

CONCORDANCE-BASED GLOSSES FOR FACILITATING SEMANTIZATION AND
ENHANCING PRODUCTIVE KNOWLEDGE OF ACADEMIC VOCABULARY

by

ROBERT POOLE

DILIN LIU, COMMITTEE CHAIR
ROBERT NELSON
ROBERT SUMMERS
SARA TOMEK

A THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of English
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2011

Copyright Robert Edward Poole 2011
ALL RIGHTS RESERVED

ABSTRACT

Extensive research has been conducted on the use of electronic glosses for second language vocabulary learning. However, many of the studies have assessed the effectiveness of textual and pictorial glosses at lower proficiency levels with less attention on higher proficiency levels and learner attitudes towards the use of the enhanced input. This study seeks to determine the effectiveness of textual glosses enhanced with modified corpus-extracted sentences as well as textual glosses enhanced with dictionary definitions for academic vocabulary learning at an intermediate to advanced level. The participants (N=26) were non-native speakers of English enrolled in introductory composition courses at a U.S. university. As academic vocabulary words are not easily annotated with pictorial glosses, finding an effective text-based modality for glossing these important terms was the goal of the study. The study aimed to determine whether concordance-based (meaning inferred) or dictionary-based (meaning given) glosses are more effective for increasing students' ability to recognize and accept variation in usage of academic vocabulary words in multiple contexts with subtly different meanings while also improving their capacity to produce the words in a series of cloze assessments. Therefore, the receptive-productive knowledge continuum greatly informed the design of the instruments. The study also elicited data from participants regarding their attitudes towards the various online gloss methods. Positive and encouraging trends in performance by the concordance-based group were discovered but not to an extent where significance could be attributed to the treatment method. While mean scores improved, a series of one-way ANOVA's did not reveal the differences between group performances to be significant.

DEDICATION

This thesis is dedicated to my parents, Mr. and Mrs. William S. Poole Jr., and to my wife,
Gu Sun Young.

ACKNOWLEDGEMENTS

I am pleased to have this opportunity to thank the many friends and faculty members who have helped me with this research project. I am most indebted to Dr. Dilin Liu, the chairman of this thesis, for always having an open door and the willingness to help. I would also like to thank my committee members Dr. Robert Nelson, Dr. Robert Summers, and Dr. Sara Tomek for their valuable input and guidance throughout the process. Finally, I would like to thank Jiang Lu for his help designing and creating the website for the project.

CONTENTS

ABSTRACT	iii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
1. INTRODUCTION	1
a. Background and Purpose	2
b. Research Questions	4
2. LITERATURE REVIEW	5
a. The Importance of Academic Vocabulary	5
b. Knowing a Word and the Receptive/Productive Continuum	8
c. Glossing and Vocabulary Acquisition	16
d. Concordancing and Vocabulary Acquisition	20
e. Student Attitudes Towards Glossing	25
3. METHODOLOGY	28
a. Participants	28
b. The Texts and Glosses	28
b. The Instruments	30
4. RESULTS	33

5. DISCUSSION.....	41
6. CONCLUSION.....	47
REFERENCES.....	49
APPENDIX A: Text 1.....	53
APPENDIX B: Text 2.....	54
APPENDIX C: Concordance Glosses.....	55
APPENDIX D: Dictionary Glosses.....	60
APPENDIX E: Pre Test.....	64
APPENDIX F: Post Test.....	68
APPENDIX G: Reaction Questionnaire.....	72
APPENDIX H: IRB Approval.....	73

LIST OF TABLES

Table 1: Assessing the Tests.....	31
Table 2: Descriptive Statistics of Receptive Pre and Post Tests.....	34
Table 3: Descriptive Statistics of Judgment Tasks for Pre and Post Tests.....	35
Table 4: Descriptive Statistics of Productive Tasks for Pre and Post Tests.....	36
Table 5: Descriptive Statistics of Likert Item.....	38
Table 6: ANOVA of Likert Items.....	39

LIST OF FIGURES

Figure 1: Five Levels of Word Knowledge (Cronbach, 1942)	9
Figure 2: Four Stages of Vocabulary Knowledge (Dale, 1965).....	10
Figure 3: The Vocabulary Knowledge Scale (Paribakht & Wesche, 1993).....	11
Figure 4: A Continuum of Knowledge.....	12
Figure 5: The Receptive-Productive Continuum.....	13
Figure 6: Henriksen’s Three Continua of Vocabulary Knowledge.....	14
Figure 7: Benefits of Concordance Instruction.....	21
Figure 8: Example of a Concordance-Based Gloss.....	29
Figure 9: Example of a Dictionary-based Gloss.....	30

CHAPTER 1

INTRODUCTION

Traditionally, glosses are annotations, textual and/or visual, that provide enhanced input on a targeted form and are provided in the margin or in an appendix of a text or online document (Lomicka, 1998). Enhanced input through electronic glosses has repeatedly been shown to facilitate reading comprehension (Brett, 1998; Chun & Plass, 1996; Leffa, 1992, Lyman-Hager et. al, 1993; Nagata, 1999) as well as vocabulary acquisition (Al-Seghayer, 2001; DeRidder, 2002; Hulstijn, 1993; Hulstijn et. al., 1996; Lomicka, 1998). While glosses are certainly not a new phenomenon, advances in Computer Assisted Language Learning (CALL) have made possible the development of an increased variety of input enhancements through pictorial cues, auditory sound bytes, L1 translations, video clips, etc. As barriers to authorship are reduced from the increasingly user-friendly and intuitive design software to nearly ubiquitous computer and internet access by educators and students, the ability for instructors to generate course-specific interactive online texts is much simpler and more feasible than just several years ago. While much of the research on the benefits of glosses in second language acquisition has focused on the possible advantages and/or disadvantages of textual versus pictorial glosses (Akbulut, 2007; Chun & Plass, 1996; Plass, Chun et. al., 1998; Yoshi, 2006; Yoshi & Flaitz, 2002), research on types of enhanced textual input for English for Academic Purposes at higher proficiency levels lacks the depth present in the previously mentioned area. The present research fills this gap in the literature by assessing two textual gloss modalities, dictionary-based (meaning-given) and corpus-based (meaning-inferred), for higher-level second language learners.

Background and Purpose

Certainly long debated is the question of what is the most efficient and effective method for L2 vocabulary acquisition. The debate has often focused on two questions: (1) “Should students be allowed “to infer the meaning of an unknown word occurring in an L2 text, using the information contained in the text?” (2) “Should learners simply be given the meaning of the lexical item immediately by either a translation to the L1 or an L2 synonym?” (Hulstjin, 1992, p. 113). Accepted logic claims the efficacy of learning new terms in context where “meaning must be inferred from context by learners themselves” (Hulstjin, 1992, p. 113). Hulstjin formulated a mental effort hypothesis which claimed that acquisition of an inferred word meaning would be greater than that of a given word meaning due to the greater effort expended. This theory clearly informed the design of the present study as it was posited that the participants exposed to the concordance glosses (meaning inferred) will perform better than those learners treated with the dictionary glosses (meaning given) on post tests where recognition and acceptance of variation as well as productive knowledge were tested. It was thus theorized that exposure to authentic usages of the vocabulary items in multiple contexts and in various syntactic forms would increase the participants’ “mental effort” leading to progression along the receptive/productive continuum and more robust knowledge of the targeted academic vocabulary items.

With concordance exercises being more frequently introduced into language classrooms and corpus data increasingly informing materials design (Witchman et al., 1997; Aston, 2001) it is increasingly relevant to assess the effectiveness of a corpus-based gloss modality for academic vocabulary learning at higher proficiency levels. As proponents commonly espouse, corpus-based approaches empower learners to be language researchers as they are able to form and subsequently either confirm or reject hypotheses (Varley, 2009). Therefore, an individual who

regularly consults corpora possibly extends more of the “mental effort” Hulstijn asserted to be so central to vocabulary learning. In addition, corpus-based approaches may promote the semantization process defined by Beheydt as “a continuing process of getting acquainted with verbal forms in their polysemous diversity within varying contexts”(1987, p. 55). Semantization in the present study refers to the learner’s ability to recognize and accept variation in usage of the academic vocabulary in various contexts. As context is recognized as integral to vocabulary acquisition, students exposed to authentic usages of vocabulary in multiple meaningful contexts may more efficiently semantize and more completely acquire vocabulary than learners who are not exposed to the varied usages of lexical items. Therefore, ready-made concordance glosses possibly benefit learners as they are exposed to multiple contexts more efficiently than extensive reading can provide.

It has been established that learners’ receptive vocabulary is larger than their productive vocabulary (Laufer & Paribakht, 1998; Webb, 2008). For the learners tested in the current project, it was theorized that their receptive vocabulary was quite developed; all the students had successfully completed the standardized tests required for admission to university and passed a departmental writing and oral proficiency entrance exam necessary for enrollment in the freshman composition course. Although the participants’ receptive knowledge may be quite strong, the research followed a theory that the students’ productive knowledge of academic vocabulary would possibly still be at a level insufficient to effectively produce the words and transfer knowledge in their classroom environments. Having yet to fully semantize the words, the learners would be unable to comprehend and/or produce the target words in various academic contexts, possibly limiting their academic success. The glosses for the study were informed by and constructed with the hypothesis that at higher levels dictionary look-up is less effective for

furthering students' progression on the receptive/productive continuum. As students were expected to perform quite well on the receptive assessment tasks, the two gloss modalities were created to assess each annotation's effectiveness in increasing the learners' recognition and acceptance of variation in word usage in academic contexts as well as their ability to use the words productively in the cloze test items. As knowledge of academic vocabulary is recognized as integral to academic success (Nation, 2001), the study was designed to determine the most effective enhanced textual gloss modality for facilitating learners' semantization of the target words to further progression along the receptive/productive continuum.

Research Questions:

- 1) Which gloss modality, dictionary definitions (meaning-given) or modified corpus sentences (meaning-inferred) most effectively enables students to recognize and accept variation in word usage in a variety of contexts?
- 2) Which gloss modality furthers students' productive knowledge of the targeted academic vocabulary terms?
- 3) What are students' attitudes towards the two textual glossing modalities?

CHAPTER 2

LITERATURE REVIEW

The Importance of Academic Vocabulary

As success on high stakes tests and university coursework can largely depend on a student's knowledge of vocabulary for reading comprehension and transmission of information through writing and speaking, acquisition of academic vocabulary is integral to a student's academic success. From personal experience and numerous anecdotes from fellow second language writing teachers, it seems that teachers at the university level often do not provide structured and explicit academic vocabulary instruction for ESL students. It is likely that university-level instructors simply expect their students to either possess sufficient vocabulary through previous language study or to have the ability to recognize unknown vocabulary and the study skills to fill their gaps in knowledge. There are numerous reasons why academic vocabulary is especially important for learners of English for Academic Purposes.

First, academic vocabulary is regularly found throughout a variety of academic disciplines (Nation, 2001). As the words from Coxhead's *Academic Word List* (AWL) (2000) are encountered frequently in the various disciplines, instruction on academic vocabulary is relevant, useful, and forwarding for students in university courses. Additionally, although these students may have succeeded on entrance exams, their procedural knowledge of academic vocabulary is possibly still lacking and could be further developed in second language writing classrooms. As the vocabulary is common across disciplines, explicit instruction targeting the *AWL* would likely benefit many students in the ESL university writing classroom.

Second, L2 learners must produce essays where transferring information requires effective vocabulary use (Kaur & Hegelmeir, 2005). L2 students must have extensive productive vocabulary knowledge to be able to produce and succeed in an academic environment (Kaur & Hegelmeir, 2005). Whether in presentations, reports, or essays, a student's ability to transfer knowledge will impact one's success in a university course. As stated above, it is possible that learners possess a well-developed receptive vocabulary; however, learners' academic success will largely rely on their procedural academic vocabulary knowledge.

Third, academic vocabulary represents a significant amount of words in an academic text (Nation, 2001). In Coxhead (2000), she asserted that 10% of the tokens in the Academic Corpus, and more than 94% of the words in her AWL can be found in 20 of the 28 subject areas of the Academic Corpus. Further, the sub-lists created from the AWL by Coxhead contain words with a wide range of frequency (Nation, 2001). Academic vocabulary is encountered frequently across disciplines, as stated above, as well as within texts. Again, this non-discipline specific vocabulary should be learned by all students, and emphasis on its acquisition should be a focus of both students and teachers.

Fourth, teachers can help students learn academic vocabulary more effectively than other kinds of specialized vocabulary. As teachers may lack background knowledge of students' specific fields making teaching technical vocabulary quite challenging, academic vocabulary can be found across disciplines, as noted in Coxhead (2000), and is easier for a teacher to instruct (Nation, 2001, p. 191). Explicit and directed instruction of vocabulary from the AWL has value (Coxhead, 2000), and courses that extend direct attention to language features such as vocabulary have been shown to foster better learning than incidental learning driven courses (Ellis 1990, as cited in Coxhead 2000).

Additionally, lexical errors are rated as most problematic and unacceptable by college professors (Santos, 1988). In Santos' study, 178 professors evaluated the errors present in two essays by two non-native speakers, one Korean and one Chinese. Consistently, professors reported lexical errors as the most serious error type. When lexical errors are made, "the meaning is very likely to be obscured" and content of the essay affected (Santos, 1988, p. 84). So while grammatical errors generally yield still comprehensible sentences, lexical errors interfere greatly with communication and understanding by the listener/reader (Gass & Selinker, 2008). For example, one would likely understand the meaning intended in sentence 1; whereas, sentence 2 would likely be less comprehensible.

(1) Where the theater is that shows Harry Potter?

(2) The director of Harry Potter used infamous actors.

The speaker/writer's intent is clear in the first sentence, but the use of *infamous* is certainly problematic and confusing in the second. Lexical errors often impede clear transmission of meaning more than grammatical errors.

It is likely though that vocabulary instruction at the university level will remain limited. Therefore, creating and providing ready-made textual enhancements to academic texts may provide an efficient and effective alternative to extensive reading for vocabulary acquisition. Certainly, extensive reading should be encouraged and promoted, but acquisition of vocabulary may be facilitated more efficiently through the glossing of online texts.

Having established that acquiring academic vocabulary is important for learners' academic success, it is necessary to discuss what it means to know a word as well as the conceptualization of the receptive/productive continuum with which vocabulary knowledge can be described.

Knowing and Word and the Receptive/Productive Continuum

The theoretical underpinning for this study was the assumption that the participants' receptive vocabulary would be larger than their productive vocabulary. It was assumed and confirmed that the non-native speakers who participated would have a more developed receptive than productive knowledge of the fifteen academic vocabulary words targeted in the study. Essentially, it was theorized that students would know the definitions of the words but would not be able to use the words in sentences. Further, it was posited that the participants' semantization of the items would be incomplete and that their productive ability to use the target words would be limited. Therefore, it is certainly requisite that what it means to know a word and the receptive/productive continuum be explicated before discussion of the effectiveness of glossing and concordance instruction may proceed.

When questioning what it means to know a word, researchers have presented the following questions as well as many others that highlight the various aspects of word knowledge. For example, does knowing a word mean simply understanding the term when encountered in text? Does knowledge mean the ability to comprehend a word when heard in conversation, on television, or on the radio? Does it mean knowing the roots of the word as well as its synonyms and antonyms? Or rather does it mean knowing how to produce the word in communicative interactions with friends and classmates? These questions make clear that 'knowing' a word is simply not a yes/no binary construct but rather a complex process that draws on possibly multiple competencies from the language learner. Nation (2001) stated that knowing a word means knowing its form (spoken, written, and word parts), its meaning (form and meaning, concept and referents, and associations) and its use (grammatical functions, collocations,

constraints on use). Clearly, knowing a word is quite complex. Several frameworks for word knowledge are presented and discussed.

Cronbach (1942) offered an early description of word knowledge. He synthesized and summarized existing concepts of word knowledge into five levels.

Figure 1

Five Levels of Word Knowledge (Cronbach, 1942)

(1) Generalization	Does the student know the definition?
(2) Precision	Can the student apply the word appropriately in multiple situations and contexts?
(3) Breadth	Can the learner remember the different meanings of the word in various contexts?
(4) Precision	Can the student apply the word appropriately in multiple situations and contexts?
(5) Availability	Does the student have the ability to use the word and its concept in thinking and discourse?

Cronbach's list acknowledged various types of behavior that would likely be required when learning a word. Importantly, Cronbach asserted that the levels were not independent and separate from each other, but rather that the various aspects of word knowledge often occurred synchronously. Although Cronbach's model was conceptualized as consisting of levels, his assertion that the levels were connected and often coexisted allows for a visualization of word knowledge along a continuum a logical evolution.

Tracking the multiple conceptualizations of word knowledge requires also a discussion of word knowledge presented by Dale (1965). Dale presented vocabulary knowledge in four stages.

Figure 2

Four Stages of Vocabulary Knowledge (Dale, 1965)

-
- (1) Never saw the word before.

 - (2) Heard it, but do not know what it means.

 - (3) Recognizes the word in context.

 - (4) Knows the word well.

This conceptualization of the stages of acquisition again represents the multi-layered process of acquisition as knowledge progresses from unknown through partial and finally to full knowledge.

A recent scale of vocabulary acquisition to gain recognition and relative acceptance among researchers is *The Vocabulary Knowledge Scale (VKS)* developed by Paribakht and Wesche (1993) (Waring, 2002). The VKS scale was created to research vocabulary learning by university level ESL students. The scale measures growth in the core knowledge of selected words, and the stages “represent gains that are large enough to be meaningful on a self report scale but small enough to reflect changes in knowledge during relatively limited instructional periods” (Paribakht & Wesche, 1993, non-paginated). The developers intended the scale to serve as a more practical assessment of vocabulary acquisition as it combines self-report and performance items to assess both perceived and actual knowledge. The levels progress from totally unknown through recognition and partial knowledge to a productive ability task requiring a learner to use the lexical item both with semantic and grammatical accuracy. The scale has shown the capability to assess progression in the knowledge of particular words (Paribakht & Wesche, 1993).

Figure 3

The Vocabulary Knowledge Scale (Paribakht & Wesche, 1993)

-
- (1) I don't remember ever seeing this word.
-
- (2) I have seen this word before but I don't know what it means.
-
- (3) I have seen this word before and I think it means _____.
-
- (4) I know this word. It means _____.
-
- (5) I can use this word in a sentence. For example: _____.
-

Again, evident is the progressive nature of vocabulary learning and the degrees of knowledge learners possibly possess. From the scale, it seems plausible that levels 1, 2, and 3 represent aspects of receptive knowledge while levels 4 and 5 exhibit qualities of productive knowledge.

Researchers at present largely concur that vocabulary knowledge exists upon a continuum with the more dichotomous terminology of levels, stages, and dimensions of acquisition being somewhat replaced. While earlier conceptualizations presented an at times more segmented framework for word knowledge, many researchers now agree upon the continuum conceptualization of word knowledge. Melka (1999), Waring (2002), and Laufer and Parikbaht (1998) have all commented on the validity of a vocabulary knowledge continuum informing the conceptualization of a theorized receptive/productive continuum.

“Investigators should construe lexical knowledge as a *continuum* consisting of several levels and dimensions of knowledge. One suggestion views this continuum as starting with a vague familiarity with the word form and ending with the ability to use the word correctly in free production” (Laufer & Paribakht, 1998, p. 367)

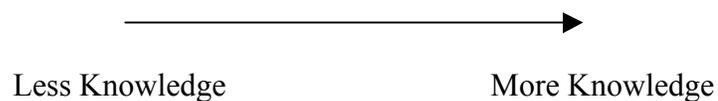
“I have attempted to replace the idea of a gap between R and P with the other more realistic notions. This idea of a *continuum* better explains the fact that boundaries between R and P are not fixed.” (Melka, 1999, p. 1010)

The basic notion has also been extended beyond the single word level to the general notion of receptive and productive vocabulary which are placed at either end of the continuum. (Waring, 2002, p 1)

Although conceptualizations of vocabulary acquisition have largely coalesced around a continuum model, various continua have been posited by researchers to represent the acquisition process from little knowledge to full knowledge as well as from receptive to productive knowledge. These continua range from the quite complex to the simple and seemingly transparent as suggested by Waring (2002).

Figure 4

A Continuum of Knowledge (Waring, 2002)



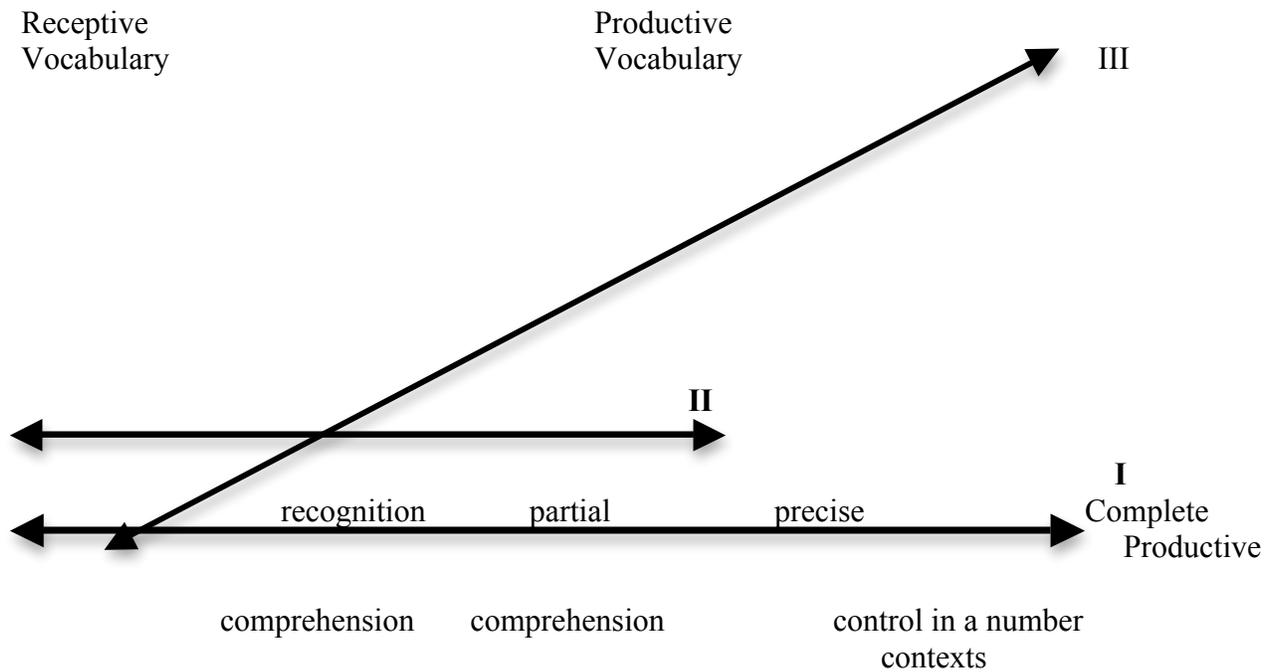
Waring stated that the central concept is that as a learner acquires knowledge, the learner will progress along the continuum (2002). This basic concept of lexical knowledge can then be further expanded to establish the receptive/productive continuum (Waring, 2002)

Nation defined receptive vocabulary as use that “involves perceiving the form of a word while listening or reading and retrieving its meaning” and productive vocabulary as use that “involves wanting to express a meaning through speaking or writing and retrieving and producing the appropriate spoken or written word form” (2001, p. 25). It is also important to note that receptive vocabulary knowledge has been shown to be larger than productive knowledge (Webb, 2008). Further, students who have a large receptive vocabulary are more likely to possess productive knowledge of a word than a learner with a less developed receptive vocabulary (Webb, 2008). It is generally acknowledged among researchers that receptive is the foundation for productive knowledge. Waring illustrated the receptive/productive continuum in the following figure.

recognizing the academic vocabulary words, did not possess control of the words to a sufficient extent to recognize variation in usage and use productively.

Figure 6

Henriksen’s Three Continua of Vocabulary Knowledge (figure from Waring, 2002)



- I The partial-precise continuum
- II The receptive-productive continuum
- III The depth-of-knowledge continuum

The continuum conceptualization guided and informed the theoretical rationale of the study as well as the design of the instruments and assessments employed for the data collection.

While the stages of vocabulary represent a more incremental and segmented view of vocabulary learning, the continuum seemingly reflects the more fluid nature of vocabulary acquisition.

Therefore, the instruments included various sections that tried not to segment learner knowledge but to assess its possible progression from recognition to semantization and finally, production.

The first section of both tests were modeled after Nation’s *Vocabulary Levels Test* and was intended to assess receptive knowledge of the targeted academic vocabulary words. For this

study, receptive knowledge means knowing that a particular lexical item denotes a specific meaning. Therefore, in the *Vocabulary Levels Test* used in the instruments, correctly identifying the written definition of the academic vocabulary item represents receptive knowledge.

Secondly, the judgment tasks of the second section assessed students' semantization of the terms as their capacity to recognize and accept variation was deemed to exist along the established continuum. Finally, the cloze test items were included as determiners of productive vocabulary.

Visualizing a continuum with two poles, receptive and productive, students' knowledge was theorized to be positioned at various points beyond the receptive extreme but not yet reaching the productive end point. The question then became, "Which glossing method, dictionary or concordance based, facilitates higher proficiency learners' progression along the receptive/productive continuum?"

Glossing and Vocabulary Acquisition

The learning of second language vocabulary is an especially important task for language learners (Gass & Selinker, 2008). Nation (2001) asserted the primary determinant in a student's comprehension of an L2 text is vocabulary knowledge and that successful comprehension requires recognition and understanding of 95-99% of the text. As comprehension of vocabulary is recognized as essential, Abraham's (2007) meta-analysis of 82 studies found that glosses provide immediate access to information thereby facilitating text comprehension and incidental vocabulary acquisition. Electronic glosses have repeatedly been shown to facilitate reading comprehension (Brett, 1998; Chun and Plass, 1996; Leffa, 1992, Lyman-Hager et. al, 1993; Nagata, 1999) as well as vocabulary acquisition (Al-Seghayer, 2001; DeRidder, 2002; Hulstijn et. al, 1996; Lomicka, 1998). The question though has evolved from whether glosses are beneficial to which gloss modality is the most effective (Yoshii, 2006). However, studies testing the effectiveness of a concordance-based gloss modality for academic vocabulary acquisition have, to my knowledge, yet to be conducted. The following discusses the benefits of various modalities at different proficiency levels and builds the case that research determining the viability of a concordance-based gloss modality for academic vocabulary for higher proficiency levels is needed.

Research has shown the advantages of pictorial glosses. Chun et. al. (1998) asserted the benefits of pictorial glosses over textual ones as participants recalled word translations when annotated both with a visual and a textual annotation better than when only textual annotations were provided. Kost et. al. (1999) further established the effectiveness of pictorial over textual glosses in a study with 56 second-semester German students enrolled at Purdue University. The subjects who utilized both text and pictorial glosses again performed better than participants who

were exposed to only text or pictorial annotations. The text + picture modality group excelled on the short-term recognition tasks as well as on retention assessments. On the delayed post-test (2 weeks), the participants exposed to the text + picture annotation again scored higher than the other treatment groups (Kost et. al., 1999). Yoshi and Flaitz (2002) tested 151 learners at beginner and intermediate proficiency levels and found that annotations with text and picture were more effective than both text-only and picture-only. Yoshi (2006) later tested 195 university EFL students in Japan and again reported the usefulness of pictorial glosses as students benefited when pictures accompanied textual glosses. Clearly, image glosses facilitate vocabulary learning; however, pictorial glosses are quite difficult to provide for academic vocabulary as image representations of words such as *monitor*, *phenomenon*, *obvious*, as well as countless other lexical items do not allow for simple pictorial representations.

Beyond pictorial annotations, research has also investigated the effects of multimedia glosses on reading comprehension and vocabulary learning. Students in Chun and Plass (1996) exposed to picture + text and video + text performed better on vocabulary tests than students treated to text only annotations. Lomicka (1998) found multimedia glosses, as compared to no gloss and a traditional definition gloss, to be more effective in incidental vocabulary acquisition and text comprehension. Specifically, her data indicated that multimedia annotations positively impact reading comprehension. Brett (1998) further espoused the benefits of multimedia glossing as his study found that items glossed with multimedia annotations were more likely to later be used by the participants in their writing. Additionally, Lyman-Hager and Davis (1996) found that learners who used multimedia glosses performed better than participants exposed to a glossed text in print form. Al-Seghayer (2001) compared two image modalities, video and still picture, and found that multimedia glosses hyper-linking students to video clips were more

effective than a still picture. Akbulut (2007) tested sixty-nine university TEFL students at a Turkish university. The subjects read a glossed text with three types of annotations: 1) definitions of words 2) definitions with pictures 3) definitions with short video. The groups exposed to the annotations that matched definitions with either a picture or video performed significantly better on immediate and delayed vocabulary post-tests. Again, it is recognized that multimedia and pictorial glosses are in fact effective means for furthering vocabulary learning, but the question of how to provide such dynamic glosses for academic vocabulary remains unanswered. Further, while teachers may be able to quickly generate textual glosses, it seems unlikely that many teachers will either create video glosses or take the time to find proper videos online.

Informing the present study is research that has shown that glosses that require learners to infer meaning are more effective than those that simply give meaning, as the degree of mental processing of new words is possibly greater (Hulstijn 1992; Nagata, 1999; Lin & Huang, 2008; Koren, 1999). As reported previously, Hulstijn found that language learners are “more likely to remember the form and meaning of an unknown word in the text when they have inferred its meaning by themselves” (Hulstijn, 1992, p. 122). Lin and Huang (2008) found that glosses foster vocabulary acquisition and that meaning-inferred glosses are more effective than meaning-given glosses for vocabulary gain and retention. Koren (1999) also confirmed that the acquisition of inferred words is higher than the acquisition of words where the meaning is given. The present study followed the theory that textual glosses requiring higher level learners to discern meaning through examining modified yet authentic corpus extracts will be more effective than glosses that provide simple definitions for enhancing both the semantization process and the gain of productive knowledge. To further progression along the receptive/productive continuum, it is

possible that glosses enhanced by concordance information may facilitate the semantization of the target words as the polysemous nature of the lexical items is revealed to the students through exposure to authentic examples of usage extracted from the corpus.

Further contributing to the possibility that a corpus-based gloss modality may prove effective for higher level learners are studies asserting the increased benefits of glosses for more advanced learners than for lower level learners. Abraham's (2007) meta-analysis surveyed approximately 80 studies and concluded that glosses were more effective for intermediate and advanced learners. One of the studies in Abraham's meta-analysis was Hulstjin (1996) that reported advanced language learners are more likely to learn incidental vocabulary when marginal glosses are provided than when dictionary use occurs as students are more likely to refer to glosses than to the dictionary. Certainly, academic vocabulary study most applies to higher level language learners; therefore, a concordance-based gloss modality that requires learners to infer meaning through studying concordance lines may prove effective.

It has been established that annotations, especially pictorial and multimedia glosses, are beneficial to learners; however, creation of image-based and multimedia glosses for academic vocabulary seems somewhat problematic if not impossible. Certainly, computers have made possible an increased variety of enhanced inputs; however, the creation of multimedia, image, and auditory enhancements for academic vocabulary for higher-level learners still seems a difficult venture. It is possible though that corpus-based textual glosses displaying multiple and varied authentic usages of academic vocabulary may most effectively facilitate advanced learners' semantization and acquisition of academic vocabulary.

Concordancing for Vocabulary Acquisition

In 1984, an international conference convened in London to celebrate the fiftieth anniversary of the British Council and its contribution to English studies since its establishment in 1934. The Council invited forty-two scholars from around the world to honor the achievements of the Council but, more importantly, to discuss current issues and trends in the field (Burgh, 1985). Present for the one-week conference, John Sinclair would later write, “We are on the verge of a major re-orientation in language description.” Prompting this comment were the many speakers extolling the possibilities of increased computing power and the growth of corpora. Sinclair recognized the great influence corpora would have on language teaching, learning and description. He wrote:

There is now ample evidence of the existence of significant language patterns which have gone largely unrecorded in centuries of study: on the other hand, there is a dearth of support for some phenomena which are regularly put forward as normal patterns of English. (1985, p. 251)

Since Sinclair’s assertion of the profound impact corpus data would have on the language classroom, a number of approaches and methods for integrating corpora into the language learning setting have been presented (Stevens, 1991; Shmitt, 2000). Sinclair’s claim was later manifested in his COBUILD texts, important texts that transferred the lessons of corpus linguistics into the language learning classroom. Another of the first and influential concordance-based methodologies was Johns’ Data-Driven Learning (DDL) (1986). Johns set forth a case for the possible benefits concordance-based approaches would have for learners. Most notably, Johns asserted that a concordance “organizes data in a way that encourages and facilitates inference and generalization” (1986, p. 159). Acknowledging possible limitations for beginner learners, Johns claimed that “a more advanced learner will be able to make more subtle high-level inferences” (p. 159) as the concordance data facilitates students’ formation and testing

of hypotheses. Sinclair and Johns' early claims of the benefits of a corpus-based approach and the discovery learning corpus consultation fosters has prompted extensive research into corpora and their use as instructional tools. The following table summarizes four advantages of concordance-based learning generally cited in the literature and discussion of studies on concordances and vocabulary acquisition follows.

Figure 7

Benefits of Concordance Instruction (Nation, 2001, p. 111)

Learners meet vocabulary in real contexts. The information which these provide often differs from non-corpus-based descriptions.
Multiple contexts provide rich information on a variety of aspects of knowing a word.
The use of concordances involves discovery learning, where the learners are being challenged to actively construct generalizations and note patterns and exceptions.
Learners control their learning and learn investigative strategies.

Krashen's Input Hypothesis stated that second languages are acquired "by understanding messages, or by receiving comprehensible input" (Krashen, 1985, p. 2). Beck, McKeown, and Kucan stated, "Students must read widely enough to encounter a substantial number of unfamiliar words...and they must read text of sufficient difficulty to include words that are not already familiar" (2002, p. 4). The challenge for the teacher then is how to provide sufficient and appropriate input to learners in an efficient manner. Most commonly, students have been urged to simply read more, but this strategy is often ineffective when considering the "real-world" time demands faced by a learner. Cobb (1997) proposed that "hands-on concordancing" possibly provides precisely the varied and abundant input required by Krashen's hypothesis in a more

time-effective manner. He stated “multi-textual learning appears to facilitate the acquisition of transferrable word knowledge” (p.313). In his study, students in the concordance group consistently performed better in tasks that involved the transfer of word knowledge. Over the six-month term, students in the concordance treatment group performed better than the no-concordance condition on weekly in-class vocabulary quizzes. The Cobb study provided rationale that concordance study stimulates the efficient acquisition of vocabulary by presenting lexical items in multiple contexts.

Cobb has extensively researched the possible benefits of concordance use in the language learning classroom. His work has also built the case that hands-on concordancing by students possibly resolves the breadth/depth paradox of vocabulary instruction often faced by materials designers, teachers, and students alike (1999). Recognizing and acquiescing to time demands, the three often choose to teach, study, and develop word lists (breadth) rather than selecting extensive reading (depth). Similar to Cobb’s earlier assertion that concordances possibly solve the input dilemma, he also claimed that concordances can possibly “resolve the breadth-depth paradox” (Cobb, 1999, p. 345). He determined that a corpus-based approach integrates the benefits of learning from lists and the vocabulary acquisition of reading. It was discovered during the year-long administration of the study that students presented with word lists and a dictionary exhibited a significant increase in definitional knowledge, i.e., receptive knowledge showed gains. However, these students did not retain the knowledge and performed poorly on gap-filling exercises. It may then be concluded that dictionary look-up possibly facilitates receptive knowledge but not productive. On the other hand, students in the concordance-based treatment displayed growth in both “definitional knowledge and transfer of comprehension to novel texts, short and long term” (Cobb, 1999, p. 352). The concordance treatment group not

only performed better on vocabulary quizzes and knowledge transfer activities but also retained knowledge for a longer period than did the other treatment group. These findings significantly informed the theoretical grounding of the current study as it was theorized that higher level language learners in the concordance-based experimental group would more completely semantize the targeted academic vocabulary and progress further along the receptive-productive continuum than would their counterparts in the dictionary gloss treatment group.

Another important study exploring the benefits of corpus use by students was Horst et. al. (2005). The study designed a set of online tools to assess incidental vocabulary acquisition in an experimental ESL course. The online course created and provided tools such as a cloze builder, concordance, dictionary, hypertext and a vocabulary database. The vocabulary targeted was Coxhead's *Academic Word List* and the tools were designed to further "retention by engaging learners in deep processing" (Horst et. al. 2005, p. 90). Horst's corpus-driven tools were designed to expand and vary retrieval, motivate deep processing, and create more successful vocabulary learning. The rich input provided in the online environment proved viable as students showed gains in word knowledge between the pre- and post tests. The study importantly reported students' willingness to use the online tools, including the concordance, to forward vocabulary learning. The study showed that vocabulary learning in CALL environments to be effective and efficient. The present study also tested vocabulary learning in an online environment to further establish the efficacy of a concordance-based gloss modality for learning academic vocabulary.

Another important question is whether concordance study will increase transfer of academic word knowledge to academic writing. Kaur and Hegelmeir (2005) tested two groups of participants with the experimental group exposed to a concordance program and the other an online dictionary. On an academic writing task, the treatment group received higher scores on

the assessment and used the words more frequently and accurately. Kaur and Hegelmeir (2005, p. 289) stated that concordancing is beneficial for language learning because the “rich, systematic, and open ended” access to data furthers self-discovery and exploration of language patterns. Concordancing enables students to study words inductively rather than through the “shallow” approaches of lists, dictionary look-ups, etc. that Schmitt (2000) cited as less effective. The Kaur and Hegelmeir study certainly has important implications as it established the effectiveness of concordance study for increasing the productive use of academic vocabulary. While Kaur and Hegelmeir and Horst et. al. have asserted the value of concordancing, to my knowledge, a study examining the possible benefits of corpus-enhanced online textual glosses for academic vocabulary learning has yet to be conducted. It is this gap that the current study seeks to address. As teachers are more easily and quickly able to generate course-specific online texts, it is important to determine the most effective gloss modality for engaging learners and facilitating academic vocabulary acquisition through effective instruction and resource design.

As conclusive as the discussed findings may be, the benefits of corpora and concordance-based approaches for teaching and learning various elements of language have only been partially realized (Varley, 2009). Although corpora and concordancing have often informed classroom pedagogy and materials design (Varley, 2009), some contend that the benefits of corpus linguistics have been rather limited in the language learning classroom (Breyer, 2009). Breyer (2009) cited several reasons for concordance use being limited in the classroom: lack of training for both teachers and students, inadequate computer skills, and availability of resources. However, this study is not intended to be a survey of the factors that sometimes limits in-class corpus consultation. Recognizing the limitations above as realistic impediments to concordance instruction in the classroom, this study instead aimed to build a case for the increased integration

of concordance and corpus data into online educational materials to facilitate semantization and acquisition of academic vocabulary at higher proficiency levels. An online concordance gloss modality possibly enhances autonomous discovery learning and increases productive knowledge of academic vocabulary.

Student Attitudes Towards Glossing

Learner attitudes are an important consideration when designing CALL activities (Davis & Lyman-Hager, 1997). As computers for learning are increasingly a normal part of a university student's academic experience, learners will likely become more selective of the online learning resources they choose to employ in their learning task. Learners expect online tasks to be designed in ways that yield additional benefits over traditional printed exercises; when value is not added, the tool is discarded (Lenders, 2008). While the benefits of glossing and concordance study have been established, additional research on learners' attitudes towards both in online environments is needed.

Recognizing that electronic glossing fosters vocabulary acquisition, Lenders (2008) instead studied attitudes of learners towards online annotations. In Lenders (2008) nearly two-thirds of the 74 participants reported that using the enhanced input provided by electronic glosses made comprehending text easier. Learners reported that their experience with glosses was positive and that using a gloss was an easy method for finding information about a word. The learners consulted the glosses extensively as the input was deemed useful and helpful to completing the task. Results also indicated "learners use electronic glosses as a means of autonomous vocabulary learning" (Lenders, 2008, p. 468). Interestingly, it was found that students also consulted glosses to confirm knowledge rather than simply using glosses to obtain knowledge. The participants also reported that they enjoyed the hypertext environment, regularly

used the glosses, and claimed that the annotations were useful for the learning task. The Akbulut study reported previously also tested students' attitudes towards annotations for vocabulary learning. Approximately 50% of the students claimed that the glosses were useful for vocabulary learning. The students also commented that the visuals helped them remember the words and that they felt more confident on vocabulary post tests (Akbulut, 2007).

Davis and Lyman-Hager (1997) investigated how intermediate undergraduate students use glosses as well as students' perceptions of their effectiveness. Participants were asked how they felt about the program, what value the computer added, and how reading from the computer screen differed from reading printed text. Student attitudes were quite favorable as descriptions of the glosses included "helpful, time saving, easy, and enjoyable" (Davis & Lyman-Hager, 1997, p. 67). One learner commented, "she was more likely to have a coherent understanding of a text when reading aided by the computer gloss" (p. 67). Others reported that glossing increased their feeling of independence and proclaimed the desire that more text be available in a glossed format. Importantly, all participants reported that their experience using online glosses was positive.

It is likely that learner anxiety towards CALL has decreased as computers are much more ubiquitous today than just several years ago. DeRidder (2002) studied 60 students clicking behavior within an online text. She found that students' use of glosses depended little on their attitude towards computers but rather their attitude towards the usefulness of the glosses. When glossed terms were highlighted and deemed useful by the student, the participants consulted the annotations extensively. Brett (1998) also studied the effects of learners' perceptions of salience on the clicking behavior in on an online text. Again, when students perceived glosses as salient and useful, the glosses were selected for study. While not directly eliciting student attitudes

towards glossing through interviews or questionnaires, these two studies indicated that students react positively to glossing methods and are generally willing to utilize glosses when annotations are perceived as salient and beneficial to the task and to overall learning.

Yoon and Hirvela (2004) investigated ESL student attitudes towards the use of corpora in an L2 writing classroom. The participants were enrolled in intermediate or advanced ESL writing courses at an American university. A majority of students reported that using the corpus was beneficial for learning the usage and meaning of vocabulary. Overall, students indicated quite positive attitudes towards corpus use and claimed that using the corpus improved their writing ability. Results also found that students attributed an increase in confidence in L2 writing to using the corpus. Both groups agreed that that corpus use should be incorporated in ESL writing courses.

The present study further assessed learner attitudes towards glosses and concordance information. Prior studies have reported positive attitudes of learners towards various types of gloss modalities. However, this study specifically investigated students' perceptions of the benefits of two textual gloss modalities used for the enhancement of online texts for acquiring academic vocabulary. The two experimental groups in the following study are presented with different forms of glosses and a reaction questionnaire (see appendix G) was administered to determine learner attitudes to the two modalities. The questionnaire consisted of Likert scale and open-ended questions.

CHAPTER 3

METHODOLOGY

Participants

Twenty-six non-native speakers of English enrolled in a freshman composition course at a large U. S. public university participated in the study. The participants were speakers of Chinese (14), Korean (5), Arabic (3), Swedish (2), Japanese (1), and Spanish (1). The students were chosen for the study as their knowledge, both receptive and productive, of the target words and other lexical items from Coxhead's AWL could greatly influence their academic success. As the students had all fulfilled college entrance requirements and passed the requisite exams for university enrollment, their proficiency was deemed intermediate to advanced. There were two experimental groups, dictionary-based and concordance-based, and one control group. The participants received no training on the use of glosses, concordance information, or the website prior to the treatment. The study initially included approximately 35 students; however, only results from participants who were administered both pre and post tests were included in the final data analysis.

The Texts and Glosses

The website designed for the study contained two texts (Appendix A and B) drawn from a vocabulary learning website which offers free exercises for learning and teaching academic vocabulary for teachers and students. The topics for the texts were both on general health issues and were amended to reduce the number of colloquial expressions and other possibly distracting items in efforts to increase the perceived salience of the target words and to remove structures or

expressions that may draw students' attention away from glossed items. Both texts were of comparable length, approximately 200 words. Also, a Flesch-Kincaid readability test was performed to assess the level of difficulty of the two texts. With scores of 2.4 and 2.5, it was determined that the texts were of equal readability. The score indicates the required years of education to understand a text, i.e., a score of 2.5 means a student needs 2.5 years of instruction for comprehend a text. Flesch-Kincaid scores are commonly used in education to assess the readability of a text.

Two online text-based gloss modalities were created for the project. The first experimental group (Group A) was exposed to glosses consisting of five modified sentences extracted from the Corpus of Contemporary Spoken English (COCA). The sentences were chosen to display a variety of semantic as well as syntactic forms of the target vocabulary in multiple contexts. The sentences were reduced to approximately eight content words per entry to reduce the possibility of incorrect inferences by making the meaning as clear as possible. The texts contained 15 glossed academic vocabulary words. The students were instructed to read the text, click on the highlighted words, and study the glosses that appeared on the right side of the screen. An example of a concordance gloss for one of the targeted vocabulary items is below.

Figure 8
Example of a Concordance-based Gloss

Establish

Teachers must **establish** a safe learning environment.

Their only concern was to **establish** their religion not spread it to the nations.

The organization was **established** in 1981.

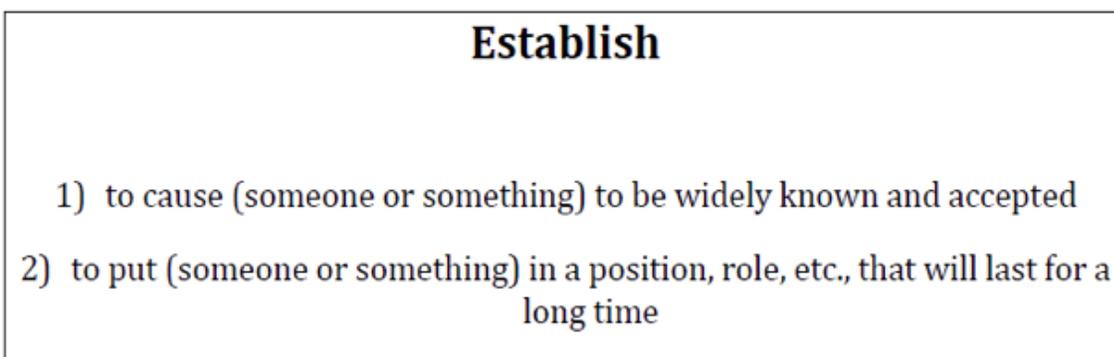
It was not easy to **establish** and maintain these two facilities.

The post office was **established** on January 19, 1880.

The second experimental group (Group B) read the identical texts in the same online environment. The target words for the second group were again bold-faced and underlined and when clicked revealed a gloss containing simple dictionary definitions drawn from Merriam-Webster's Online Learner's Dictionary. Again, students were instructed to read the texts, click on the highlighted words, and study the glosses. An example of the dictionary gloss follows.

Figure 9

Example of a Dictionary-based Gloss



The control group read the texts on the website, but the participants were not provided glosses.

The Instruments

Both tests were divided into three sections with the first portion constructed following Nation's Vocabulary Levels Test. This first section was included as an assessment of foundational receptive knowledge of the targeted items. The second part consisted of 30 sentences containing the boldfaced and underlined target word. Again, the sentences were extracted from the COCA and modified to ensure accessibility. The participants judged the 30 sentences on a three point scale: 1=Correct, 2=I don't know, and 3=Incorrect. There were 10 sentences where the target word was used in its most frequent form, 10 where the target word was used in a different form and/or function, and 10 where the target words were used

incorrectly. The final portion of the test consisted of 10 cloze sentences; the students were asked to fill in the blank with the correct word. The students were asked to use the word in the proper syntactic form as dictated by the context but simply selecting the correct word was marked as correct. All the sentences in this section elicited usages of the target words in their non-core meaning. The tests are provided in Appendix E and F.

The tests were validated through a series of pre-tests. First, a group of 8 TESOL graduate students completed the tests and were asked to circle and comment on items they judged to be confusing, misleading, and/or erroneous. Also, a class of students similar in make-up to the primary participants completed the tests. Assuming the students in the group to be of equal proficiency, half of the students completed the pre-test and the other completed the post-test. Their means and standard deviations for the three sections are displayed in the following table.

Table 1

Assessing the Tests

Group	Means for Receptive Assessment	SD Receptive	Means for Recognition of Variation	SD Recognition of Variation	Means for Productive Assessment	SD Productive
Group A (Pre-Test)	12.17	1.33	15.33	4.37	2.83	1.72
Group B (Post-Test)	12.83	1.72	14.33	3.78	2.67	1.03

In addition, independent samples T-tests were performed to determine if there were significant differences in the means between the corresponding sections of the tests. There were no significant differences between the three sections of the test (Receptive $t(10) = .75$, p value > 0.05) (Recognition of Variation $t(10) = .42$, p value > 0.05) (Productive $t(10) = .20$, p value $>$

0.05). As all p-values were greater than .05, it was determined that there were not significant differences in difficulty between the corresponding sections of the pre and post-test.

The students were interviewed following the test and asked to comment on the clarity of the instructions, the level of fatigue experienced in the judgment tasks (e.g. Did they haphazardly mark the last 10 statements? Were there too many items?), and whether they felt any items were confusing. Per their comments, adjustments were made to the wording of the instructions of section 2. In addition, several students commented that a colloquial expression used in one of the judgment items was unknown; the expression was amended for later tests. All the students tested finished in approximately 20 minutes and no student commented on the number of items influencing their level of motivation.

Following the post test, a reaction questionnaire was completed by the participants to assess their attitudes towards the glossing treatments. The questionnaire consisted of 5 Likert Scale items and 3 open-ended questions. The questionnaire is included in Appendix G.

CHAPTER 4

RESULTS

The instrument consisted of three sections with each section hypothesized to assess various aspects of word knowledge: 1) receptive knowledge through a definition matching task, 2) level of semantization of the target words through judgment tasks, and 3) productive knowledge through cloze test items. Tables displaying descriptive statistics for the pre and post tests of each section of the assessment are included. Also, one-way ANOVA's were performed to assess whether any of the trends evident in the data actually represented significant differences between the treatment groups and gloss methods. The ANOVA's compared the differences between the mean scores between the pre and post tests, i.e. a new variable was computed by subtracting pre test scores from post test scores. Computing the new variable for the ANOVA analysis allowed a more robust analysis as it more completely accounted for time differences between the administering of the two tests. However, the strength of the ANOVA analysis was limited as a result of the small sample size.

The first section of the test was included to assess the participants' receptive knowledge of the targeted lexical items. Interestingly, the percentage scores on the receptive pre-test for the experimental groups were 59% and 65%, indicating the students' receptive knowledge of the targeted vocabulary items was not as developed as expected. However, both the concordance and dictionary groups exhibited positive improvements from the pre-test to post-test as the mean of the concordance group grew to 13.5, a mean difference of 3.8, while the mean of the dictionary-group improved to 12.12, a mean difference of 3.24. The mean of the control group increased

little. The percentage mean on the post-test for the concordance based group was 90% while the definition group mean was 80%, an important difference if considering classroom performance. The concordance gloss treatment facilitated the development of receptive knowledge more than the definition treatment. It would seem that for enhancing receptive knowledge that concordance lines would possibly be too difficult for acquiring initial foundational receptive knowledge. However, the data indicates that concordance study may possibly be effective for developing receptive knowledge. As the tasks of this section required matching targeted terms to a simple and frequent definition, it was expected that the definition group would likely display more growth between the pre and post-tests for this aspect of knowledge. It is possible though that the participants of the concordance-based group performed better on the receptive post-test assessment simply because they responded favorably to the treatment (as noted on the reaction questionnaire) and were therefore more engaged with the enhanced input. It is possible that liking the treatment fostered engagement that resulted in higher scores on the post test. The table below displays the descriptive statistics of the three groups on the receptive pre-test and receptive post-test.

Table 2

Descriptive Statistics of Receptive Pre and Post Tests

Treatment Group	Pre Test		Post Test	
	Mean	SD	Mean	SD
Concordance	9.70	3.53	13.50	1.58
Dictionary	8.88	3.18	12.12	1.96
Control	11.38	2.67	11.87	3.56

A one-way ANOVA was performed to assess whether the differences in means between groups were significant. Performance on the receptive assessment differed significantly by group, $F(2, 23) = 3.74, p = 0.04$. However, as the post hoc Tukey test revealed, the significance between groups was attributed to the difference between the concordance-based and control group, $F(2, 23) = 3.74, p = 0.04$, with no significant difference discovered between the experimental groups, $F(2, 23) = 3.74, p = 0.90$.

Research Question 1: Which gloss modality, dictionary definitions (meaning-given) or modified corpus sentences (meaning-inferred) most effectively enabled students to recognize and accept variation in word usage in a variety of contexts?

The second portion presented 30 sentences for the participants to judge. As stated, of the 30 items, 10 sentences employed the target word in its most frequent form, 10 displayed the words in a less frequent usage, and 10 were simply incorrect exemplifications of the lexical items. The descriptive statistics for the semantization pre-test and post-test are reported in the following table. The means represent correct judgments of the sentences.

Table 3

Descriptive Statistics of Judgment Tasks for Pre and Post Tests

Treatment Group	Pre Test		Post Test	
	Mean	SD	Mean	SD
Concordance	15.40	3.98	17.70	4.11
Dictionary	12.88	6.31	17.00	4.11
Control	14.00	4.99	15.13	4.643

Again evident are positive improvements by the two experimental groups. On the pre-test, percentage scores were approximately 50% for the concordance-based group and 43% for the definition group. The dictionary group's mean difference was 4.12 while the concordance

group's mean difference was 2.3. It was theorized that the concordance-based treatment group's exposure to authentic examples extracted from a corpus would more facilitate recognition of variation and facilitate semantization of the lexical items than would the meaning-given definition annotations. However, the definition annotations more positively affected participants' performance on the judgment task items. To assess between-group significance, a one-way ANOVA was performed using the mean differences between the pre and post test on the judgment task portion of the instruments. No significant difference was found between the groups' performances, $F(2, 23) = 0.999, p = 0.384$.

Research Question 2: Which gloss modality furthered students' productive knowledge of the targeted academic vocabulary terms?

The students' productive knowledge was assessed through cloze test items on both the pre test and the post test. The cloze test items, extracted from the corpus, tasked participants with producing the words in contexts/functions that were not the most frequent use of the target item. The descriptive statistics of the productive pre and post test assessment are reported in the following table.

Table 4

Descriptive Statistics of Productive Tasks for Pre and Post Tests

Treatment Group	Pre Test		Post Test	
	Mean	SD	Mean	SD
Concordance	2.50	1.35	3.70	1.70
Dictionary	2.88	2.03	3.00	1.85
Control	3.13	3.04	2.63	2.13

On the productive assessment, the concordance based group performed better than the dictionary group with a mean difference of 1.20 as compared to 0.12. Hence, the definition group exhibited

stronger gains in recognition of usage while the concordance treatment group performed better on the productive assessment. A one-way ANOVA was performed on the mean differences of performance on the cloze test items intended to test productive knowledge. Again, no significant differences were found between the groups' performances, $F(2, 23) = 1.704, p = 0.204$.

Additional discussion of the research questions 1 and 2 as well as possible implications of the findings follow in the discussion chapter.

Research Question 3: What were students' attitudes towards the two textual glossing modalities?

The students in both the concordance and dictionary treatment group were administered a questionnaire following the post-test. As reported in the methodology, the questions were based on a 5-point Likert Scale (5=Strongly Agree, 4=Mostly Agree, 3=Agree, 2=Mostly Disagree, 1=Strongly Disagree). Descriptive statistics are displayed in Table 6 and the ANOVA results are shown in Table 6.

Although the first two items were not necessarily judgments of students' perceptions, their inclusion was important as they further established the similarities between groups. A one-way ANOVA was used to test the differences in existing vocabulary knowledge prior to instruction and the perceived level of difficulty of the lexical items. Perceptions of the difficulty of the vocabulary did not differ significantly across the treatment groups, $F(1, 21) = 1.255, p = 0.28$. Also, both groups self-reported similar pre-existing knowledge of the words as again no significant difference between groups was evident, $F(1, 21) = .02, p = 0.89$. That no significant differences were found between the mean scores of the treatment groups on questions 1 and 2 reinforced the assumption that the groups' proficiency levels were essentially equal.

Table 5

Descriptive Statistics for Likert Items

		Mean	SD
The vocabulary was difficult.	Concordance	2.91	.831
	Dictionary	3.25	.622
I knew the definitions of the words before the test.	Concordance	2.82	1.250
	Dictionary	2.75	1.055
I feel the information helped me understand how the words are used in a sentence.	Concordance	4.18	.751
	Dictionary	2.92	.669
I feel the information helped me learn how to use the words in a sentence.	Concordance	3.73	1.009
	Dictionary	3.08	.669
I would like to use this method to study vocabulary in the future.	Concordance	4.00	1.183
	Dictionary	3.17	1.193

The remaining three items more closely assessed the participants' attitudes towards the two gloss modalities. As increased semantization and progress along the receptive/productive continuum was central to the study, the results of Likert item #3 were quite revealing. A significant difference was found between groups as participants from the concordance treatment group more consistently reported that their treatment helped them to understand the words in a sentence, $F(1,21) = 18.28, p = 0.00$. However, significant differences were not found for Likert item # 4 (I feel the treatment helped me learn how to use the words in a sentence), $F(1,21) = 3.31, p = 0.083$, and Likert item # 5 (I would like to use this method to study vocabulary in the future), $F(1, 21) = 2.82, p = 0.108$.

Table 6

ANOVA of Likert Items

		df	F	<i>p</i>
The vocabulary was difficult/easy	Between Groups	1	1.255	.275
	Within Groups	21		
	Total	22		
I knew the definitions of the words before the test.	Between Groups	1	.020	.889
	Within Groups	21		
	Total	22		
The treatment helped me understand how the words are used in a sentence.	Between Groups	1	18.280	.000
	Within Groups	21		
	Total	22		
I feel the treatment helped me learn how to use the words in a sentence.	Between Groups	1	3.310	.083
	Within Groups	21		
	Total	22		
I would like to use this method to study vocabulary in the future.	Between Groups	1	2.821	.108
	Within Groups	21		
	Total	22		

Note: Significant at the $p < 0.05$ level.

The questionnaire concluded with three open-ended items: 1) One thing I did not like about the information in the box was 2) One thing I did like about the information in the box was 3) any additional comments. Not all participants responded to the items, but the responses given, were interesting. For example, one student from the dictionary treatment group wrote, “There should be example sentences”. Two others stated, “I know the information of this word, but I still don’t know how to use it” and “It is difficult to connect the definitions of the words and sentences”. A concordance group participant responded that he/she liked how the words were “used in vary ways to demonstrate how to use a word in the different functions”. Humorously, one student commented, “I am lazy so if somebody makes the example sentences like this method, I would love to use this”. Another student reported liking the many example sentences and how the gloss put the words in the same position so “I can compare the vocabulary easily”.

However, not all the responses were so favorable. One student reported that in the concordance gloss, “I don’t know if I am thinking the right meaning”. Echoing the previous comment, one student stated “give us some true or false examples to help us recognize how to use the words and avoid problems” while another wrote, “Some sentences are similar. If I cannot understand one of them, I cannot make sure what the meaning is”. The same participant also stated, “I can understand some word meanings after reading the box, but I forget it very quickly”. This student on the Likert item responded that the glosses were helpful and that he/she would like to use the method in the future.

CHAPTER 5

DISCUSSION

The results of the studies were positive but somewhat inconclusive, and it is not possible to make definitive statements regarding the effectiveness of the textual glossing modalities. However, it was encouraging that both groups responded favorably to the enhanced input and displayed improvements in their performance. Interestingly, the dictionary group exhibited larger gains on the judgment tasks that asked students to assess the acceptability of the word usages. It seems that the simple definitions provided in the online glosses helped the participants to recognize correct usages of the targeted lexical items. Although the concordance group also showed improvement, their scores did not increase at the level of the definition treatment group. It is possible that the concordance glosses overwhelmed students and led them to judge additional incorrect sentences as correct. Seeing the multiple usages of the words, they may have perceived that the words could be used much more freely than previously believed. This initial regression in accuracy may possibly lead to semantization gains in the future as learners are exposed to multiple usages and explore the boundaries of word usage but such a claim cannot be made definitively. Concordance and corpus use has been promoted on their ability to further learners' ability to make generalizations about usage. However, learners must at some point learn the boundaries of applications for a lexical item. The concordance-based group was more open to accepting variation in usage as they more willingly marked usages as correct; however, this willingness led to incorrect judgments as the learners had yet to recognize boundaries for the items' usages. Concordance-based glosses though may be positive for learning as students are

more engaged with exploring these boundaries, recognizing variation in usage, but understanding limitations as well.

In the study there was the possibility that the students in the concordance-based experimental group would make incorrect inferences, a concern noted by Hulstjin (1992). However, the words presented to participants were theorized and subsequently confirmed to be partially known. The study assumed that receptive knowledge was possessed but the knowledge required to recognize the items in various contexts and then use the words productively was thought to be incomplete. As partial knowledge was possessed, the possibility of students making incorrect inferences was minimized. The participants were expected to use the glosses not to gain new knowledge but to confirm and expand previous knowledge. The university level students had likely encountered the words in other learning environments. However, incomplete knowledge could have led to errors by students on the assessment. If a word was indeed unknown, the concordance gloss likely did little to expand knowledge while the dictionary annotation at a minimum allowed students to acquire foundational receptive knowledge. The participants generally reported in the reaction questionnaire that they possessed previous knowledge of the words; however, some students did report the words to be new. These students who judged the words as new would benefit less from a concordance based gloss. Additionally, mean scores on the pre-test indicated that the participants' knowledge was not at the theorized level. If considering classroom performance, the mean percentage scores would not even be of a level needed for a passing mark. The below-theorized level of knowledge, although a little surprising, did not necessarily negatively influence the intended thrust of the research. Participants' progression from the receptive pole along the continuum could still be somewhat followed. However, it has been posited that advanced learners are more likely to benefit from

concordance study (Johns, 1986). As the participants would likely not be characterized as advanced, it would be more revealing to replicate the study with more proficient language learners to more accurately assess the possible advantages of a concordance-based gloss modality for more advanced learners.

It was recognized during testing that the participants displayed the tendency, regardless of treatment group, to use the definitions presented in the first section of the test as the standard to judge variation in usage in the semantization assessment. As the participants attended to the second section, some were noticed to return to the definitions of the first page to seemingly help them judge accuracy on the judgment tasks. Verbal instructions directed students to view each part as separate entities and not use the definitions to guide responses of subsequent sections. Certainly, using the definitions may have assisted participants on some items, but many of the items exemplified the usage of the target words in their non-core meaning. Further, if the word was included as a verb in the first section but used later in the judgment tasks in a different function, students possibly judged the sentence incorrectly based on the limited explication from the first section. This error though again represented incomplete semantization of the word and somewhat confirmed the theory that the participants' word knowledge was incomplete. If knowledge had been more developed, the participants would have been able to accept variation in usage and recognize the polysemous nature of the terms. That their knowledge did not allow flexibility in word usage reflected that the word had not been semantized and productive knowledge was yet to be obtained. In effect, the tendency simply confirmed the researcher's theory that semantization and productive knowledge were not sufficiently developed. Using their established receptive knowledge of the lexical items' core meanings as a foundation, the

participants displayed limited ability to judge sentences correctly and employ the words in the productive assessment.

After studying the results from the usage section of the assessment, it would seem logical to assume that the group exhibiting the greater gain in the judgment tasks would also display greater improvement in productive knowledge. Somewhat surprisingly, this was not the case. Contradicting this assumption, the concordance group, although not performing as well on the judgment tasks, improved more on the productive assessment. As reported, the mean difference between pre and post test for the concordance group was 1.2 while the dictionary group was only .13. Although lacking in significance, it does warrant further investigation in a future study where more words are targeted, more learners participate, and more items are included in the task. The dictionary group's performance stagnated with essentially no gain while the concordance group did improve. Whether this improvement will translate to tasks requiring transfer of word knowledge is certainly unknown. Regardless, the benefits of the concordance-based modality are evident as students' performances increased in all aspects of knowledge. The easy-to-access ready-made concordance-based gloss helped students perform better on the receptive assessment, the measure of semantization, and the cloze test items. The small sample size and small number of assessment items restrict the formulation of conclusive statements regarding the effectiveness of the annotation modalities, but the positive trends in mean scores once again display the possible advantages for textual glossing of online texts for academic vocabulary learning with a concordance annotations.

The concordance-based gloss modality displayed the potential to help learners further the semantization process and increase productive knowledge. Although the texts selected adhered to a number of criteria (general topic, length, level of difficulty), the study would have been

strengthened if the included words had more variation in meaning across contexts. For example, one of the targeted lexical items was *encounter*. The term simply lacks variation in meaning as its core meaning is its most frequent usage. Although several of the words exhibited subtle differences in meaning and usage, e.g. *assume*, testing words that displayed more variation would have enhanced the study. The limited variation restricted the possible effectiveness of concordance-based glosses intended to display the polysemous nature of academic vocabulary words. On the other hand, the reduced variation likely benefited the dictionary-based treatment group. The core meaning presented on the first page was more likely to resemble the usages of later sections. This limitation possibly skewed the results to reflect a better performance by the dictionary treatment group than would have been possible if the targeted words displayed more variation in meaning and usage. Regardless of this limitation, the concordance group still displayed gains on the assessments for each aspect of knowledge. Importantly, the concordance treatment group exhibited the largest improvement in productive knowledge, the ultimate goal of vocabulary acquisition.

Possibly most encouraging for those espousing the benefits of corpus-based instructional methods and tools were the positive attitudes toward the concordance gloss modality reported by the participants. As the Likert Analysis revealed, the learners in the concordance-based groups responded quite favorably that the treatment helped them understand how the words are used in a sentence. There was a significant difference on this question between the groups, which was further supported in the open-ended questions from the questionnaire. Consistently, students from the definition group responded that they did not agree that the definition was helpful for understanding how the target words are used. Although they did perform slightly better in the judgment tasks than did the concordance group, their collective perceptions of the

ineffectiveness of the gloss is certainly important to note. If they perceived the method as ineffective, it seems logical that they would be less likely to use the treatment method in the future. On the other hand, the concordance group improved their performance and perceived the treatment as beneficial, an important combination. This conclusion for likelihood of future usage is supported by the results of item 5 which asked students whether they would like to use the method in the future. The mean response for the concordance group was 4.0 and the dictionary group was 3.17. Not a significant difference, but an important one that further displays students' positive attitudes towards the concordance glosses. Some may comment that student's simply gave positive assessments of the new methods in order to please the researcher/instructor. However, the differences between the groups' Likert Scale responses indicate that students were in fact truthful as participants in the dictionary group gave generally less positive feedback than did the concordance group. This suggests that students were in fact answering truthfully. The participants' positive attitudes towards the concordance glosses may help further the integration of corpus data and concordance lines into text and online resources

CHAPTER 6

CONCLUSION

Enhanced input through electronic glosses has repeatedly been shown to facilitate reading comprehension (Brett, 1998; Chun and Plass, 1996; Leffa, 1992; Lyman-Hager et. al, 1993; Nagata, 1999) as well as vocabulary acquisition (Al-Seghayer, 2001; DeRidder, 2002; Hulstijn, 1993; Hulstijn et. al., 1996; Lomicka, 1998). This study extended the previous research by assessing the effectiveness of a concordance-based (meaning inferred) and a dictionary-based gloss (meaning given) for facilitating semantization and increasing productive knowledge of academic vocabulary. The study confirmed the usefulness of a concordance based glossing modality as the concordance based treatment group displayed gains in semantization and in productive knowledge. Although the dictionary group also improved on the judgment tasks, they did not display improvement on the productive tasks. However, additional research is needed for a more definitive conclusion on the issue. To more accurately assess the efficacy of a concordance-based gloss modality, further research testing a higher number of learners on vocabulary that displays more variation in meaning is required. Subsequent research with more participants may reveal more conclusively that a meaning-inferred concordance-based glossing modality for higher-level learners efficiently facilitates more complete acquisition of vocabulary and progression along the receptive-productive continuum.

Of additional importance were the students' attitudes towards the concordance annotations. Learners are increasingly technologically savvy and are likely to reject input they

perceive to not be salient and beneficial to a task and to learning. Importantly, participants in the concordance-based treatment group consistently reported that the modified corpus sentences helped them to understand how the academic vocabulary words are used in sentences. In addition, the participants reported that they would likely use a concordance-based modality for vocabulary study in the future. The combination of students' willingness to use the concordance glosses matched with the perceived salience and effectiveness of the glosses in improving learning justifies an increase in research into the further integration of corpus data into materials design, both online and in text.

An effectively designed, easy-to-access, ready-made concordance-based gloss modality may efficiently and effectively help language learners semantize and ultimately acquire productive knowledge of academic vocabulary. A gloss modality that exposes more proficient language learners to varied and multiple usages of academic vocabulary in authentic contexts is a viable strategy for academic vocabulary acquisition. While a dictionary gloss certainly has its place in materials design for students establishing foundational receptive knowledge, a concordance-based gloss modality requiring students to infer meaning may help learners progress along the receptive-productive continuum and improve their productive knowledge. Additional research exhibiting the benefits of concordance study while indicating learners' positive attitudes towards concordance use will allow further integration of corpus data and concordance information into mainstream language learning classrooms.

References

- Abraham, L. (2007). Computer-mediated glosses in second language reading comprehension and vocabulary learning: a meta-analysis. *Computer assisted language learning*, 21(3), 199-226.
- Akbulut, Y. (2007). Effects of multimedia annotations on incidental vocabulary learning and reading comprehension of advanced learners of English as a foreign language. *Instructional science*, 35 (6), 499-517.
- Al-Seghayer, K. (2001) The effects of multimedia annotations on L2 vocabulary acquisition: a comparative study. *Language learning and technology*, 5(1), 202-232.
- Aston, G. (Ed.). (2001). *Learning with corpora*. Houston, Texas: Altheban.
- Beck, I, McKeown, M, & Kucan, L. (2002). *Bringing words to life: robust vocabulary instruction*. New York, NY: The Guilford Press.
- Beheydt, L. (1987). The semantization of vocabulary in foreign language learning. *System*, 15(1), 55-67.
- Burgh, J (1985). Foreword. In R. Quirk & H. Widdowson (Eds.), *English in the world* (p. vii-ix). Cambridge, Great Britain: Cambridge University Press.
- Brett, P. (1998). Using multimedia: a descriptive investigation of incidental language learning. *Computer assisted language learning*, 11(2), 179-200.
- Breyer, Y. (2009). Learning and teaching with corpora: reflections by student teachers. *Computer assisted language learning*, 22(2), 153-172.
- Chun, D. & Plass, J. (1996). Effects of multimedia annotations on vocabulary acquisition. *The modern language journal*, 80 (2) 183-198.
- Chun, D. & Plass, J. (1996). Facilitating reading comprehension with multimedia. *System*, 24(4), 503-519.
- Chun, D., Mayer, M., Leutner, D., Plass, J. (1998). Supporting visual and verbal learning preferences in a second-language multimedia learning environment. *Journal of educational psychology*, 90(1), 25-36.

- Cobb, T. (1999). Breadth and depth of lexical acquisition with hands-on concordancing. *Computer assisted language learning*, 12(4), 345-360.
- Cobb, T. (1997). Is there any measurable learning from hands-on concordancing? *System*, 25(3), 301-315.
- Coxhead, A. (2000). A new academic word list. *TESOL quarterly*, Vol. 34 (No 2).
- Cronbach, L. (1942). An analysis of techniques for diagnostic vocabulary testing. *The journal of educational research*, 36(3), 206-217.
- Dale, E. (1965). Vocabulary measurement: techniques and major findings. *Elementary english*, 42, 82-88.
- Davies, Mark. (2008-) The Corpus of Contemporary American English (COCA): 410+ million words, 1990-present. Available online at <http://www.americancorpus.org>.
- Ellis, R. (1990). *Instructed second language acquisition*. Oxford: Basil Blackwell.
- DeRidder, I. (2002) Visible or invisible links: does the highlighting of hyperlinks affect incidental vocabulary learning, text comprehension, and the reading process?. *Language learning & technology*, 6 (1), 123-146.
- Gass, S., & Selinker, L. (2008). *Second language acquisition*. New York, NY: Routledge
- Hegelmeir, V. & Tower, D. (2004). Using CALL in the classroom: analyzing student interactions in an authentic classroom. *System*, 32, 185-205.
- Henriksen, B. (1999). Three dimensions of vocabulary development. *SSLA*, 21, 303-317.
- Horst, M. et. al. (2005). Expanding academic vocabulary with an interactive online database. *Language learning and technology*, Vol 9 (No 2), p 90-110.
- Hulstjin, J. (1993). Retention of inferred and given meanings: Experiments in incidental vocabulary learning. In P.J.L. Arnaud @ H. Bejoint (Eds.), *Vocabulary and applied linguistics* (p. 113-125). London: Macmillan.
- Hulstjin, J. (1992). When do foreign-language readers look up the meaning of unfamiliar words? The influence of task and learner variables. *The modern language journal*, 77 (2), 139-147.
- Hulstjin, J.H., Hollander, M., & Griendanus, T. (1996). Incidental vocabulary learning by advanced foreign language students: the influence of marginal glosses, dictionary use, and reoccurrence of unknown words. *The modern language journal*, 80(3), 327-339.
- Johns, T. (1986). Micro-concord: a language learner's research tool. *System*, 14(2), 151-162.

- Johns, T. (1994). From printout to handout: grammar and vocabulary teaching in the context of data-driven learning. In T. Odlin (Eds.), *Perspectives on pedagogical grammar* (293-314). New York: Cambridge University Press.
- Kaur, J. & Heglemeir, K. (2005). ESL students' use of concordance in the transfer of academic word knowledge: an exploratory study. *Computer assisted language learning*, 18(4), 287-310.
- Koren, S. (1999). Vocabulary instruction through hypertext: are there advantages over conventional teaching methods of teaching? *TESL-EJ Vol. 4* (2).
- Kost, C.R., Foss, P., & Lenzini, J.J. (1999). Textual and pictorial glosses: effectiveness on incidental vocabulary growth when reading in a foreign language. *Foreign language annals* 32 (1), 89-97.
- Krashen, S. (1985). *The input hypothesis: issues and implications*. New York: Longman.
- Laufer, B. & Paribakht, T. (1998). The relationship between passive and active vocabularies: effects of language learning context. *Language Learning* 48 (3), 365-391.
- Lenders, O. (2008). Electronic glossing-is it worth the effort? *Computer assisted language learning*, 21 (5), 457-481.
- Lin, C. C. & Huang, H. M. (2008). Meaning-inferred gloss and meaning-given gloss on incidental vocabulary learning. *Journal of National Taiwan Normal University: Humanities & Social Sciences*, 53(2), 87-116.
- Leffa, V.J. (1992). Making foreign language texts comprehensible for beginners: An experiment with an electronic glossary. *System*, 20 (1). 63-73.
- Lomicka, L. (1998). To gloss or not to gloss: an investigation of reading comprehension online. *Language learning & technology*, 1 (2), p 41-50.
- Lyman-Hager , M., Davis, N., Burnett, J., & Chennault, R. (1993). Us vie de boy: interactive reading in french. In F.L. Borchardt & E.M.T. Johnson (Eds.), *Proceedings of CALICO 1993 Annual Symposium on Assessment* (p. 93-97). Durham, NC: Duke University.
- Lyman-Hager, M.A. & Davis, J. (1996) The case for computer-mediated reading: une vie de boy. *The french review*, 69(5), 775-792.
- Melka, F. (1999). Receptive vs. productive aspects of vocabulary. In Schmitt, N. & McCarthy, M (Eds), *Vocabulary: description, acquisition, and pedagogy* (84-102). New York: Cambridge University Press.
- Nagata, N. (1999). The effectiveness of computer-assisted interactive glosses. *Foreign language annals*, 32 (4), 469-479.

- Nation, I.S.P. (2001). *Learning vocabulary in another language*. Cambridge: Cambridge University Press.
- Paribakht, T. & Wesche, M. (1996). Assessing vocabulary knowledge : depth vs. breadth. *Canadian modern language review*, 53 (1), 13-40.
- Santos, T. (1988). Professors' reactions to the academic writing of nonnative-speaking students. *TESOL Quarterly*, 22(1), 69-90.
- Sinclair, J. (1985). Retrospect and prospect: selected issues. In R. Quirk & H. Widdowson (Eds.), *English in the world* (pp. 248-255). Cambridge, Great Britain: Cambridge University Press.
- Shmitt, N. (2000). *Vocabulary in language teaching*. Cambridge: Cambridge University Press.
- Stevens, V. (1991). Concordance-based vocabulary exercises: a viable alternative to gap-fillers. In T. Johns and P. King (Eds.), *Classroom concordancing: english language research journal* (p. 47-63). Centre for English Language Studies, University of Birmingham.
- Varley, S. (2009). I'll just look that up in the concordance: integrating corpus consultation into the language learning environment. *Computer assisted language learning* 22(2), 133-152.
- Waring, R. (2002). Scales of vocabulary knowledge in second language vocabulary assessment. Appeared in *Kiyo, the occasional papers of notre dame seishin university*, March 2002.
- Webb, S. (2005). Receptive and productive vocabulary learning: the effects of reading and writing on word knowledge. *SSLA*, 27, 33-52.
- Webb, S. (2008). Receptive and productive vocabulary sizes of L2 learners. *SSLA*, 30, 79-95.
- Wichmann, A., Fligelstone, S., McEnery, T., Knowles, D. (Eds.), 1997. *Teaching and Language Corpora*. Longman, London and New York.
- Yoon, H. & Hirvela, A. (2004). ESL student attitudes toward corpus use in L2 writing. *Journal of second language writing*, 13, 257-283.
- Yoshi, M. (2006). L1 and L2 glosses: their effects on incidental vocabulary learning. *Language learning & technology* 10 (3), 85-101.
- Yoshi, M. & Flaitz, J. (2002). Second language incidental vocabulary retention: the effect of text and picture annotation types. *CALICO Journal* 20(1), 33-58.

Health

The twentieth century saw great advances in medical knowledge. At the end of the nineteenth century life expectancy was comparatively short for people in Britain and many children did not **survive** to adulthood. By the end of the twentieth century, however, infant mortality was low and many people **anticipated** living beyond 60 years old. This rapid progress **occurred** as a result of a series of breakthroughs, along with a political focus on social welfare and public health.

Today, however, we **encounter** new threats. Although it had been **assumed** that many diseases would be **eliminated**, new types of TB and malaria have recently **emerged** and are fast **establishing** themselves. The viral infection, Aids, has reached epidemic levels in some countries. The rate of heart disease is increasing, along with other so-called “self-inflicted” illnesses. Superbugs, resistant to our range of antibiotics, continue to evolve.

Predictions for the twenty-first century suggest that we will increase our understanding of the roles of genes in having good health. Many diseases will be prevented as screening will allow defective embryos to be **identified**. Those who do get ill will receive drugs made to fit their individual needs and thus be more effective. Will there also be surprises awaiting us as the world population ages?

The Heart

The heart **functions** as a pump at the centre of the circulatory system. In humans it is located in the chest, between the lungs. The heart **consists** of four chambers surrounded by a very strong muscular wall. The upper chambers receive blood entering the heart, and the lower chambers pump the blood out of the heart through the circulatory system.

The two systems work as follows. Blood from the body enters the right atrium, is passed into the right ventricle and from there is pushed through an artery to the lungs. In the lungs the blood **releases** carbon dioxide and absorbs oxygen and is then **transported** back to the heart into the upper chamber. From here it passes into the left side of the heart, which pumps the oxygenated blood around the body.

The heartbeat is caused by the alternating contractions and relaxations of the muscles. The heart rate **varies**, increasing temporarily during exercise and decreasing during sleep. Babies have a heart rate of 130 beats per minute but this **diminishes** until the average adult rate of 70 is reached.

Appendix C: Concordance Glosses

Survive

Of the eight, only Anne's father survived.

He is survived by two children and three great-grandchildren.

Every person in the building survived the fire.

He is survived by his wife, Jan, whom he married in 1947.

The company needs \$5 billion in government loans to survive.

Anticipate

I don't anticipate that happening. It seems impossible.

It is anticipated this could be one of the biggest movies ever made.

He anticipates the demand for oil will continue to grow.

The problem lasted longer than anyone anticipated.

What we are trying to do is anticipate how a company is likely to change.

Occur

His death occurred on February 28, 1967.

This decision occurred two days after the break.

This element does not naturally occur in the Earth's atmosphere.

About 75 percent of cases occur in women 50 or older.

If these symptoms occur, you should seek emergency treatment.

Encounter

The people I **encountered** were clearly frightened.

I frequently **encounter** the word in magazines.

We **encounter** many serious difficulties in life.

In the next **encounter**, Strake Jesuit won 54-38.

My first **encounter** with Clinton came when he was governor of Arkansas.

Assume

It is often **assumed** that women are not as dangerous as men.

We **assume** too often that it will always be true.

I incorrectly **assumed** they were part of the group.

I **assume** this is the most important thing you need to focus on right now?

He can actually **assume** the loan.

Eliminate

Most parents feel the school should not **eliminate** after-school programs.

Many positions at the company were **eliminated** during the recession.

Most airlines have **eliminated** meals, free pillows and magazines.

Obama wants **to eliminate** "Don't ask, don't tell".

You're never going to **eliminate** all birds from any airport environment.

Emerge

A number of problems **emerged** after the disaster.

We are optimistic that we can **emerge** from this tough cycle.

He or she should **emerge** a changed person at the end.

Those problems would **emerge** in a matter of months.

Vladimir Putin **emerged** as the new leader in 2000.

Establish

Teachers must **establish** a safe learning environment.

Their only concern was to **establish** their religion not spread it to the nations.

The organization was **established** in 1981.

It was not easy to **establish** and maintain these two facilities.

The post office was **established** on January 19, 1880.

Identify

First, they try to **identify** the cause of the problem.

I don't think people want to be **identified** with failure.

Many people in the Northeast **identify** as democrat.

The group **identified** a number of factors that contributed to the situation.

An American scientist was the first to **identify** the site in the 1980s.

Function

DNA determines how genes function.

The schools teach students how to function in the world.

One function of local government is to provide clean drinking water.

He awoke from the coma and regained brain function.

The AIDS drugs make them so sick they can't function.

Consist

The race will consist of a 1,000-yard swim and a 5-mile run.

Their fall courses consist of writing, science, and math.

Most of their meals consist of organic fruits and vegetables.

The center will consist of a variety of structures of different styles.

Punishment consists of completing from 10 to 40 community service hours.

Release

The school said it would release the test scores next week.

Israel is expected to release 1,000 prisoners.

The movie is scheduled for release later this year.

She can release the abortion records.

He's only asking for the release of 26 prisoners.

Transport

Its small size makes it easy to **transport**.

The **transport** system will deliver oil to major cities.

Today's ships can **transport** more than 5,000 passengers.

They decide where to **transport** patients based on several factors.

They're building a network of pipelines to **transport** the gas to population centers

Vary

The actual number **varies** by city.

Human rights laws **vary** widely around the world.

The school curriculum **varies** from state to state.

The daily high school news shows **vary** in content, length and audience.

Their reasons for connecting with others online **vary**.

Diminish

The value of CDs has **diminished** dramatically.

The population will **diminish** if changes are not made.

The violence has **diminished** in the past year.

The ability to multi-task or think on your feet may **diminish**.

I don't want to **diminish** the president's ability to fight this war.

Appendix D: Dictionary Glosses

Survive

- 1) to remain alive : to continue to live
- 2) to remain alive after the death of (someone)

Anticipate

- 1) to think of (something that will or might happen in the future)
- 2) to expect or look ahead to (something) with pleasure : to look forward to

Occur

- 1) to happen
- 2) to appear or exist : to be found
- 3) to be thought of by (someone)

Encounter

- 1) to have or experience (problems, difficulties, etc)
- 2) to meet (someone) without expecting or intending to

Assume

- 1) to think that something is true or probably true without knowing that it is true
- 2) to begin (a role, duty, etc.) as a job or responsibility

Eliminate

- 1) to remove (something that is not wanted or needed) : to get rid of (something)
- 2) to defeat and remove

Emerge

- 1) to become known or apparent
- 2) to rise or appear from a hidden or unknown place or condition, to come out into view

Establish

- 1) to cause (someone or something) to be widely known and accepted
- 2) to put (someone or something) in a position, role, etc., that will last for a long time

Identify

- 1) to know and say who someone is or what something is
- 2) to find out who someone is or what something is

Function

- 1) to work or operate
- 2) to have a specified function, role, or purpose

Consist

- 1) to have (something) as an essential or main part
- 2) to be formed or made up of

Release

- 1) to allow (a person or animal) to leave a jail, cage, prison, etc. : to set free
- 2) to stop holding something
- 3) to allow a substance to enter the air, water, soil, etc

Transport

- 1) to carry (someone or something) from one place to another
- 2) to cause (someone) to imagine that he or she is in a different place or time

Vary

- 1) to be different or to become different
- 2) to make (something) different : to make changes to (something)

Diminish

- 1) to become or to cause (something) to become less in size, importance, etc
- 2) to lessen the authority or reputation of (someone or something)

Appendix E: Pre Test

Match the words to their definitions.

1. function _____
2. diminish _____
3. eliminate _____

4. consist _____
5. survive _____
6. emerge _____

7. release _____
8. anticipate _____
9. establish _____

10. transport _____
11. occur _____
12. identify _____

13. vary _____
14. encounter _____
15. assume _____

- a. to increase
- b. to begin
- c. to work as
- d. to decrease
- e. to include
- f. to remove

- a. to be made of
- b. to remain alive
- c. to quit or stop
- d. to leave
- e. to appear
- f. to be consistent

- a. to hold
- b. to destroy
- c. to create
- d. to happen
- e. to expect
- f. to set free

- a. to disappear from view
- b. to translate
- c. to happen
- d. to move something
- e. to make a mistake
- f. to recognize a person or thing

- a. to be different
- b. to not believe
- c. to meet
- d. to avoid
- e. to believe to be true
- f. to be the same

Please rate the following sentences using the scale in the box.

1=Incorrect	2=I don't know	3=Correct
--------------------	-----------------------	------------------

- 1) _____ Nearly 50 world leaders **consisted** a Washington meeting on stopping the spread of nuclear weapons.
- 2) _____ They make it possible for larger numbers of humans to **function** as a society.
- 3) _____ Love is sometimes less an affair of the heart than a **function** of the brain.
- 4) _____ Commanders often sent their men to hunt for the enemy in villages near vital **transport** roads.
- 5) _____ The ability to **transport** a plot is the most important skill a screenwriter needs.
- 6) _____ Projections for the next couple of decades **vary** widely.
- 7) _____ The 3 million annual burglaries in the United States clearly **diminish** the security of homes and neighborhoods.
- 8) _____ One strategy that has been used to **diminish** feedback to students is peer tutoring.
- 9) _____ He is **survived** by his wife, Irene; daughter Susan; and two grandchildren.
- 10) _____ To **survive** the information would seem impossible.
- 11) _____ Did you **anticipate** the possibility of an angry reception from the Soviets?
- 12) _____ If there' s a builder that can accurately **anticipate** what boat owners want, it's this one.
- 13) _____ If the government **occurred** the tax, it would apply only to tickets purchased in France.
- 14) _____ The important point here is that this does not **encounter** the important benefits of regular exercise.
- 15) _____ If it's an FHA loan, she can -- he can actually **assume** the loan
- 16) _____ This makes it an excellent vehicle to drive to help **eliminate** greenhouse gases.
- 17) _____ The latest effort is an attempt to **emerge** a tube into the leak to siphon off at least some of that oil.

1=Incorrect

2=I don't know

3=Correct

- 18) ____ In fact, sleep problems often **occur** as the result of poor sleep routines.
- 19) ____ A memorial fund in Jim's name has been **established** at MIT to support economics graduate students.
- 20) ____ I need only a proper novel for me to be **established** in a career where I can make my own way.
- 21) ____ 28 percent of registered California voters **identify** with the group.
- 22) ____ Employees need to **assume** the technology in question and present it in a favorable light.
- 23) ____ He will **eliminate** us to a lower place so others will feel more powerful.
- 24) ____ Students learn how to **function** mirrors to reduce the area around the car where they cannot see.
- 25) ____ **Diminishing** our ministry by closing a parish is not the answer.
- 26) ____ **Encounters** like these are becoming more and more common in and around the nation's capital.
- 27) ____ The **release** of a movie based on a book often pushes sales of the book higher.
- 28) ____ It is appropriate for regulators to **identify** offshore drilling until the cause can be determined and fixed.
- 29) ____ Bill collectors don't tend to **encounter** many friendly comments, even in the best of times.
- 30) ____ The Afghan government is able and prepared to **assume** the responsibilities that they must for governance.

Fill in the blank with a word from the box.

function	consist	release	transport	vary	diminish
survive	anticipate	occur	encounter	assume	
eliminate	emerge	establish	identify		

1. She is _____ by her two children, James and Sally, and her husband, John.
2. The _____ of the guards was to keep danger out and keep the prisoners in.
3. Nike will also _____ \$380 million of debt from Converse as part of the deal.
4. The element does not _____ naturally on Earth.
5. The age of first sexual _____ has on average gone up from 14 to 17 years.
6. Teachers should _____ their methods to teaching to make classes more interesting and to facilitate learning.
7. The _____ of products to market is often a very costly task.
8. The band followed the _____ of their book with a concert tour.
9. Many people from the southeast _____ strongly with the conservative values of the Republican party.
10. The at-first unknown candidate slowly _____ as the frontrunner as the election neared.

Appendix F: Post Test

Post Test—Match the words to their definitions.

- | | |
|---------------------|-----------------------------------|
| 1. Release _____ | a. to be the same |
| 2. Transport _____ | b. to give freedom |
| 3. Vary _____ | c. to not move |
| | d. to move something |
| | e. to decrease |
| | f. to be different |
| | |
| 4. Function _____ | a. to include |
| 5. Survive _____ | b. to remain alive |
| 6. Anticipate _____ | c. to be surprised |
| | d. to work as |
| | e. to expect |
| | f. to fall |
| | |
| 7. Occur _____ | a. to decrease |
| 8. Encounter _____ | b. to divide |
| 9. Diminish _____ | c. to meet |
| | d. to happen |
| | e. to forget |
| | f. to remove |
| | |
| 10. Emerge _____ | a. to create or build |
| 11. Establish _____ | b. to avoid or stay away |
| 12. Identify _____ | c. to come out, to appear |
| | d. to destroy or tear down |
| | e. to recognize a person or thing |
| | f. to forget someone |
| | |
| 13. Assume _____ | a. to remove, to delete |
| 14. Eliminate _____ | b. to be made up of |
| 15. Consist _____ | c. to make a mistake |
| | d. to believe to be true |
| | e. to be move quickly |
| | f. to turn |

Please rate the following sentences using the scale in the box.

1=Incorrect

2=I don't know

3=Correct

1. ____ The distances of your throws **vary** wildly.
2. ____ We have been able to create pulses for the first time that **consist** of only one or two wave cycles.
3. ____ It is appropriate for regulators to **identify** offshore drilling until the cause can be determined and fixed.
4. ____ Howell might have hired Sarah to **eliminate** an enemy or a rival.
5. ____ Bill collectors don't tend to **encounter** many friendly comments, even in the best of times.
6. ____ His first task was to **identify** the veterans among the thousands of residents in Milledgeville.
7. ____ In fact, sleep problems often **occur** as the result of poor sleep routines.
8. ____ Taipei has **emerged** an alliance with the United States for over six decades
9. ____ I **anticipated** interviews with experts and observed the work of a start-up company based in Rio.
10. ____ I don't see how they do it, but I **assume** they are really good at
11. ____ Ellickson knew that he did not have to **emerge** " it " to Lester.
12. ____ Many issues must be **released** when teachers choose to co-teach.
13. ____ The things I trade **consist** of luxury goods: pieces of precious copper; polished white shell; buffalo wool...
14. ____ My position is that there is absolutely a role and a **function** for the federal government.
15. Thevis, now 76, was convicted and sentenced to federal prison. He is scheduled for **release** in 2028.
16. ____ He **survived** the earthquake, pulled from the rubble at Port-au-Prince's Hotel Montana.
17. ____ The occasion for this look back on Eastwood's career is the **release** of a remarkable new DVD set.

1=Incorrect

2=I don't know

3=Correct

18. ____ The highway is used heavily by the U.S. military to **transport** equipment out of the country.
19. ____ The 1996 state law doesn't **vary** whether cities and counties can ban or regulate local use.
20. ____ While symptoms **vary**, they usually include a speeding heart, light-headedness, sweating, and a feeling of depression.
21. ____ The loss did nothing to **diminish** the boy's appetite for music.
22. Strontium (STRON-tee-um) is a naturally **occurring** mineral that is closely related to calcium.
23. ____ This paper examines the **encounters** between women on two sides of the issue.
24. ____ In marriage, women are **established** in many ways they did not experience when they were single.
25. ____ As far as I can **encounter**, he has always expressed a total aversion to alcohol.
26. ____ The **emerging** rivalry between China and the United States is a concerning trend in global politics.
27. ____ One **function** they attended during their vacation was a party on the beach.
28. ____ Toyota has **encountered** its main problem to be a poor braking system.
29. ____ We got back on the **transport** then, and the doctor gave me a pill to help me sleep.
30. ____ **Anticipating** recovery, companies are investing in talent, technology, even real estate.

Fill in the blank with a word from the box.

function	consist	release	transport	vary	diminish
survive	anticipate	occur	encounter	assume	
eliminate		emerge	establish	identify	

1. What can be done about _____ water resources?
2. My position is that there is absolutely a role and a _____ for the federal government.
3. The reasons some people become terrorists are as _____ as the reasons other people become doctors or lawyers.
4. He briefly described his first _____ with his boss at the company.
5. Because this is an _____ technology, there was not a lot of information to research.
6. Her association with Buchanan _____ solely of her attendance at a speech during a 1999 visit to Alaska.
7. As students work on their essays, they must _____ the role of editor and proofreader.
8. He is _____ by two children and three great-grandchildren.
9. I think there's an enormous number of people out there who really _____ with her.
10. Any time is the right time to _____ a film like this one.

Appendix G: Reaction Questionnaire

Answer the following questions. Use the scale in the box.

5= Strongly Agree 4= Mostly Agree 3=Agree 2=Mostly Disagree 1=Strongly Disagree

1. The vocabulary was difficult.

5 4 3 2 1

2. I knew the definitions of the words before the tests and instruction.

5 4 3 2 1

3. I feel the information helped me understand how the words are used in a sentence.

5 4 3 2 1

4. I feel the information helped me learn how to use the words in a sentence.

5 4 3 2 1

5. I would like to use this method to study vocabulary in the future.

5 4 3 2 1

6. One thing I did not like about the information in the box was....

7. One thing I did like about the information in the box was...

8. Any other comments?

Appendix H: IRB Approval

Office for Research
Institutional Review Board for the
Protection of Human Subjects



April 9, 2010

Robert E. Poole
Department of English
College of Arts & Sciences
The University of Alabama

Re: IRB # 10-OR-110 "Vocabulary Retention in Second Language Acquisition"

Dear Mr. Poole:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your protocol has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on April 7, 2011. If your research will continue beyond this date, complete the relevant portions of Continuing Review and Closure Form. If you wish to modify the application, complete the Modification of an Approved Protocol Form. When the study closes, complete the appropriate portions of FORM: Continuing Review and Closure.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,



152 Rose Administration Building
Box 870117
Tuscaloosa, Alabama 35487-0117
(205) 348-8661
FAX (205) 348-8882
TOLL FREE (877) 820-3066

