removed from the root, and the remaining elements can stand on their own and make sense. Such is the case with the

word *nonintrusive*. When the prefix *non-* is removed, what remains, *intrusive*, is a word that has meaning on its own. A list of common prefixes with examples is shown in Table 2.

TABLE 2
A List of Common Prefixes

Prefix	Meaning	Example
a	from, down, away	abolition, aberration
anti	opposing, against	anti-contraceptive
bi	two	binary
circum	around	circumvent
contra	against, opposite	contraception
de	from, down	deteriorate
dis	not, apart	disintegrate
em, en	not, into, very	embody, enhance
equi	equal, fair	equivalency
il, ir	not	illogical, irrelevant
mal, male	harmful	maladjusted
mis	wrongly, badly	mistreat
post	after	postmodernism
pseudo	false	pseudoscience
socio	social, society	sociology
sub	below, under	submerge

(Chatzisavvas, K, 2003)

The final word element is the suffix. Suffixes carry the least amount of meaning. Their primary function is either to change the part of speech, as in from *propose to proposition,* or to change the word to its plural form or its past tense, as in the words *complications* and *spawned.* Some suffixes, such as *logist*, which means "one who studies", extend the meanings of word roots, as in the case of *biologist* and *gynecologist*. A list of common suffixes is shown in Table 3.

TABLE 3
A List of Common Suffixes

Suffixes that form noun	Suffixes that form adjectives	Suffixes that form verbs
ac	able, ible	ate
cracy	ac, ic	ify
ance	al	ise
dom	ant, ent	Ish
ence	ary, ory	Suffixes that form adverbs
er, or	dom	ly
ess	en	
graph	ful	
ion, tion	ive	
ician	like	
ism	ous, ious	
ist	some	
ity	y	
ment		
meter		
ness		
ology		
scope		
sis		
tude		
ure		

(Nist-Olejnik, S. L., & Simpson, M. L., 2001)

Nist and Simpson (2001) also proposed guidelines for using morphology as a strategy for vocabulary enrichment as follows:

- Learners should try not to memorise the definitions of prefixes or roots in isolation because attempting to learn definitions in this manner will

often cause them to know a word at the superficial level rather than at the conceptual level.

- If learners guessed the meaning of a word that contained a root or prefix, they should use the dictionary or context to verify their hunch. Sometimes word elements, such as content, communicate only a vague definition, so this extra step may be necessary and helpful to the learners in their quest to understand a word or a sentence.

2. As Kinsella *et al*. (2012) explained, morphological analysis or word analysis is very crucial to vocabulary learning because it can help students to determine the meanings of unknown words. For example, a secondary school teacher (Kinsella *et al*., 2012) reported reading about a character who suffered from amnesia. Teaching students that the prefix *a-* derived from Greek and means "not" while the base *mne-* means "memory" revealed the meaning of the word "amnesia". As a result, the students could make connections to various words in which the prefix *a-* changed the meaning of the base word (e.g. *apolitical, asymmetrical* and *atypical*). This was in line with Nation's (2006) proposal that using morphological analysis or word analysis to help remember new words is a major vocabulary-learning strategy. This strategy deserves time and repeated attention because it can involve such a large proportion of English words. Learning and reviewing high-frequency affixes will equip students with some basic tools for word analysis, which will be especially useful when they are prompted to apply them in rich and varied learning contexts. There are too many affixes to teach them all; however, it is important to realise that relatively few affixes account for the majority of affixed words in English. Thus, it is helpful to explicitly teach high-utility affixes (meaning and pronunciation) and to assist students in making connections as they encounter new vocabulary containing these parts. Once these basic affixes have been mastered, it can be useful to explore more complex or less frequent word parts. Additionally, focused word study that builds students' knowledge of Greek and Latin roots and bases can be of significant assistance to students. Learners in particular are unlikely to have read enough or engaged in enough academic conversations beyond school in which key roots were clarified. Linguists estimate that over 50% of the polysyllabic words found in English texts are of Latin and Greek derivations. Consequently, students must know the significance of learning English from roots.

3. Nation (2006) observed that knowledge of affixes and roots has two values for learners of English; this knowledge can be used to help them learn unfamiliar words by relating these words to known words or to known prefixes and suffixes, and it can be used as a way of ensuring whether an unfamiliar word has been

successfully guessed from context. Moreover, Nation also suggested that learners need to know several things to make use of a word's parts:

- For receptive use, they have to be able to recognise that a complex word, such as *unhappiness*, is made up of parts and that these parts can occur in other words, such as *unpleasant, happily* and *sadness*. Learners also need to know what the parts mean. In addition, they have to be able to see how the meanings of stems and affixes combine to make new but related meanings. In the case of most suffixes, this is largely syntactic, but particularly with prefixes, the affix can contribute significantly to the meaning of the complex word. An important extension of this to help learning is for learners to be able to see how the meanings of the parts relate to the dictionary meaning of a new word. This then allows the parts to act as mnemonic devices for the meaning.
- For productive use, the learner needs a more detailed awareness of the formal changes to the stem and the affix that can occur when they are combined to form a complex word. These formal changes can affect pronunciation, for instance as a result of stress change such as in words like *flirt/flirtation, quantity/quantify and describe/description*. They may also affect the written form, as in words like *sacrilege/sacrilegious* and *legal/illegal*. Some changes in the written form are covered by regular spelling rules. Additionally, for productive use the learner needs to be aware which form classes of stem words can take which affixes. For example, *-ly* can be added to adjectives but not to nouns.

4. Buddingh (2009) stated that one strategy that can be effective when teaching English is recognising and teaching cognates between the two languages. Cognates are words that are similar in structure and meaning in two languages and that have the same or similar meaning in two or more languages. Roots and affixes can be considered cognates. The study by Short and Echevarria (2005) echoed by Buddingh (2009)) showed that students who have a Latin-based native language are able to recognise English words with similar Latin derivations. The authors built a case for the need for students to learn academic language and vocabulary words. Many of these academic words are cognates, derivatives of the Romance languages, which refer to a group of related languages all derived from Vulgar Latin, which can be traced back to the era of the Roman Empire. Languages typically included in this category are French, Italian, Spanish, Portuguese and Romanian. These related languages all share a common basic vocabulary despite some phonological differences. Although English is not an official Romance language, the high instance of cognates between English and the Romance languages makes English very similar to the Romance languages. Table 4 shows

cognates relating to the Latin root word *viv*, which means life/live.

TABLE 4
Cognates Relating to the Latin Root Word "viv"

Language	Word	Meaning
English	live	live
French	vivre	live
Italian	vivere	live
Spanish	vivir	live
Portuguese	vivo	live

Roots and affixes can help students decode and decipher new words even if they are in an unknown or unfamiliar language because they sound and look similar. Although not all languages have cognates with the English language (for example, Chinese, which uses characters and different phonological pronunciation), teaching roots as cognates will be helpful for many students.

In addition to the perspectives of various scholars presented here, after reviewing the literature extensively, I found that many studies were carried out to demonstrate the three benefits of morphological analysis: enlarging vocabulary, decoding the meanings of unfamiliar words and bolstering reading comprehension (Singson *et al*., 2000; Mochizuki & Aizawa, 2000; Carlisle & Fleming, 2003; Ku & Anderson, 2003; Buddingh, 2009).

In Thailand, Thai students have difficulty figuring out and retaining the plethora of unfamiliar words found in their textbooks and examinations. This problem likely derives from the fact that Thai students like to study vocabulary using word lists and always immediately look up difficult words in a dictionary to find their meanings, which interrupts their reading comprehension (Jenpattarakul, 2012). As a result, their grades, especially in reading, tend to be very bad. Hence, to overcome major vocabulary pitfalls, students should be taught vocabulary-learning strategies that will assist them in determining, analysing and comprehending unfamiliar English words.

Because morphological analysis is one of several vocabulary-learning strategies and it is advantageous to students' vocabulary development, this research aimed to find out how morphological analysis affected students' vocabulary-developing ability by comparing their abilities before and after being taught morphological analysis.

PURPOSES OF THE STUDY

This study set the following as its purposes:

1. To compare students' vocabulary-developing abilities before and after being given explicit instruction in morphological analysis.
2. To survey the students' attitudes towards using morphological analysis.

RESEARCH QUESTIONS

To accomplish this investigation, the following research questions were formulated:

1. To what extent did the students improve their vocabulary-developing ability after being given explicit instruction in morphological analysis?

2. How did the students respond to the use of morphological analysis?

MATERIALS AND METHODS

The following is a discussion of the materials and methods used in this study:

1. This research used a one-group pre-test-post-test design. The data were collected from 40 students enrolled in an intermediate English course in the first semester of the 2012 academic year at Bangkok University. The participants were selected by purposive sampling. Among the participants, 20 were males and the other 20 students were females. The ages of the participants ranged from 18 to 20 years old.
2. Two instruments were employed in the study:

   a. Vocabulary pre-test and post-test

To boost the internal validity of the study by ensuring vocabulary pre-test and post-test, three criteria were used to screen the target words on the vocabulary test.

Twenty words were selected from the Collins COBUILD English Dictionary (2006) to ensure that these words were intriguing and able to make the students realise the importance of morphological analysis as a vocabulary-developing strategy. Furthermore, the components of selected words included roots, prefixes or suffixes so that students could practice assembling, disassembling and reassembling word parts. The target words were *amnesia, disruption, metropolis, pseudonym, seduction, conspicuous, carnivore, benevolent, credulous, mortuary, post-mortem, corpulence, malformation, circumscribe, asymmetrical, annuity, deify, vivacity, clamorous* and *malefactor*.

To minimise the students' familiarity with the selected words, vocabulary familiarity tests were given to them before they took the vocabulary pre-test to ensure that none of the students knew the meanings of the target words. The vocabulary familiarity test was constructed by Paribakht and Welsche (1997) and consisted of 5 levels as follows:

Level 1: I do not remember having seen this word before.

Level 2: I have seen this word before, but I do not know what it means.

Level 3: I have seen this word before, and I think it means _ _ _ _ _ _ _ _ _ (synonym or translation).

Level 4: I know this word. It means _ _ _ _ _ _ _ _ _ _ (synonym or translation).

Level 5: I can use this word in a sentence, for example, _ _ _ _ _ _ _ _ _.

To ensure the validity of the vocabulary test by calculating the Item-Objective Congruence (IOC) index, the test was given to two experts at the Language Institute of Bangkok University to examine and rate each item so that the content met the objectives of the study. The Item-Objective Congruence (IOC) or the content validity of the vocabulary test was calculated by assigning scores to three types of answers: congruent = 1, uncertain = 0, incongruent =

-1. The Item-Objective Congruence (IOC) of vocabulary test is .96 which is acceptable. In this study, a vocabulary pre-test and post-test contained 20 targeted words designed to assess the students' vocabulary developing abilities as follows:

- to remember the meanings of roots, prefixes and suffixes.
- to identify a variety of forms of the roots, prefixes and suffixes.
- to decode the meanings of words through morphological analysis.
- to assemble, disassemble and reassemble roots, prefixes and suffixes.

The pre-test and post-test shared the same 20 targeted words, but they had different format (activities and exercises were different) so that the exposure of the words in the pre-test would not help students to remember vocabulary in the post-test.

The format of the pre-test included matching roots, prefixes and suffixes with their meanings, disassembling word parts, choosing the right definitions for words by using morphological analysis and filling in the blank (see Appendix A). In contrast, the format of the post-test included completing the sentences with words having similar roots, choosing the right targeted words and guessing the word meanings in a paragraph by applying morphological analysis (see Appendix B).

For the pre-test, students used the technique of memorising word lists to do the test whereas students had to adopt morphological analysis to complete the post-test. This treatment procedure was to demonstrate if a morphological analysis outweighed memorising word lists and if morphological analysis could assist students in developing vocabulary.

b. Questionnaire surveying the students' attitudes towards using morphological analysis

The data obtained from the vocabulary pre-test and post-test and the questionnaire were analysed quantitatively through dependent t-test and descriptive statistics.

The treatment procedure was as follows.

Week 1: The teacher evaluated whether the students had prior knowledge of the 20 target words by having them take the vocabulary familiarity test and recorded the results in Table 5. After that, the teacher taught the students the 20 new words, and the students were asked to write down the meanings in either Thai or English. The teacher suggested that they learn new words by rote (memorising vocabulary lists). At the end of the period, the teacher informed the students that a vocabulary test would be administered the following week (Week 2).

Week 2: The teacher had the students take a vocabulary pre-test. The test required the students to complete several exercises and activities using word lists that had been memorised. The vocabulary items were the words that the students had been taught in Week 1. The students completed the test within 30 minutes. The teacher

corrected and recorded the pre-test scores as shown in Table 6. After that, the teacher introduced the students to morphological analysis, one of several vocabulary-developing strategies. The teacher explained to the students the meaning and types of morphology and its benefits for enlarging vocabulary, decoding meanings and retaining vocabulary in long-term memory. In addition to the 20 targeted words, the teacher provided a lot of word examples that were comprised of roots and affixes, and gave opportunity for students to participate in morphology instruction and application. Finally, the teacher explained the morphological analysis of each selected word to the students.

Week 3: The students were asked to take the post-test, of which the format differed from that of the pre-test administered in Week 2. They had 30 minutes to complete the test. The test was aimed at evaluating the students' memory of the meanings of the 20 words they had memorised by using the morphological analysis taught in Week 2. The teacher corrected the tests and recorded the post-test scores as shown in Table 6.

Table 5 revealed that most students had no prior knowledge of these words: 90% chose Level 1 and 10% chose Level 2, but no one chose Levels 3–5.

As shown in Table 6, the results of the vocabulary test indicated that all the students obtained higher scores on the post-test completed in Week 3 than

TABLE 5
The Result of the Students' Familiarity with 20 Target Words

Level	Statements	Percentage of response (n=40)
1	I don't remember having seen this word before.	90%
2	I have seen this word before, but I don't know what it means.	10%
3	I have seen this word before, and I think it means _____(synonym or translation)	0%
4	I know this word. It means _____(synonym or translation)	0%
5	I can use this word in a sentence e.g. _____	0%

TABLE 6
Pre-test and Post-test Scores

Student No.	Pre-test (20 scores)	Post-test (20 scores)
1.	6	14
2.	8	15
3.	10	13
4.	2	17
5.	4	14
6.	6	14
7.	7	15
8.	8	16
9.	7	17
10.	6	13
11.	7	16
12.	10	18
13.	9	12
14.	6	12
15.	3	10
16.	5	10
17.	8	12

TABLE 6 (Cont.)

18.	9	13
19.	4	14
20.	3	11
21.	5	14
22.	3	9
23.	5	12
24.	7	16
25.	6	13
26.	8	14
27.	8	16
28.	6	9
29.	4	11
30.	3	12
31.	7	16
32.	11	17
33.	6	12
34.	12	16
35.	4	10
36.	5	10
37.	6	12
38.	7	11
39.	2	9
40.	3	8
	= 6.15	= 13.07

they did on the pre-test. This means that morphological analysis favourably affected the students' vocabulary-developing ability.

RESULTS AND DISCUSSION

Research question 1: To what extent did the students improve their vocabulary developing ability after being given explicit instruction in morphological analysis? Table 7 gives the results that answered the first research question concerning the student's vocabulary-developing ability.

TABLE 7
Mean of the Pre-test and Post-test of the Students

	N	$\bar{X}$	S.D.	t	p
Pre-test	40	6.150	2.445	-18.408	<0.01
Post-test	40	13.075	2.625		

The results shown in Table 7 indicated that the mean of the post-test was higher than that of the pre-test based on a paired-sample test. The result from the t-test revealed that there was a significant difference between the pre-test and post-test scores. The findings supported the notion that morphological analysis can improve students' vocabulary-developing abilities.

Research question 2: How did the students respond to the use of morphological analysis? Table 8 gives the results that answered the second research question.

Table 8 shows that the students' attitudes toward morphological analysis were positive; 90% of the students expressed that morphological analysis was interesting and challenging in vocabulary learning, helped them to connect their prior knowledge of known words or known affixes with new words they were learning, made them have fun and feel relaxed when studying English vocabulary and finally, encouraged them to learn new vocabulary words. In addition, 80% of the students identified that morphological analysis had helped them to determine the meanings of the unknown words and had enabled them to store and recall vocabulary words more easily and retain their vocabulary in long-term memory.

TABLE 8
Results of the Students' Attitudes Towards Using Morphological Analysis

Statements regarding students' attitudes towards using morphological analysis	Response	Total number of students (n=40)	
		No. of students	Percentage
1. Morphological analysis is interesting and challenging in vocabulary learning.	Yes	37	92
	No	3	8
	Not sure	0	0
2. Morphological analysis helps me determine the meaning of the unknown words.	Yes	33	82
	No	7	18
	Not sure	0	0
3. Morphological analysis helps me to connect my prior knowledge of known words or known affixes with new words I am learning.	Yes	36	90
	No	2	5
	Not sure	2	5
4. Morphological analysis acts as a mnemonic device for the word meaning because it helps me to store, recall vocabulary more easily and retain my vocabulary in long-term memory.	Yes	34	85
	No	2	5
	Not sure	4	10
5. I have fun and feel relaxed when studying English vocabulary through morphological analysis.	Yes	37	92
	No	0	0
	Not sure	3	8
6. Morphological analysis encourages me to learn new vocabulary words.	Yes	37	92
	No	3	8
	Not sure	0	0

CONCLUSION

The research findings indicated that morphological analysis considerably contributed to the improvement of students' vocabulary-developing ability, which is consistent with Nist and Simpson's (2001) proposal that knowledge of roots and affixes would build students' vocabulary. When used along with other context and dictionary strategies, roots and affixes can be helpful in that students' knowledge of one root can help them determine the meaning of more than one unfamiliar word. The results were also in line with those of Mochizuki and Aizawa (2000), supporting their notion that affix knowledge correlated with vocabulary size. Furthermore, numerous studies have endorsed that morphological analysis can influence learners' vocabulary enrichment (Mountain, 2007; Nilsens, 2006 cited in Mountain, 2007; Nation, 2006; Nist & Simpson, 2001; Chatzisavvas, 2005). In addition, the students participating in this study regarded morphological analysis as a mnemonic device for word meanings, which is supported by Jenpattarakul (2012), who noted that mnemonic devices could help students store and recall vocabulary more

easily and retain vocabulary in their long-term memory; thus, by using morphological analysis, they gained optimistic attitudes and increased confidence in learning vocabulary.

As in the study by Bromley (2007), the students in this study agreed that morphological analysis could assist them in storing new information by linking it to their existing schema or networks of organised information. As a result, there is a better chance that new words will be remembered later. In this regard, Nation (2006) also confirmed that affixes and roots helped in the learning of unfamiliar words by relating new words to known words or to known prefixes and suffixes. The burden of learning new words would be light if the words consisted of known parts, that is, affixes and stems that were already known from the first language or from other second-language words.

Apart from the benefits of morphological analysis in developing vocabulary, the findings also revealed that the students' attitude towards learning vocabulary through morphological analysis was positive and they were enthusiastic, as seen in the following statements they expressed: (1) *Morphological analysis is interesting and challenging in vocabulary learning.* (2) *I have fun and feel relaxed when studying English vocabulary through morphological analysis* and (3) *Morphological analysis encourages me to learn new vocabulary words*.

The students' attitude asserted that they enjoyed learning vocabulary through morphological analysis because they felt that practising morphological analysis had been a matter of trial and error. In fact, they practised assembling, disassembling and reassembling word parts which they found interesting and fun. For example, during the treatment procedure, the students had to select the prefixes (*im-, un-, mis-, dis-, ir-, il-, and ig-*) to add to the word "logical"; they tried several times to add a correct prefix until they were exposed to lots of correct examples and taught the rule that prefix *il-* is used to add to words that begin with the letter "l" to form words with the opposite meaning, such as *legal, literate,* and *legitimate* etc. Regarding enjoyment and enthusiasm to learn, they expressed that they had fun as well as felt relaxed and encouraged when they used morphological analysis, and they could share their sense of the excitement and fascination with words composed of roots and affixes. This suggested that it is worthwhile teaching vocabulary through morphological analysis because vocabulary learning will be fruitful if students have more intrinsic motivation (enthusiasm to learn) but have less classroom anxiety. The outcome is in accordance with Moni *et al*. (2012) who stated that affective variables, such as attitude, motivation, anxiety and belief about foreign language learning have also been considered as factors that might influence foreign language learning.

To make use of the findings of this research, I recommend that:

1. Apart from morphological analysis, teachers should encourage students to integrate other vocabulary-learning

strategies and use them interchangeably because there is no single strategy that is considered the best strategy. Nist and Simpson (2001) expressed that learning words is not a cure-all. It is simply another piece of the puzzle that, together with context and the dictionary, supplies one more option for understanding words. Therefore, teaching other vocabulary-learning strategies such as guessing word meanings from context and training students to optimise the advantages of a dictionary, should be integrated into teachers' lesson plans.

2. Teachers must ensure that students understand how morphological analysis works. Hence, educating students to be able to disassemble words into parts and reassemble the meaningful parts of words is a must (Mountain, 2007). For example, the word *explication* is assembled with the prefix ex- meaning "out of and away from", the root *plic*- meaning "to fold or to twist", and the suffix *–ation* indicating that this word is a noun. Therefore, ex+plic+ation (*explication*) means "the unfolding and opening of something", or "explaining something clearly". Another example is the word *morphology*, which is comprised of the root *morph*- meaning "shape, form and structure" and the suffix *–ology* or *–logy* meaning "science or study of". Thus, morph+ology (morphology) means "the study of form, part or structure". In this study, *morphology* refers to the study of word parts i.e. roots, prefixes and suffixes.

3. Teachers should teach students roots and affixes and make them realise the importance of roots and affixes because almost 50% of English words are complex, and these words can be more easily understood through the study of the roots and affixes of each word (Chatzisavvas, 2005). Similarly, Greek and Latin roots can lead to familiarity with thousands of related words (Mountain, 2007). Aside from teaching, teachers should encourage students to practise using roots and affixes in vocabulary exercises so they may reuse vocabulary, which can lead to improved vocabulary-developing abilities (Thornbury, 2008); in addition, the effort of learning word parts will be repaid by the chance to meet and make use of them (Nation, 2006). However, according to Nation (2006), to optimise the teaching of roots and affixes for vocabulary learning, teachers should be able to (1) decide which affixes their students should know, (2) test to see if the students know them and (3) design a range of activities to help the students learn the affixes. Additionally, teachers should explain to students that there are a large number of roots and affixes, but some are much more useful than others. When giving attention to roots and affixes, teachers should consider the frequency of use of the word or affix to ensure that learning and teaching efforts are well repaid by many opportunities for use.

4. According to the experts' constructive comments and concerns, there are a few limitations which should be improved for further research and be the basis for teachers or practitioners to appropriately take this study's findings into account for their specific teaching circumstances. The limitations are discussed below.

a. Pre-test and post-test use the same set of 20 words. This can trigger *testing* or *practice effect* (the exposure of vocabulary in the pre-test will help students to remember the vocabulary in the post-test), and the data obtained might not be valid or reliable. As a result, as suggested by the experts, the strong claim that morphological analysis can improve the students' vocabulary-developing abilities in this study should be moderated. Furthermore, to prevent the *testing* or *practice effect*, the post-test should include a new set of 20 unseen words and a variety of types of question to distract the students from the correct answer such as true/false, multiple choices, matching, filling in the blank etc. The criterion for selecting a new set of 20 unseen words is the components of these words must include roots, prefixes or suffixes so that students can assemble, disassemble and reassemble word parts to show vocabulary improvement as a result of morphological analysis skill and not the *testing* or *practice effect*. With the employment of a new set of 20 unseen words and a variety of types of question, if the post-test's scores are higher than those of the pre-test, the results can be reasonably attributed to the benefit of morphological analysis to help students to decode and enlarge their vocabulary.

b. With regard to the treatment procedure, as pre-test and post-test used the same set of 20 words and the interval between the pre-test and the post-test was only one week (the pre-test was administered in Week 2, and the post-test was administered in Week 3), the students could recall the words in the pre-test to help them do the post-test. Thus, I cannot conclude that morphological analysis can help the students' with word retention. The possible solution is that the second post-test consisting of a new set of 20 unseen words and a variety of types of question (delayed post-test) should be administered three months, if possible, after the first post-test (immediate post-test) is completed. However, the teacher should not inform the students beforehand that there will be a second post-test in order to prevent them from deliberately memorising vocabulary in the first post-test. If the second post-test's scores are the same as or higher than those of the first post-test, we could possibly conclude that morphological analysis can help students analyse new words and remember them.

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APPENDIX A

Vocabulary Pre-test

Part I: Match the following roots, prefixes, and suffixes with their definitions. (worth 5 points)

_____1. mort (root)	a. harmful
_____2. circum (prefix)	b. body
_____3. mal, male (prefix)	c. cause to be
_____4. corp, corpo (root)	d. death
_____5. ify (suffix)	e. around

Part II: Each word below contains roots, prefixes and suffixes. Write its root, prefix or suffix; then write the meaning of each word. (worth 10 points)

Word	Root	Prefix	Suffix	Meaning
1. asymmetrical				
2. malefactor				
3. credulous				
4. pseudonym				
5. circumscribe				
6. mortuary				
7. seduction				
8. metropolis				
9. deify				
10. vivacity				

Part III: Choose one of the four possible answers for each word (worth 5 points)

1. post-mortem
   a. happening after someone's death
   b. connecting with time after a baby is born
   c. examining of a dead body to discover why the person died
   d. changing an event, action etc. to a later time or date

2. carnivore
   a. a human who eats flesh
   b. an animal that eats flesh
   c. an animal that eats human's flesh
   d. human eating human's flesh

3. metropolis
    a. an important priest in the Orthodox
    b. an underground railway system
    c. a small city where less people work and live
    d. a principle city or a capital of a country

4. annuity
    a. an insurance policy giving a fixed some of money each year
    b. a contract which is declared invalid
    c. an event happening once every year
    d. a period of one year

5. malefactor
    a. a tumor or disease in a state which can cause death
    b. a failure to work a machine properly
    c. someone who has done something immoral
    d. an intention to honor people or their reputations

APPENDIX B

Vocabulary Post-test

Part I: Complete each sentence by using morphological analysis (worth 5 points)

1. She would like to pay for her music lesson, but she does not have enough money. Fortunately, her_____ uncle promises to give her money.

a. benediction
b. beneficiary
c. beneficial
d. benevolent

2. He was very embarrassed because he can't walk steadily due to the bone _____.

a. maladroit
b. malformation
c. malfeasance
d. malignancy

3. When Peter was dead from a heart attack in a hospital, his dead body will be temporarily kept at _____.

a. mortician
b. mortality
c. moratorium
d. mortuary

4. I am going to retire next year, and I want to know how much the _____of my life insurance is.

a. annals
b. centennial
c. annual
d. annuity

5. She is a _____woman because she loses a lot of money due to the quack doctor.

a. accredit
b. credentials
c. discredit
d. credulous

Part II: Complete each sentence with word from the list below (worth 10 points)

amnesia, disruptive, metropolis, pseudonym, seduction, conspicuous, carnivore, benevolent, credulous, mortuary, post-mortem, corpulence, malformation, circumscribe, asymmetrical, annuity, deify, vivacity, clamorous, malefactor

1. The crowded and _____concert hall was filled with Chinese, Italian and Japanese teenagers.
2. Tom has to take care of her mother who suffers from _____. She always forget and may lose her memory.
3. Even today the Chinese in Thailand always _____their ancestors during the Chinese New Year.
4. An immoral lawyer can save many _____from going to jail.
5. Kate is lively, exciting and attractive; consequently, many like her because she has _____.
6. The _____examination showed that Tom and her daughter had been murdered.
7. Bangkok is one of the most multicultural _____of Southeast Asia.
8. Normally, people's eyes and faces are_____.
9. She caught everyone's attention because she wore _____dress.
10. The law was rapidly passed to _____the power of the ad hoc committee.

Part III: Applying the knowledge of morphology to answer each question (worth 5 points)
1. Knowing that the word part means hear, and that *ible-* means "able to", what does *audible* mean?

a. very quiet
b. loud enough to be heard
c. difficult to hear

2. Use your knowledge of roots, prefixes and suffixes to determine the meaning of the word *pseudonym*.

It was one of the publishing world's biggest secrets: Robert Galbraith, the so-called retired military policeman-turned-author of the suspense detective novel hit, "The Cuckoo's Calling," was a *pseudonym* for none other than JK Rolling

(Source: m.csmonitor.com)

a. pseudonym probably means false name.
b. pseudonym probably means concealment of the identity of someone.
c. pseudonym probably means name which the writer uses instead of his or her real name.

3. Use contextual clues and your knowledge of roots, prefixes and suffixes to determine the word *carnivore*.

> Lions are carnivores; they require up to 7 kilograms (15lbs) of meat per day. A major component of their diet is the flesh of large animals like the African buffalo.

(Source: http://en.m.wikipidia)

a. carnivore probably means a human that eats flesh.
b. carnivore probably means an animal that eats an animal's flesh.
c. carnivore probably means an animal that eats human's flesh.

4. Use your knowledge of roots, prefixes, and suffixes to determine the meaning of the word "*amnesia*" as used in the following passage.

> There are two main types of amnesia: anterograde amnesia (where the ability to memorize new things is impaired or lost because data does not transfer successfully from the conscious short-term memory into permanent long-term memory); and retrograde amnesia (where a person's pre-existing memories are lost to conscious recollection, beyond an ordinary degree of forgetfulness, even though they may be able to memorize new things that occur after the onset of amnesia).

(Source: http://www.human-memory.net/disorders_amnesia.html)

What is the most likely definition of the word "*amnesia*"?

a. being memorable
b. being able to remember correctly
c. being able not to remember anything due to an illness

5. Use your knowledge of roots, prefixes, and suffixes to determine the meaning of the word "disruption" as used in the following passage.

> Pilots at Lufthansa will hold a three-day strike next week in a row over retirement conditions, their union said on Friday, bringing more disruption to travelers after a spate of industrial action at Germany airports. The pilots' strike, which will run from 2200 GMT on April 1 until 2159 GMT on April 4, is likely to cause the cancellation of hundreds of flights, and will be the third strike to hit Frankfurt airport, Europe's third-largest hub and Lufthansa's home base, in six weeks.

(Source: http://www.reuters.com/article/2014/03/28/us-germany-strike-idUSBREA2R16Q20140328)

a. ruining or destroying morally.
b. throwing out lava, ash, and steam.
c. preventing something from continuing or operating in a normal way.