The University of San Francisco

USF Scholarship: a digital repository @ Gleeson Library | Geschke Center

Doctoral Dissertations | Theses, Dissertations, Capstones and Projects

2020

A Convergence of Conceptual Frameworks: Neurocognitive, Metacognitive and Social Cultural Techniques in Vocabulary Teaching and Learning

Malihe Eshghavi
University of San Francisco, meshghavi@dons.usfca.edu

Follow this and additional works at: https://repository.usfca.edu/diss

 Part of the Language and Literacy Education Commons, and the Linguistics Commons

Recommended Citation

Eshghavi, Malihe, "A Convergence of Conceptual Frameworks: Neurocognitive, Metacognitive and Social Cultural Techniques in Vocabulary Teaching and Learning" (2020). *Doctoral Dissertations*. 531.
https://repository.usfca.edu/diss/531

This Dissertation is brought to you for free and open access by the Theses, Dissertations, Capstones and Projects at USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. It has been accepted for inclusion in Doctoral Dissertations by an authorized administrator of USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. For more information, please contact repository@usfca.edu.

The University of San Francisco

A CONVERGENCE OF CONCEPTUAL FRAMEWORKS: NEUROCOGNITIVE, METACOGNITIVE AND SOCIAL CULTURAL TECHNIQUES IN VOCABULARY TEACHING AND LEARNING

A Dissertation Presented
to
The Faculty of the School of Education
International and Multicultural Education Department

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Malihe Eshghavi
San Francisco
May 2020

THE UNIVERSITY OF SAN FRANCISCO

DISSERTATION ABSTRACT

This mixed methods study investigated the effectiveness of neurocognitive, metacognitive and sociocultural techniques in vocabulary instruction at the high-intermediate level of English as a second language learners' vocabulary learning and recall at a community college in Northern California. While previous studies offered and demonstrated different methods, those studies emphasized only one particular vocabulary learning modality. As a result, most ESL learners learn vocabulary passively but not actively. No study has proposed to explore the inclusion of the neurocognitive, metacognitive and sociocultural techniques on vocabulary learning and recall, in order to analyze the resulting effects of these proposed instruction techniques among community college students.

Utilizing a mixed methods approach, 51 ESL students, including 27 students in the experimental group and 24 students in the control group, participated in this study. The experimental group was taught the target words based on neurocognitive, metacognitive and sociocultural techniques; the control group received the target words based on a traditional method. Split-plot ANOVA and Independent t-sample tests were used to analyze the pre-test and post-test data. Learners' attitudes and perceptions towards the inclusion of neurocognitive, metacognitive and sociocultural techniques were examined through a questionnaire and interviews.

The quantitative findings revealed a statistically significant difference in gain score means between the control and experimental groups. Qualitative findings revealed that the experimental group noticed improvement in their vocabulary learning and recall

as a result of efficiently utilizing the proposed techniques. Thus, the qualitative and quantitative findings converged and suggested a new conceptual framework in the field of second language acquisition. Based on the evidence of this dissertation's research, the inclusion of neurocognitive, metacognitive and sociocultural techniques had positive effects on the community college ESL students' vocabulary learning and helped them to use the study's target words actively in their writing and speaking.

This study has implications for the fields of research methods and ESL vocabulary instruction. More research on the inclusion of neurocognitive, metacognitive and sociocultural techniques in instruction for different age ranges and different ESL group levels would further expand the current findings of the effects of the vocabulary technique instruction and to identify curricular implications.

This dissertation, written under the direction of the candidate's dissertation committee and approved by the members of the committee, has been presented to and accepted by the Faculty of the School of Education in partial fulfillment of the requirements for the degree of Doctor of Education. The content and research methodologies presented in this work represent the work of the candidate alone.

Malihe Eshghavi May 20, 2020
Candidate

Dissertation Committee:

Shabnam Koirala Azad, Ph.D. May 20, 2020
Chairperson

M. Sedique Popal, Ed.D. May 20, 2020
Committee Member

Matthew Mitchell, Ph.D. May 20, 2020
Committee Member

DEDICATION

To my parents and all of my teachers and professors who planted the seeds of knowledge, sprinkled them with love, and patiently nurtured their growth so as to produce my dreams and inspire me to believe in my dreams.

ACKNOWLEDGEMENTS

Without the support and contributions from my professors, my friends, my family, and others, the successful completion of this rewarding doctoral journey would not have been possible. I take this opportunity to express my gratitude to each and all of the above persons. They have enriched my life's experience and knowledge and helped me to graduate on this journey through a memorable chapter of my life.

First and foremost, I am grateful to my thesis supervisor and chairperson, Dean Shabnam Koirala Azad, for her amazing academic supervision. Her outstanding knowledge and professional social justice expertise inspired me greatly during my academic life at the University of San Francisco. I have appreciated her helpful guidelines and suggestions, unfailing support, great patience, and strong management skills, all used in helping me resolve obstacles as encountered during preparation of this work. I feel honored to have had her support for my doctoral studies.

I would like to extend my heartfelt gratitude to my adviser and dissertation committee member, Dr. Sedique Popal, for his supportive, thoughtful and compassionate guidance, careful reading, and insightful comments. I have been fortunate and privileged to work with Professor Popal and learn from his invaluable linguistic expertise and constructive feedback throughout my doctoral studies as well as my dissertation.

My sincere appreciation goes to my professor and dissertation committee member, Dr. Matthew Mitchell, who inspired me with his knowledge during his classes. I am thankful for his expertise on research methods and statistics as well as his unlimited guidance.

I would like to thank my expert panel members, Dr. Didem Ekici and Professor Brian Ng, who reviewed and evaluated every item of my research instruments for content validity, linguistic sensitivity, and cultural relevance. I am very appreciative of their contribution and assistance during this dissertation study.

I would like to extend my sincere thanks to the community college ESL students who devoted their time participating in this research.

Also, my warmest gratitude goes to George Keller, J.D., for all his time and unfailing support during my doctoral study. Since I arrived in the United States, Mr. Keller has always been a great friend; as a previous neighbor and current friend, he has helped me through the process of interacting with and appreciating American culture. Words cannot express my appreciation for the strong and steady support that he has provided in numerous ways.

Last, but in no way least, I want to thank my beloved parents and family for all of their support and encouragement received throughout my doctoral studies. They helped me to achieve all of my dreams even the one from my childhood and always made sure that I achieved them. I am grateful for all of their sacrifices. I am very delighted to know that my accomplishment has made my parents and family so proud.

Without my professors', friends' and family's whole-hearted encouragement, the endeavor of my doctoral journey would not have been possible. I owe them a lot, now and forever.

TABLE OF CONTENTS

DISSERTATION ABSTRACT ..... **ii**

DEDICATION ..... **v**

ACKNOWLEDGEMENTS ..... **vi**

LIST OF TABLES ..... **xii**

CHAPTER I **1**

THE RESEARCH PROBLEM **1**

Introduction **1**

Statement of the Problem **4**

Background and Need for the Study **6**

Second Language Vocabulary Instruction Methods **7**

Significance of the Community College ESL Program **13**

Purpose Statement **15**

Theoretical Framework **16**

The cognitive theory of multimedia learning 16

Metacognition in relation to language awareness (haukås, 2018) 22

Sociocultural theory (vygotsky, 1978) 26

Research Questions **32**

Limitations and Delimitations of the Study **32**

Significance of the Study **33**

Definition of Terms **34**

Summary **36**

CHAPTER II **38**

REVIEW OF THE LITERATURE **38**

Introduction **38**

Section I: Brain Mechanism in the Creation of Memory **39**

Transferring information from short-term into long-term memory 42

Section II: Expanding on Elements of the Conceptual Framework **45**

Cognitive theory and memory processing in second language acquisition 45

Significance of memory in second language vocabulary processing 48

Metacognition in second language learning 58

Metacognition in second language vocabulary learning 63

Sociocultural theory of mind in second language learning and teaching 69

Sociocultural theory of mind in second language vocabulary learning and teaching 75

Section III: Community College Context in English Teaching and Learning **79**

Summary **82**

CHAPTER III **87**

METHODOLOGY **87**

Introduction **87**

Restatement of Purpose **87**

Research Design **88**

Research Setting **89**

Participants **91**

Protection of Human Subjects **92**

Research Instruments (Vocabulary Instruction Techniques) **93**
The pictorial-auditory technique 93
The multi-sensory drawing technique 96
The circle rotation technique 100
The storytelling technique 101

Data Collection Instruments **103**
Demographic information form for both quantitative and qualitative data 103
Quantitative data instruments 104
Participants' privacy identification and coding 109

Qualitative Data Sources **109**
Questionnaire 109
Semi-structured focus group interview 110

Expert Panel Review **110**

Data Collection Process and Timeline **111**
Quantitative data collection process and timeline 111
Qualitative data collection process and timeline 117
Questionnaire 118
Focus group interviews 118

Data Analysis **119**
Quantitative data analysis 119
Qualitative data analysis 126

Background of the Researcher **127**

CHAPTER IV **129**

RESULTS **129**

Quantitative Research Analysis **129**

Results of Testing the Normality Assumption for Groups **130**

Between-Group Comparison (Research Question One) **131**
Productive test (between-group) 131

Recognition test (between-group) 133

Within-Group Comparison (Research Question Two) 136
Productive test (within-group) 136
Recognition test (within-group) 138

Independent t-Samples Test 140
Productive pre-test 141
Productive post-test 142
Recognition pre-test 143
Recognition post-test 143

Quantitative Results Summary 144
Productive recall test 144
Recognition test 146

Qualitative Research Analysis - Questionnaire and Focus Group 147

Interview (Research Question Three) 147
Questionnaire 147
Focus group interview 157

Qualitative Result Summary 170

CHAPTER V 172

DISCUSSION, RECOMMENDATIONS, IMPLICATIONS, AND CONCLUSION 172

Overview 172

Summary of the Study 172

The Research Questions 177
Research question one 177
Research question two 177
Research question three 178

Discussion 180
The Pictorial-Auditory technique 183
The Multi-Sensory Drawing technique 185
The Circle Rotation technique 186
The Storytelling technique 188

Reflections on Chosen Theoretical Frameworks in Language Learning and Teaching .. 191
Mayer's (2005, 2014) cognitive theory of multimedia learning 191
The Dual Channels principle 192
Metacognition in relation to language awareness (Haukås, 2018) 196
Sociocultural Theory (Vygotsky, 1978) 199

Significance of the Community College ESL Programs 204

Emergence of Socio-Neurocognitive Method in Language Learning & Teaching 208

Conclusion 215

Recommendations 217

Pedagogical implications 217
Research Implications 220

Concluding Remarks 223

REFERENCES 227

APPENDIX A 248
IRB APPROVAL LETTER 248
APPENDIX B 249
INFORMED CONSENT FORM 249
APPENDIX C 252
PRODUCTIVE RECALL PRE-/POST-TEST 252
APPENDIX D 255
RECOGNITION PRE-/POST-TEST 255
APPENDIX E 260
QUESTIONNAIRE 260
APPENDIX F 262
FOCUS GROUP INTERVIEW QUESTIONS 262
APPENDIX G 263
PICTORIAL AUDITORY TECHNIQUE SAMPLE 263
APPENDIX H 264
PARTICIPANTS' WORK SAMPLES 264

LIST OF TABLES

Table 1: Kolmogorov-Smirnov Test on Distribution Score Normality.....130
Table 2: Descriptive Statistics; Groups.....132
Table 3: Split-Plot ANOVA Results on Productive Test for Between-Group.....133
Table 4: Descriptive Statistics; Groups.....134
Table 5: Split-Plot ANOVA Results on Recognition Test for Between-Group.....135
Table 6: Within-Group Comparison on Productive Pre-Test and Post-Test.....136
Table 7: Split-Plot ANOVA Results on Productive Test Within-Group.....137
Table 8: Within-Group Comparison of Recognition Pre-Test and Post-Test.....138
Table 9: Mixed-Design ANOVA for Recognition Test Within-Group.....139
Table 10: Independent t-Samples Test.....141

CHAPTER I

THE RESEARCH PROBLEM

Introduction

Many second language learners often complain that they cannot adequately retrieve language knowledge acquired in the classroom and apply it in a real-world context (Vallar and Papagno, 2002). Based on the experience of this researcher, while language learners may communicate successfully with peers in the classroom setting itself, they usually experience difficulty recalling new vocabulary to use widely in different settings outside of the classroom. Vocabulary learning is challenging for second language learners especially during the initial process of first learning a language (Ghazal, 2007). Vocabulary is an essential component of language learning, and it is a focus of second language teaching (Nation, 2011).

Unfortunately, adult language learners may easily lose information obtained in the language class if they do not make the conscious and determined effort to retain it. In tandem, one rather compelling aspect of second language education is the fact that the more complex brain networks are, the better language learners are able to effectively retain words. The word network consists of many components, such as visual, aural, kinetic, olfactory, etc. which stores and retrieves information much more efficiently than a smaller, less-advanced network (McClelland, 1985; Klimesch, 1994).

The author of this study, having learned English in adulthood, faced the persistent struggle in recalling new vocabulary as well as using that new vocabulary actively in speaking and writing. Although equipped with a vocabulary of considerable size, it consistently remained difficult to recall the newly learned vocabulary for use in

conversation. While words were always retained in the mind, as was most often proven by recall at other required or even random times, it was much more typical that a particular word did not come easily when needed instantly for immediate use in real life conversation. Generally speaking, particular items of a learner's *receptive* vocabulary increases, yet, unfortunately the bulk remains unused as a part of the speaker's *active* vocabulary in conversational (as well as written) interactions. Surprisingly, this difficulty is a common barrier for adult language learners' vocabulary development and fluency, and it is present as a consequence of English language instruction methods. The difficulty encountered by this researcher inspired the intended project as a means to gather findings made by observation of other adult language learners in order to (a) investigate the degree to which this obstacle may be faced by other adult English learners as well and (b) propose vocabulary instructional techniques for instructors' use in their classes.

Vocabulary is generally considered as the basic communication tool, and vocabulary acquisition is thus a vital prerequisite for both proficiency and fluency in a language. Accordingly, many language learning theories have placed an emphasis on teaching vocabulary (Asher, 1969; Demirezen, 1988; Krashen; 1989; Lin 2015; Xia, 2014), and many scholars such as Harmon, Wood, & Keser (2009) and Linse & Nunan (2005) believe that language learners' vocabulary development is a significant aspect of language learners' fluency development. Given these premises and the resultant strong correlation with learning achievement in second/foreign language classes, effective teaching methods are needed to help language learners to obtain, retain and recall new words. Yet while there is much experimental research about language learners' vocabulary *perception* and word *recognition*, the scope of research focusing on adult

language learners' vocabulary *production* remains somewhat limited. In fact, recalling, activating and using *new* vocabulary presents a challenge for adult language learners. This issue can significantly affect their language fluency and impair their ability to effectively communicate in the target language or even interacting with native speakers and participating in social activities. Wilken's theory (1972) is still relevant "while without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (p.11).

One step in this endeavor was Krashen's publication of an "input hypothesis" (Krashen 1985), which has subsequently been promulgated to language teachers for consideration. According to Krashen's input hypothesis, the meaning of words will be acquired subconsciously if students are exposed to vocabulary words multiple times in different contexts. Krashen's "comprehensible input" emphasis aims to deepen students' understanding of vocabulary and overall learning so as to express more freely in English (Krashen, 1985).

Krashen's hypothesis has been subject to the appropriate critical review as well. Many critics feel that Krashen has not properly explained many variations and functions of this postulated model, thus rendering it unsatisfactory when empirically tested. As a particular point, there is not much research on how teachers themselves take these theories into consideration in the context of the classroom when planning lessons that may specifically address the challenges of second language vocabulary instruction in order to promote and achieve active use of language inside and outside classroom interactions.

Statement of the Problem

Vocabulary knowledge is considered a major aspect of learning a second language (Nation, 2011). If language learners have excellent grammar but limited vocabulary, their communicative competence as well as communicative performance are impeded in target language interactions compromising their ability to successfully communicate. Schmitt (2000) strongly emphasizes that "lexical knowledge is central to communicative competence and to the acquisition of a second language" (p. 55). Other researchers such as Nation (2001) also describe the relationship between vocabulary knowledge and language use as complementary: knowledge of vocabulary enables language use and, conversely, language use leads to an increase in vocabulary knowledge.

Appropriate vocabulary instructions merit an emphasis in language classrooms as they assist and encourage language learners to use their established class language achievement while out of the classroom context for communication in a social context. Many researchers such as Laufer and Nation (1999), Maximo (2000), Read (2000), Gu (2003), Marion (2008) and Nation (2011) all claim that the acquisition of vocabulary is vital for communicating in a second language and plays an essential role in the formation of complete spoken and written texts.

Thornbury (2002) appropriately states that teaching words are indeed a crucial aspect of learning a language – as languages are based on words. Learning a language without words is unquestionably implausible because human communication is based on words. Development of linguistic proficiency is absolutely dependent on vocabulary knowledge. To master both receptive and productive skills, students of English as a

second language must acquire knowledge and proficiency of the meaning of words, recall them, and be able to use them to interact in new, unfamiliar contexts.

Given the importance of second language vocabulary instruction, the researcher of this study believes that the main and the largest obstacle for second language (L2) adult learners is the process of learning, retaining, recalling and using second language vocabulary. While language learners may already have the intended meaning and concept of the word which needs to be expressed, they may yet need to recall that word as a vocabulary item in order to express it for themselves instantly and appropriately.

Based on the knowledge of the researcher and supporting scholarship, while previous studies offered and demonstrated different methods, they respectively emphasized only one particular vocabulary learning modality. The result has been that most ESL learners learn most of their ESL vocabulary passively but not actively. ESL learners can recognize a word that they learned in the reading context or heard in speech but cannot recall these new words for active use in speaking and writing. Although a wide range of methods and techniques which focus on teaching vocabulary exist, there is still a gap in current literature investigating vocabulary instruction that can help language learners become more *productive*. The researcher proposed new techniques based on cognitive (Mayer, 2005, 2014), metacognitive (Haukås, 2018) and sociocultural (Vygotsky, 1978) theories and investigated if these techniques combined in a novel manner could aid language learners to obtain, retain, recall and use new words through vocabulary instruction.

From the researcher's point of view, the above-mentioned theories when implemented concurrently in vocabulary instruction can effectively result in obtaining,

retaining and recalling vocabulary more easily. Through experience both as language teacher and educator, this researcher believes techniques that are based on cognitive, metacognitive and socio-cultural theories can help ESL adult learners to activate new vocabulary in their speaking or writing.

Background and Need for the Study

The population of immigrants in the United States has steadily grown. Historically in the United States, there has been a dominant expectation for people from other linguistic and cultural backgrounds to assimilate into the dominant culture and dominant language (Phillipson 2010). Therefore, in order to access education, employment and other significant resources, learning English is essential for everyone who immigrates into the United States to achieve access to all social, cultural and economic prospects. According to the United States Department of Education (2014, 2015), the demographic of ESL learners is 40 percent of the adult education population. 97% of English learners in the United States are adult English as a second language learners with an age range from 19 to 60+ (Department of Education, 2014, 2015). Because the ESL student population is growing quickly, ESL vocabulary instruction is necessary to help these English learners to be successful in this society where English is used in all aspects of life.

Over the past few decades, there have been a lot of advancements in language learning and teaching. Some of the main ESL instruction methods that stemmed from these advancements will be laid out in the next section to appreciate the need for new evolved instructional methods.

Second Language Vocabulary Instruction Methods

There is much recent research discussing difficulties that teachers experience in vocabulary teaching. According to Berne & Blachowicz (2008) teachers are challenged in developing a practical technique for vocabulary teaching given a lack of confidence about where to even begin let alone form an instructional emphasis on learning words. When vocabulary instruction is underway in the learning processes of adult language learners, problems begin to appear; it is very common that while language learners know and understand the meaning of words, they do not readily recall the words for use as an active part of their communication repertoire. Harmer (1991) divided vocabulary into two types: active vocabulary and passive vocabulary. Most language learners have the command of more words passively than actively in their knowledge and use of vocabulary. Hatch and Brown (1995) also categorized vocabulary as "receptive" vocabulary and "productive" vocabulary. Receptive vocabulary is only useful for reading and listening skills, while productive vocabulary is the word bank that learners not only understand but also use in speaking and writing. As Stuart Webb (2005) states, when the learners can produce the words to express their thoughts to others, they get involved in an active process of vocabulary use.

In order to both understand and use the language, it is crucial that language teachers employ techniques that help language learners to master vocabulary learning. Vocabulary mastery means to be able to understand other people and be understood by others. Therefore, vocabulary mastery by adult language learners means to not only know the definition of words but to also use that vocabulary while drawing connections and even more so outside of class – that is, in real-life situations.

There are several ESL methods which set forth a variety of explanations on how to teach English and how to account for ESL learners' vocabulary development. The following provides a brief review of these approaches and methods.

Looking back to the early parts of the 20th century, second/foreign languages were principally taught by using only the *grammar-translation method* (Larsen- Freeman 2000). The grammar translation method is based on the academic teaching method used primarily for the Classical languages, *i.e.* Latin and Greek. It is based on the use of high culture literary text introduced at the start and the subsequent parsing of grammar rules to be learned for translation of the subject text materials. As far as grammar teaching and learning are concerned, students are taxed with learning "paradigms," whereas for vocabulary, learning from and by lists is the most common manner. As a result, learners may often recognize vocabulary from literary texts which is actually of little-to-no use in any functional sense. In the context of the times, learning a language was a very academic exercise, and the notion that one might need, for example, to ever actually ask anyone for travel directions (in Classical Greek or Latin) was certainly a quite slim possibility compared to the need to be able to read a book in that language. However, by around the time of the Second World War, issues of mobility and the need to be competent in spoken language presented a particularly new imperative to more and more second language learners (Larsen-Freeman 2000).

In the behaviorist model, aspects of human behavior, including language, can be broken into a series "habits." Therefore, all facets of language learning (including vocabulary teaching) were seen as habits whereby learning them was a matter of "habit formation" (Skinner, 1953). The behaviorist approach to language teaching effectuated

the audio-lingual approach with the classroom emphasis on teacher modeling and student repetition of words. Under the audio-lingual approach, classroom instruction is structured on the student hearing the teacher model a word, then the student imitating and repeating that word, in both the individual and choral context (Larsen-Freeman 2000). Thus, dialogues are used as the primary effective tool for instructing new vocabulary. For learners to work on the dialogues thoroughly, teachers use certain drills such as repetition, backward build-up, chain, question-answer, transformation and substitution. While transformation and substitution drills are presented to focus mainly on the improvement of vocabulary knowledge, the audio-lingual approach underestimates vocabulary and thus the introduction of new vocabulary is kept at a minimum in phases where learners study sounds and grammatical patterns (Larsen-Freeman and Anderson, 2013).

Caleb Gattegno originated *the silent way* as a reaction to the audio-lingual approach's behavioral perspective in language teaching and Gattegno thus adopted a cognitive approach to learning. Rather than instilling habit formation, the *silent way* tries to help learners to develop an "inner criteria" for their language learning process in which the learners can self-control their progress. In the beginning phases, pronunciation is praised, and vocabulary is restricted. As such, the silent way tends to restrict vocabulary acquisition as an intended component of the teaching process.

Moving along through the historical range and development of ESL teaching methodology, the *total physical response* [TPR] component of James Asher combined cognitive and kinesthetic ways of learning in language instruction. It simply follows a listen-respond sequence. In TPR, "imperatives" have a significant place, and vocabulary

instruction is mainly embedded in imperatives so that language learners acquire vocabulary passively as they respond physically to the command of the instructor.

As another example of this development of instruction methodologies, the *community language learning* [*CLL*] approach, as can be understood from its name, praised the notion of community in the learning environment and accordingly promoted interaction. The basis of CLL depends on the counselling approach and the natural approach. CLL tries to get learners to speak in the target language. To do this, CLL emphasizes that learners need to feel secure and build a relationship during the learning process. Vocabulary is studied by chunks and it is based on what learners have studied before. Although CLL is counted as a contemporary approach, CLL does permit the use of native language and vocabulary is introduced by literal explanations of words. CLL attempts to make the meaning clear in every case and in vocabulary instruction CLL freely uses bilingual word lists to make meaning clear.

Suggestopedia, originated by Georgi Lozanov, was another method introduced during the 1980s. Suggestopedia emphasizes the psychological nature of the learning process. It highlights the importance of a lively learning environment and the learner's psychology. Vocabulary is presented by teachers in texts and important words are emphasized in bold so that learners can establish a connection between parts and the whole. Teachers do not dwell on vocabulary but expect it to be subconsciously acquired by learners. Suggestopedia tries to make the meaning clear by using literal translations. Accordingly, it is intended to acquire as much vocabulary as possible through this such method (Larsen-Freeman and Anderson, 2013).

Communicative language teaching [CLT] embodies the principles of most contemporary communicative methods and relies on the authentic target language described as the natural language in life itself, not one introduced in a prepared context for the learning process but rather in a real context. Since communication is the main purpose, vocabulary has a crucial importance in CLT in that speaking performance highly depends on learners' vocabulary knowledge. CLT does not have a fixed vocabulary syllabus but rather allows an automatically generated vocabulary formed according to the need of the learner as relevant to that learner's interest (Littlewood, & William, 1981). Learners are expected to express themselves without fear of making errors because errors are regarded as a natural outcome of the learning process, thus tolerated.

Content-based instruction, which attracted great attention worldwide, offered a fast and effective language learning process by narrowing the process down to a panoply of specific purposes. For vocabulary instruction, it is resolutely built according to present vocabulary needs of learners themselves, and the learner will be familiar with the vocabulary or there will be contextual clues in the learning process to help convey the meaning.

The *lexical approach*, set forth by Lewis and Gough (1997), can be regarded as the first comprehensive vocabulary teaching approach. The lexical approach adheres to the notion that language is produced and thus learned in multi-word chunks, not to be separated into traditionally described realms of grammar and vocabulary. These chunks – academically referred to as lexical phrases – are prefabricated multi-word phrases such as compound words, phrasal verbs, collocations, functional phrases, and idiomatic or fixed expressions (Harmer, 1991). Here, the focus is on the chunks, not on a grammar which

enables the deduction of grammar subconsciously. One achievement acknowledged of chunk-based learning is fluency in speaking performance. The lexical approach adopts a semantic syllabus formed according to word meaning and based on a lexical focus. As stated above, the lexical approach specifically regards meaning as encoded to words, and not to grammar. Accordingly, this means that using the most frequently used words in the target language is a good way of forming a coherent syllabus because meaning can be best conveyed through these words which are appropriately called "high-frequency" words (Thornbury, 2006). However, the focus is unfortunately only limited to high-frequency words without presentation of a systematic technique.

Therefore, to date a question still remains concerning the best means to implement vocabulary instruction in the classroom. In reviewing each of the above methods, there can be seen for each an obvious focus on only one more particular mode for vocabulary instruction. Accordingly, when language learners speak or write in real communication contexts these new vocabulary items still do not come easily to them. As a result, while the language learner can properly receive and perceive the meaning of new words, the learner remains ill-equipped and unable to *produce* that same vocabulary item when a need arises. As such, it appears inherent to this researcher to investigate and apply new methods and techniques that can help language learners to use the new vocabulary actively in their spoken and writing interactions.

The researcher of this study proposed that if we include techniques based on cognitive, metacognitive and sociocultural theories in ESL vocabulary instruction, then language learners can more readily and effectively obtain, retain, recall and use the new vocabulary. The researcher suggests a pictorial schema of quad, framing method as well

as other multimedia and multisensory techniques to teach ESL vocabulary. These pedagogical techniques postulate an explicit instruction for vocabulary teaching which is intended and designed for ESL students to overcome vocabulary learning difficulties by (a) integrating and associating new words with the previous ones, (b) facilitating imaging, experiencing and correcting, and (c) promoting a deep level of sociocultural interaction that may facilitate processing for using new vocabulary in real life contexts. ESL teachers may also benefit from this research with terms of employing better techniques for ESL classes and providing students with more comprehensive guidance.

Significance of the Community College ESL Program

Community colleges in the United States are among the largest providers of adult education ESL services in many states and communities. According to the Community College Consortium for Immigrant Education (CCIE) (2019), ESL instruction for adults is the largest and fastest growing component of America's adult education system – representing more than 40 percent of enrollments and more than 1.2 million students per year – and the fastest growing program of any kind at many community colleges, such as those in New York City, San Francisco, and Miami. Drawn from the "Council for Advancement of Adult Literacy" (2007), CCIE (2019) states that while ESL programs make a major contribution in improving the English abilities of many immigrants, only a small percentage of ESL students are enrolled in programs for as long as four semesters (the equivalent of two years or less), either consecutively or at any time. Moreover, only about 10 percent of non-credit ESL students' transition to credit ESL, and an even smaller percentage make a transition to college academic or vocational programs. As a result, few ESL students experience significant learning gains from adult education ESL

programs. The growing number of ESL adult learners coming to and living in the United States creates an increasing demand for ESL programs to be prepared to serve English learners.

The researcher of this study believes that the demographic data – more than 40 percent of enrollments in community colleges according to Community College Consortium for Immigrant Education (CCIE) (2019) – creates the need to find an effective way to teach the rapidly growing population of English learners. An effective method may support ESL community college students to achieve their individual goals which depend on their educational, professional and daily needs while they try to integrate into the dominant language and culture in America.

According to Aragon (2001), the "open access" policies of many community colleges attract students of various linguistic, ethnic, and cultural backgrounds, as well as students with a wide range of educational needs and goals and prior educational achievement (Bailey& Santos, 2009). Many ESL students attend community colleges as a bridge to enter higher education because oftentimes they do not know how to apply for a program in higher education colleges and universities, and their language proficiency is not even high enough to fulfill the required English proficiency. This researcher believes that this dissertation study is appropriate for ESL community colleges since many new immigrating students participate in ESL programs not only to get their foot in the door to go to a higher education college or university but also to master English for their new life in a new country's environment. The researcher believes that the evolution of teaching ESL vocabulary in community colleges may address the needs of ESL community college students better and may promote social justice for ESL community college

students by aiding them to acculturate themselves more proficiently in their new sociocultural environment.

Through the proposed method of vocabulary instruction, this researcher was interested in investigating how effective the study would be to assist community college ESL students to achieve their goals in new sociocultural environments. Community college ESL programs can play a valuable role in ensuring quality academic preparation, the kind that supports ESL students' success in the classroom and, ultimately, their completion of educational programs and degree attainment. It is also very important to take into consideration the sociocultural background of ESL students and to help the students build upon that by learning English through innovative methods. This study explores how the proposed techniques based on cognitive, metacognitive and sociocultural theories may best serve ESL students and empower them to engage in their learning contexts while also learning to navigate their sociocultural environment.

Purpose Statement

The purpose of this study was to investigate whether the inclusion of cognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance vocabulary acquisitions of community college adult ESL learners and could help ESL students to recall and use new second language vocabulary effectively in their speaking and writing. The main purpose of this study is to help community college ESL learners transform their *passive* vocabulary into *active* vocabulary by using methods informed by cognitive, metacognitive and sociocultural concepts. The researcher has explored the effectiveness of integrating cognitive, metacognitive and sociocultural consideration in vocabulary teaching and its impact on converting students' passive vocabulary to active

vocabulary. This study, then, asserts that the interconnection of neurocognitive, metacognitive and sociocultural methods should support ESL learners to learn new English words effectively.

The present research discusses and correlates the brain mechanisms and the cognitive process which is involved in actively learning new second language words. This research further discusses how these new second language words can be acquired by building on existing language networks and in relation to pre-existing familiar concepts as well as the sociocultural background of adult ESL learners.

The researcher taught a six-week ESL class at a community college by using the new methods of vocabulary instruction. The students' learning was measured by a pre-test and a post-test each for a control group and an experimental group. Students then participated in focus group discussions. The research methodology is based on mixed methods. Quantitative data and qualitative data were collected in order to measure the effectiveness of the teaching methods employed and its effect on the students' learning.

Theoretical Framework

This dissertation draws on three prominent theories that explain the value and effect of cognitive, metacognitive and social cultural theories in second language vocabulary instruction: (a) Mayer's (2005, 2014) cognitive theory of multimedia learning, (b) metacognition in relation to language awareness (Haukås, 2018), and (c) sociocultural theory (Vygotsky, 1978).

The cognitive theory of multimedia learning

The basic premise of the cognitive theory of multimedia learning is that "people learn more deeply from words and pictures than from words alone" (Mayer, 2014, p. 47).

Mayer (2005, 2014) sets forth an instructional theory based on cognitive multimedia learning developed with three main assumptions:

1. Dual Channels – This term suggests that humans have two separate information processing channels (auditory/verbal and visual/pictorial). Information such as spoken and written words, narrations and sounds is received via the auditory/verbal channel through the ear; information such as pictures, graphs, videos/animation clips and on-screen texts is received via the visual/pictorial channel through the eyes.

2. Limited Capacity: Each channel has a finite capacity or cognitive load, that is, the amount of information that learners can process in each channel at one time is limited. Thus, the preparatory organization and handling of the information through the two different mental models referred to as (a) the verbal mental model and (b) the visual mental model. Mayer (2014) explains this clearly, "When an illustration or animation is presented, the learner is able to hold only a few images in the visual channel of working memory at any one time, reflecting portions of the presented material." (p. 49). The same is also true when learners are presented with a narration in that they can only hold a few words in the verbal channel of working memory at any one time (Mayer, 2014).

3. Active Processing: Learning is based upon prior knowledge. Active processing is an active process of filtering, selecting, organizing, and integrating information. Some cognitive activities should be processed in long-term memory and brought back into the short-term memory in order to build a connection between verbal and visual representations so that these respective elements are integrated into the learner's existing knowledge as a result. These active cognitive processes consist of the following:

(1) selecting relevant words for processing in verbal working memory;

(2) selecting relevant images for processing in visual working memory;

(3) organizing selected words into a verbal model;

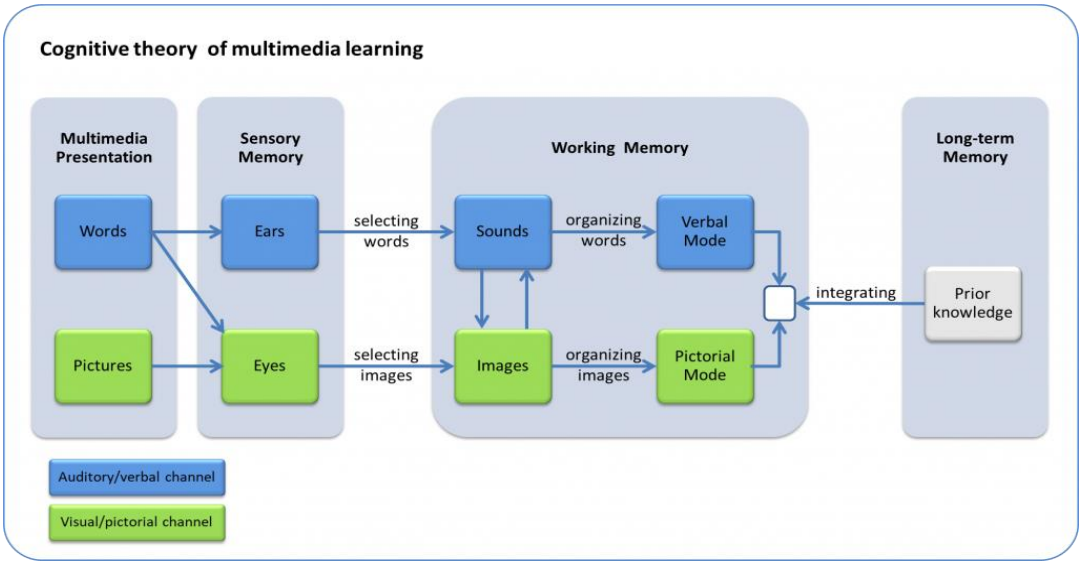
(4) organizing selected images into a pictorial model; and

(5) integrating the verbal and pictorial representations with each other and with relevant prior knowledge activated from long-term memory (Mayer, 2014, p. 54).

Figure 1 below is Mayer's illustration of how second language learners learn vocabulary according to the cognitive theory of multimedia learning:

Figure 1

Mayer's Cognitive Theory of Multimedia Learning (2014, p. 52)



A further breakdown of this representation shows that the learning of new information is processed through at least one of two respective linear channels: the auditory/verbal channel and/or the visual/pictorial channel. The new information must travel to one of the respective memory stores in order that the new knowledge or information is learned efficiently and effectively. As per the above figure, there are three memory stores:

(1) Sensory memory, in which the "words" and "pictures" – the two initial forms as presented under multimedia presentation – enter through the ears and the eyes from the outside world passing into and stored by a learner's sensory memory. That is, the written form of words and pictures are first held in the visual/pictorial channel, while words and sounds first held in the auditory/verbal channel.

(2) Working memory, into which this information is then again passed for materials to be temporarily stored for further effective manipulation. Learners can select materials through attention to appropriate words and images with structural relations built among those elements in working memory when relevant materials are indeed selected. There are two sides depicted under the working memory: the left side, which represents "the raw material" such as "visual images of pictures and sound images of words"; and the right side, which represents "the knowledge constructed in working memory" such as "pictorial and verbal models and the links between them" (Mayer, 2014, p. 53).

(3) Long-term memory, in which the brain is able to hold large amounts of information over long periods of time. However, in order for the materials to stay in long-term memory, they should – and, moreover, actually must – be actively transferring back and forth from long-term memory to working memory (Mayer, 2014, 2005). In this way, knowledge is rehearsed and can be activated in the long-term memory and brought into working memory if there exists a connection between new material and the learner's prior knowledge (Mayer, 2014).

The researcher of this study drew on Mayer's (2014, 2005) cognitive theory of multimedia learning in this dissertation so as to provide support for the effectiveness of a cognitive method on second language learners' vocabulary development in respect to

learning and transforming passive vocabulary into active vocabulary through the retention and recall of the newly learned vocabulary from long-term memory. The researcher believes that second language learners can recall vocabulary items when a vocabulary instruction provides two or more modalities, such as the verbal and visual modalities, as available, at the same time rather than only through one of the modalities alone. Employing this cognitive technique can help language learners to establish a direct mental connection between visual and verbal models in short-term memory and facilitate the cognitive processes and effective retrieval of words stored as long-term memory (Mayer, 2014, 1997). The researcher claims that using two separate but interrelated verbal and visual systems in vocabulary instruction allow the learners to benefit even more when they learn the target words through such multimedia presentation by triggering both the auditory/verbal channel and the visual/pictorial channel.

Per this research, the two principles of multimedia learning – namely the multimedia principle (Fletcher & Tobias, 2005; Mayer, 2005, 2001) and the temporal contiguity principle (Mayer & Fiorella, 2014) – justify the rationale for the application of the cognitive theory in teaching ESL vocabulary. Regarding the first, under the multimedia principle learners can learn more effectively if they are presented with words and pictures rather than words alone (Mayer, 2014). However, this principle is not limited literally to words and pictures alone but rather is broadened so as to refer to any term encompassing the different forms of visual and verbal representations when they are presented together (Butcher, 2014, 2006). As such, visual components of the multimedia instruction may also include illustrations, pictures, graphs and charts, photographs, and videos/animations (Butcher, 2014).

The cognitive theory of multimedia learning as a theoretical framework of the present study warranted the researcher to employ two modes of vocabulary instruction, text and spoken words as well as word definition and pictorial schemata, video and animation presented through Adobe Spark Page. In other words, the researcher employed both verbal and visual components, while defining the words in authentic contexts. This was in keeping with the proposition that ESL learners may learn the target words better and more effectively when new words are introduced in dual modes rather than only in a single mode of vocabulary instruction. According to Sweller (2005), use of both words and pictures allows the brain to process more information into working memory so that they can be more readily obtained within and recalled from long-term memory when required.

As to the second, the temporal contiguity principle proposes the idea of reducing an extraneous overload of multimedia materials. According to the temporal contiguity principle, learning is successful when multimedia presentations consider the text, audio, pictures, and video/animation simultaneously rather than successively or sequentially (Mayer & Fiorella, 2014). Mayer (2008) states that "learners must have corresponding words and images in working memory at the same time in order to make connections between them" (p. 764). The temporal contiguity principle for word instruction in this study was to help ESL learners to hold all of the relevant target words in the working memory while they heard a spoken word and saw a new word definition with its corresponding pictorial schemata, video and animation clips.

The theoretical constructs of the cognitive theory of multimedia learning framed this investigation appropriately due to the overlap between the theory and its application

to the domain of vocabulary instruction. This underscores the implication that teaching vocabulary via a multimedia format presented through both verbal and visual representational modes – rather than through just a single mode – is best to facilitate learning when the information is new (Mayer, 2014; Paivio, 1986).

The author of this dissertation hypothesizes that connecting both visual and verbal systems to written and pictorial cues in the brain may help language learners to obtain, retain and recall new vocabulary effectively and use such vocabulary in their speaking and writing. Consequently, ESL learners in this study had this opportunity to enhance their input from a variety of resources that included both verbal and visual vocabulary information. Both the verbal and visual vocabulary information was presented to the ESL learners at the same time in order to help them to enhance input of learning target words as well as to retain and recall the target words as needed for use in the context of real interactions.

Metacognition in relation to language awareness (haukås, 2018)

A base description of metacognition is the activity of 'thinking about thinking', yet an even a bit more precise definition of metacognition would be 'knowing about knowing' or, most succinctly and directly put, 'cognition about cognition'. According to Livingston (1997), metacognition is "higher order thinking involving active control over the cognitive processes engaged in learning" (p. 1). The use of the term "metacognition" is originally associated with the cognitive psychologist John Flavell, as the founding researcher in metacognition.

According to Flavell's (1979) metacognitive theory "the monitoring of a wide variety of cognitive enterprises occurs through the actions of and interactions among four

classes of phenomena: (a) metacognitive knowledge, (b) metacognitive experiences, (c) goals (or tasks), and (d) actions (or strategies)" (p. 906).

Metacognitive knowledge is defined by Flavell (1979) as one's knowledge or beliefs about the factors that affect cognitive activities. Cognitive and metacognitive knowledge are closely dependent and interrelated. Any ensuing distinction between cognitive and metacognitive knowledge depends on how the information is used and processed. Metacognitive activity usually precedes and follows cognitive activity. And these characteristics, and idiosyncrasies, are further elaborated by Wenden (1998) as well:

> Metacognition is thinking about how one learns, and cognition is the actual act of learning itself, then, metacognitive strategies are utilized in the management of learning. In contrast, cognitive strategies are mental steps or procedures that are utilized in the processing of learning. These strategies enable learners to deal effectively with language input by enabling them to (1) attend to incoming information (2) comprehend what they attend to (3) store this new learning in long term memory so that (4) retrieval is facilitated. (Wenden, 1998b, p. 5).

Metacognitive experiences can occur before, during, or after a cognitive enterprise. Where metacognitive knowledge is actually experienced, Flavell (1979) then defined it as a metacognitive experience which is the subjective internal responses of an individual to their own metacognitive knowledge, goals, or strategies.

*Metacognitive goals (*or *tasks)* are the desired outcomes or objectives of a cognitive venture. Goals and tasks include comprehension, committing facts to memory, or producing something, such as a written document or of simply improving one's knowledge about new vocabulary that they have learned.

*Metacognitive action (*or *strategies)* are designed to monitor cognitive progress. Metacognitive strategies are ordered processes used to control one's own cognitive

activities and to ensure that a cognitive goal (for example writing an effective sentence, understanding new vocabulary, etc.) has indeed been met. A person with good metacognitive skills uses these processes to oversee their own learning process in planning and monitoring ongoing cognitive activities.

Nevertheless, while metacognition is acknowledged as an essential learning tool for effective *learning*, it has yet to be adequately considered as an essential tool in language *instruction*. Only scant studies have considered metacognition as an integrated aspect of language teaching and learning. For example, Wenden (1987) was only the first researcher to emphasize the importance of metacognition in language learning and teaching.

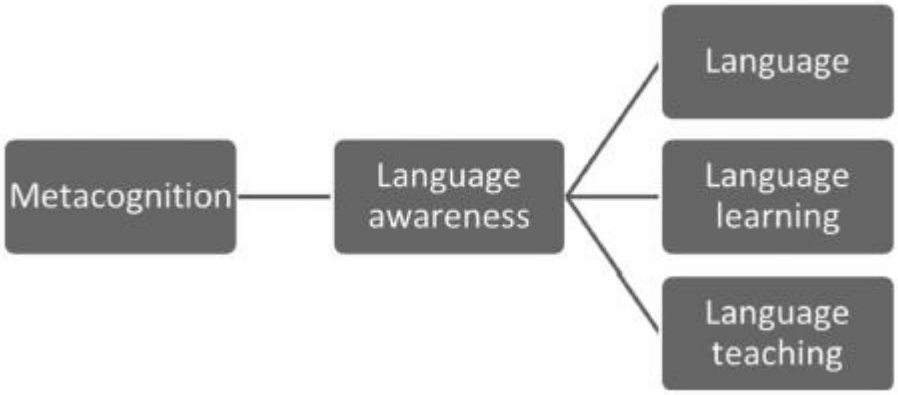
Most recently, Haukås (2018) discussed the concept of metacognition in a manner analogous to other concepts related to cognition and thinking. According to Haukas, metacognition is "an awareness of and reflections about one's knowledge, experiences, emotions and learning" in language learning and language teaching. Clearly Haukås' (2018) definition of metacognition is broad. In considering aspects of thinking about language learning and teaching, Haukås (2018) asserts as a principle:

> Metacognition relates to an awareness of and reflection on one's knowledge, experiences, emotions and learning in all domains, whereas its subordinate category, Language awareness, relates to reflections on one's knowledge, experiences, emotions and learning in three subdomains: Language, Language learning and Language teaching. Obviously, these domains are closely related, and metacognition in language teaching, for instance, typically involves reflection in all three domains simultaneously" (Haukås, 2018, p. 18).

Figure 2.1 illustrates Haukås' (2018) model of metacognition and its association with language learning and teaching:

Figure 2

Metacognition in Relation to Language Awareness and Its Subdomains (Haukås, 2018, P. 14).



Promoting metacognition in a language learner requires the activation of the learner's prior knowledge, the language instructor's reflections on what the learner knows and wants to learn, and the modelling of those strategies by the language instructor. This means that the language teacher as a facilitator should assist the language learner – in order to enable the learner to become more readily aware of the language learning process in part by drawing on existing language knowledge. As the researcher of this study, I believe that the metacognition model by Haukås (2018) may help language instructors to enhance second language vocabulary instruction by applying metacognitive techniques in the language classroom. These techniques may better help an ESL learner in defining knowledge gaps and in setting goals for how these gaps can be more efficiently and adequately overcome.

Haukås (2018) considers "language awareness" a main category of metacognition with three subdomains – (1) language, (2) language learning, and (3) language teaching. According to Haukås (2018), each of these subcategories can in turn be further divided

itself into several new categories depending on theoretical viewpoints and interests of any particular researcher. In this study, Haukås' (2018) metacognitive model was considered as a broad metacognitive theoretical framework and focus was given to the "language teaching" subcategory while also expanding on that premise in order that the researcher may propose some additional metacognitive techniques for vocabulary instruction.

Sociocultural theory (vygotsky, 1978)

The sociocultural theory espoused by Vygotsky (1978) sets forth a framework for development of higher mental practices which considers social interaction as the core of the communication and learning process. One of the prominent features of sociocultural theory is the highlighting of learning as social in nature where meaning is derived through language use within the social context. A fundamental assumption of Vygotsky's theory is the idea that psychological structures do not exist in the individual's mind but rather are formed as a result of interaction within the social context. In such respects, any and all emergence of mental functions arises dependent upon social interaction.

Sociocultural scholars such as Cole and Engeström (1993), Van Lier (2000), and Lantolf (2000) switched their attention from individual cognition to the mental activity of members of a same social community. It is worthwhile mentioning here that the main aspect of sociocultural theory is not on the *individual* alone but on the individual's *surroundings* so as to readily ensure learning as a social activity. From the foregoing aspect of sociocultural theory, this researcher is conscious of learning as the product of shared activity and purports continued attention to the language teacher-student relationship so that it may be continually honed towards collaborative learning.

Mediation

Mediation is one of the most significant aspects of Vygotsky's (1978) theory to consider in this current dissertation. Mitchell and Myles (2004) believe that "learning is mediated partly through learner's developing use and control of mental tools" (p. 195). According to Vygotsky, we do not make our relationship with the outside world only through direct stimulus-response reflexes; rather, we have the ability to use physical tools to make indirect connections and mediate their relationship. And in order to purposefully do so, we can regulate and control our behaviors through psychological and technical tools and artifacts.

Lantolf (2000) proposed three different modes of mediation: mediation by others, mediation by self through private speech, and mediation by artifacts (e.g., tasks and technology). Considering the Vygotskian perspective through Lantolf's taxonomy of mediation, this study treats "mediation by others" as the key role of vocabulary instruction with a primary focus on the teacher's teaching and scaffolding methods. Obviously, second language development does not derive from one's personal attempts of the individual learning function. Effective and efficient development derives rather as a result of a system of sociocultural interaction, connections and relations.

Zone of Proximal Development (ZPD)

The Zone of Proximal Development (ZPD) is one of Vygotsky's central contributions to learning and teaching and presents a primary concentration on the significance of cultural tools and social learning (Smidt, 2009). Vygotsky (1978) defines ZPD as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Vygotsky (1981) states that during socialization and interaction with others one becomes faced with participating in the activities of others. This presents the learner's first step to become part of the shared culture through sharing something with another member in that community. Thus, any resultant cognitive development by the learner must take place through involvement or "through participation in an ongoing social world" (Lave & Wenger, 1991, p. 50).

The main intent of considering sociocultural theory as one the theoretical frameworks of this study was to reconfigure ESL classroom culture in a manner intended and designed to further help ESL adult learners' interactions with each other while using their new vocabulary in communications. In adapting Vygotsky's ZPD for second language classrooms, "[f]or the L2 learner, the ZPD is the distance between the actual developmental level as determined by individual linguistic production, and the level of potential development as determined through language produced collaboratively with a peer or teacher" (p. 9).

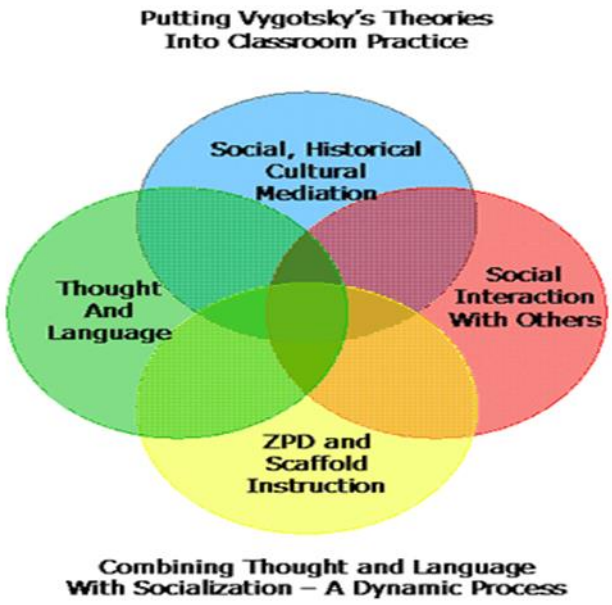
In order to facilitate the learners' cognitive development and social construction of knowledge within their ZPD, in an ESL classroom context an instructor may scaffold

students in different ways by giving helpful directions in the process of doing tasks and giving feedback of language learners' group work. The role of the language teacher is central in providing a supportive environment for an ESL learner to learn – the learner becomes involved in the performance of different language interactions helping to use new vocabulary. For instance, a getting language learner to do role-play while also realistically simulating an authentic context as a means to further relax any barriers in cultural group discussions.

Connell and Charles (2019) illustrated putting sociocultural theory practice into the classroom in the following diagram:

Figure 3

Sociocultural Theory into Classroom Practice (Connell and Charles, 2019)



Tharp and Gallimore (1990) presented a four-stage model for the operationalization of the ZPD in a learning and teaching context that can be employed in language classrooms.

Based on the Vygotskian perspective of scaffolding, a teacher can promote independent learning by recognizing the learner's zone of proximal development. Thus, a learner's own mental processes and functions may indeed be developed through joint collaboration with the teacher. By putting the sociocultural theory in practice as a real-life mechanism in support of ESL instruction, the teacher would be in a position to minimize one obstacle on the ESL language learner's conduct and learning load which may result in increasingly effective social communication.

The researcher of this study has assumed that, within the social context of classroom ESL, a learner must learn to and continually further activate the use of new vocabulary by receiving social assistance from other capable peers or the language instructor. In order to provide assistance in maximizing a student's ZPD based on Vygotsky's (1978) theory, this present study purpose was to organize a social context in which a more capable peer paired with a less capable one promoted the language learners' ability and knowledge.

Sociocultural theory can help ESL students to master vocabulary and improve their language by focusing on interaction with the social environment. This study tried to look at the influence of sociocultural theory on teaching vocabulary and ESL learners' vocabulary development. Consequently, this study considered the use of the sociocultural theory while teaching vocabulary to ESL community college adult learners.

As point of fact, many such students indeed do complain about forgetting newly learned words (Nation, 2013) and have problems in language production. Since the ultimate goal of language acquisition is to help language learners communicate

effectively, a more pronounced introduction of sociocultural theory could be quite suitable for increased use in ESL community college instruction.

Based on the researcher's experience, the best method to get the language learners to interact and use new vocabulary in speaking and writing is to use a method associated to the real-life experiences and real conversation situations of the learners as a motivation for the students to express their views and convey their background knowledge while interacting with their language teachers and peers. This researcher believes that sociocultural theory is uniquely appropriate for advancing daily teaching as it emphasizes that role of language as the primary (and indeed, at times, sole) means of interaction between teachers and students, students and society. Further to the above notion, in the field of vocabulary acquisition adult ESL learners may face a uniquely serious challenge which hinders active use of newly learned vocabulary. This challenge must be addressed and countered in a satisfactory manner in order to readily improve and increase students' vocabulary acquisition and thus students' resultant productive vocabulary size and their receptive vocabulary size (Nation, 2013). Therefore, this current study investigated the impact and relevance of sociocultural theory on ESL community college students' vocabulary development and how to advance the incorporation of sociocultural theory in practice to aid ESL language learners' vocabulary production.

This use of sociocultural techniques may indeed make the language of the classroom highly interactive. A study based on the sociocultural theory of second language acquisition (SLA) as reported by Lantolf & Poehner (2015) emphasized the significance of this interaction in the learning process of any language. It sets forth that sociocultural theory mediates the learning of another language as driven by interaction

and social context. The assumption of the present study was that reconfiguration of the culture of ESL classrooms by a pronounced incorporation of dynamics based on sociocultural theory addresses in part some of the ESL learner's communication obstacles such as difficulties encountered in a learner's transfer of passive vocabulary into active vocabulary. For vocabulary development, Vygotsky's theory appears paramount given its multidimensional approach regarding the impact of cognitively affective contextual aspects and social interaction.

Research Questions

This study explores the following questions through inquiry:

1. How do community college ESL students exposed to neurocognitive, metacognitive and sociocultural vocabulary instruction techniques perform on a vocabulary test as compared to students exposed only to traditional vocabulary instructional methods?
2. How do teaching methods based on neurocognitive, metacognitive and sociocultural theories facilitate vocabulary acquisition of ESL learners at a community college in Northern California?
3. After engaging the community college ESL students with new techniques, how do they describe the effectiveness of that in mastering ESL vocabulary?

Limitations and Delimitations of the Study

There were some delimitations to this study. One delimitation concerned the availability of community college ESL participants. As a simple example, the researcher did not have any control regarding the absence of some students on a teaching day or testing day. A second delimitation is class hour and time which is also pre-determined by

the ESL program itself, and the researcher would have to follow the ESL program policy for class dates, times and duration.

Another significant delimitation from the outside was the impact of the global pandemic coronavirus (Covid-19). In addition to the general impact to the emotional and subsequent intellectual atmosphere of the classroom, there were also more quantitative impacts as well. For example, the researcher had to wait around one month to collect the qualitative data through a newly instituted virtual class set-up due to the pandemic. In addition, there was a time gap in collecting quantitative data which happened in the classroom, and qualitative data, which occurred one month later in the online class. Because of the different methods of gathering data, it may have had degrees of impact on the results of this study. Thus, the unprecedented and unpredictable impacts of the Covid-19 institutional shutdowns has created delimitations for this study.

There are also additional limitations to this study. First of all, the participants in this study were adult English learners in a community college. Therefore, the findings of the study cannot be generalized to non-community college ESL students. Another limitation of this study was the diversity of ESL community college students' in terms of socio-economic status, experience, and college degree. Therefore, the result may be different with a more homogenous and less diverse participant population.

Significance of the Study

The author of this study believes that this research is significant because traditional second language teaching methods have not considered the integration of neurocognitive, metacognitive and sociocultural concepts in vocabulary instruction. Results arising from this mixed method research project may have several pedagogical

implications. It is essential for ESL teachers to apply effective vocabulary instruction to help ESL learners to obtain, retain, recall and use acquired vocabulary in their communication. The results of this study (a) provide further support in offering the effective vocabulary teaching method as a suggestion for language teachers to consider for classroom use; (b) help language learners in fostering and raising awareness of the advantages of the vocabulary learning method when learning a second/foreign language; (c) enable ESL adult students to communicate effectively by transferring passive vocabulary into active vocabulary. Ultimately, this study would be an aid to language teachers in teaching a language efficiently so that students may remember ESL vocabulary effectively by storing the vocabulary into long-term memory and being able to suitably retrieve the vocabulary items later on as needed in their speaking or writing.

Lastly, as this study incorporates quantitative and qualitative methods, it examines the impact of techniques based on neurocognitive, metacognitive and sociocultural theories in teaching ESL vocabulary more thoroughly. Thus, the present study filled the gap in the current literature and added to the growing body of research investigating the instruction on ESL vocabulary instruction.

Definition of Terms

The following section defines the terms used in this study.

Working memory: According to Chai, et al. (2018), working memory is a multicomponent system that manipulates information storage for greater and more complex cognitive utility (Baddeley and Hitch, 1974; Baddeley, 1996, 2000b). There are three subcomponents involved in working memory (1) phonological loop (or the verbal working memory); (2) visuospatial sketchpad (the visual-spatial working memory); and

(3) the central executive which involves the attentional control system (Baddeley and Hitch, 1974; Baddeley, 2000b).

Long-term memory: Long-term memory is able to hold large amounts of information over long periods of time. However, in order for the materials to stay in long-term memory, they should be actively transferring back and forth from long-term memory to working memory (Mayer, 2014, 2005).

The cognitive theory of multimedia learning: As set forth by Mayer (2005, 2014), the cognitive theory of multimedia learning is based on three main assumptions: (a) there are two separate channels (auditory and visual) for processing information; (b) there is limited channel capacity; and (c) learning is an active process of filtering, selecting, organizing, and integrating information. The basic premise of the cognitive theory of multimedia learning is that "people learn more deeply from words and pictures than from words alone" (Mayer, 2014, p. 47).

Metacognitive theory: According to Livingston (1997), metacognition is "higher order thinking involving active control over the cognitive processes engaged in learning" (p. 1). The use of the term "metacognition" is originally associated with the cognitive psychologist John Flavell (1979).

The sociocultural theory: Vygotsky (1978) sets forth a framework for development of higher mental practices which considers social interaction as the core of the communication and learning process. A fundamental assumption of Vygotsky's theory is the idea that psychological structures do not exist in the individual's mind but rather are formed as a result of interaction within the social context.

Passive and active vocabulary knowledge: Milton (2009) states that there are two categories for word knowledge: *passive* versus *active* vocabulary knowledge. Passive word knowledge, by definition, refers to the words that are understood when heard or read, whereas a learner's active word knowledge entails the words that need to be recalled when one is using them in speech or writing (Milton, 2009).

Receptive and productive word knowledge: Nation (1990) and Read (2000) stated that receptive word knowledge refers to the ability of the language learners to recognize and recall the meaning of a word, while the productive word knowledge refers to the ability of the learners to use the target words in speech or writing.

Summary

ESL students' demographic is the remarkable growing component of America's adult education system. More than 1.2 million students per year enroll in ESL programs of many kinds at many community colleges (CCIE, 2019). The vocabulary learning process is a critical part of second language learning. Recalling and using new vocabulary is challenging for adult language learners. Most of the adult language learners have difficulty in transferring their passive vocabulary into active vocabulary for use in speaking and writing. Most of the traditional second language teaching methods emphasize only one modality of vocabulary instruction. Effective techniques and methods can facilitate obtaining, retaining and recalling novel vocabulary that may be strongly correlated with learning achievement in second/foreign language classes.

This study is based on three theoretical frameworks: the cognitive theory of multimedia learning (Mayer, 2014 & 2005), metacognition in relation to language awareness (Haukås, 2018), and the sociocultural theory (Vygotsky, 1978). The main

purpose of the study was to investigate if proposed techniques based on neurocognitive, metacognitive and sociocultural theories can promote the vocabulary learning process and if this can empower language competence, improve retrieval of novel vocabulary, and enhance second language vocabulary development. These methods can be defined as techniques focused on effective storage and retrieval of vocabulary for continuing the development and improvement of language learners' communicative performance. This study highlights principles of sociocultural theory. From the researcher's point of view, second language learning is a mediated process, social in origin, which occurs between language learners, their peers and instructors as experienced members of the society.

The researcher planned to find out how teaching methods based on neurocognitive, metacognitive and sociocultural theories facilitate vocabulary acquisition and how ESL learners describe the effectiveness of that in mastering ESL vocabulary. This study focused only on ESL students in a community college in northern California and the result of the study cannot be generalized to other ESL students. These methods can assist language teachers in creating study plans which help students' language skills grow. The implication of this study is an aid to language teachers for teaching a language efficiently so that adult language learners may learn, remember and use novel vocabulary better by storing new words into their long-term memory and retrieve vocabulary effectively in their communication.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

One of the most important challenges that language learners face during the process of second language learning is vocabulary development. Vocabulary has been recognized as crucial to language use since an insufficient command of vocabulary will impede second language learning (Asgari & Mustapha 2011).

From the researcher's observations as well as her own experience, vocabulary development of adult language learners is centered on speaking and writing. The process of obtaining, retaining, recalling and using second language vocabulary and using that vocabulary actively in spoken and written interactions presents the main and largest English language learning challenge for adult learners.

Richard (2003) considered vocabulary the main component in estimating language proficiency on the basis that command of vocabulary illustrates how well a learner can master the second language. This research study points toward the significant gap between a language learner's passive vocabulary and that same language learner's active vocabulary. Furthermore, what the researcher's investigation has revealed is that while previous studies applied and considered different methods in vocabulary instruction, the focus of each previous study was generally centered on the notion that a particular vocabulary learning modality resulted in passive word development but not active word communicative performance for speaking and writing. Although an ESL adult learner may aptly demonstrate the ability to understand ESL vocabulary in reading and listening, namely the learner's passive vocabulary, the learner may still remain

unable to recall and use this vocabulary in speaking and writing as a part of active vocabulary.

The purpose of the current study is to investigate whether the inclusion of neurocognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance vocabulary acquisitions of community college adult ESL learners and if it can help the ESL students to recall and use new second language vocabulary effectively in their speaking and writing. The main purpose of this study was to help ESL community college language learners transform their passive vocabulary into active vocabulary by using methods informed by neurocognitive, metacognitive and sociocultural concepts.

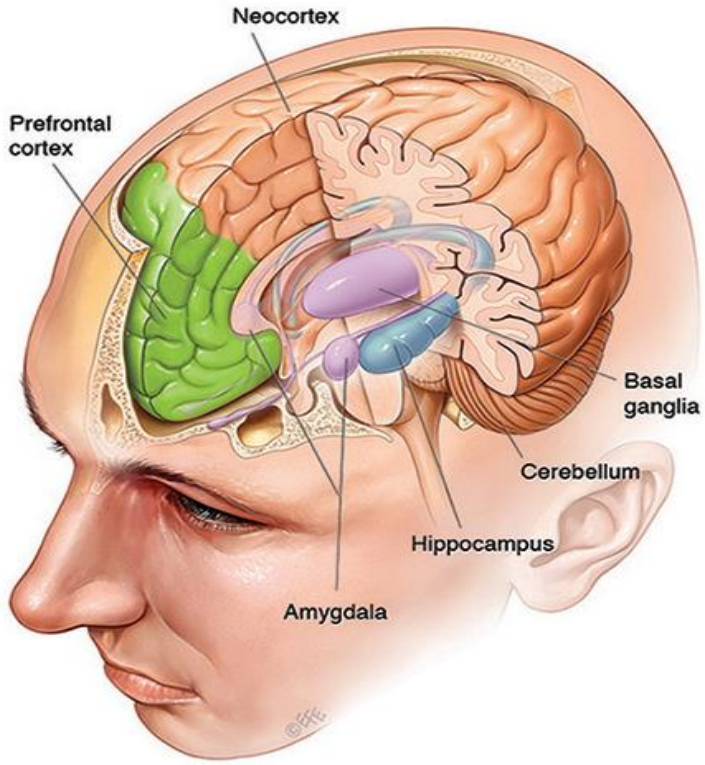
This literature review covers the following sections related to the purpose of the study: (1) brain mechanism in the creation of memory; (2) expanding on elements of the conceptual framework; (3) community college context in English teaching and learning.

Section I: Brain Mechanism in the Creation of Memory

Information is stored and processed in memory. Different regions of the brain are involved in the encoding, storage, retrieval of acquired information and skills. Various brain areas are simultaneously activated during retrieval of memory (Robertson, 2002). Figure 4 illustrates the various brain areas involved in memory.

Figure 4

Brain Involved in Memory by Levent Efe *(2019)*



Prefrontal cortex: As figure 4 illustrates, the prefrontal cortex (PFC) is located at the very front of the brain involving\many complex cognitive functions. Short-term and working memory rely highly on the prefrontal cortex. The prefrontal cortex becomes very active by holding information temporarily and before completing a task. The left side of the PFC is more involved in verbal working memory. Prefrontal cortex (PFC) function encodes task-relevant information in working memory (Goldman-Rakic, 1987; Miller and Cohen, 2001; Baddeley, 2003).

Basal ganglia: The basal ganglia is located deep within the brain and are involved in a broad range of processes such as emotion, habit formation, movement, and learning. According to Foerde & Shohamy (2011), the basal ganglia has a selective role

in procedural learning of habits or skills. According to these researchers, the role of the basal ganglia in non-declarative memory, such as procedural or habit learning, is very important.

Cerebellum: The cerebellum lies deeply at the rear base of the brain. It is the most important region for fine motor control and movement. Based on several functional imaging studies, Desmond and Fiez (1998) reported that changes in cerebellar activation happen during a variety of cognitive tasks. They suggest that this structure is involved in basic cognitive processes, such as working memory, implicit and explicit learning as well as the memory, and language. For example, one of the most-cited instances of cerebellar involvement in language processing is the verb-generation task.

Hippocampus: The hippocampus has an important role in how episodic memories are formed. Episodic memories are autobiographical memories from specific events in our lives. Hannula and Ranganath (2008) investigated the importance of the hippocampus to short-term associative memory. Their evidence yields new insights into the nature of the hippocampal contribution to short-term memory, suggesting that the hippocampus function is primarily in encoding and retrieval and it has a time-limited role in the storage and retrieval of memory. The most important role of the hippocampus is to consolidate information from short-term to long-term memory.

Neocortex: The neocortex is the largest part of the cerebral cortex, the sheet of neural tissue at the outside surface of the brain, with its wrinkly appearance. Higher functions such as sensory perception, generation of motor commands, spatial reasoning and language are the main neocortex functions. Over time, information stored temporarily in the hippocampus can be transferred to the neocortex as general

knowledge. Respectively, specific areas of the neocortex are more activated by remote than by recent memory retries (Wiltgen et al, 2004).

Amygdala: The amygdala role is to connect emotional significance to memories. In their studies, McGaugh, et al. (1996) found extensive evidence that emotional arousal activates the amygdala resulting in the modulation of long-term memory storage occurring in other brain regions. The "stability" of memory and how effectively it is retained over time depends on interactions between the amygdala, hippocampus, and neocortex.

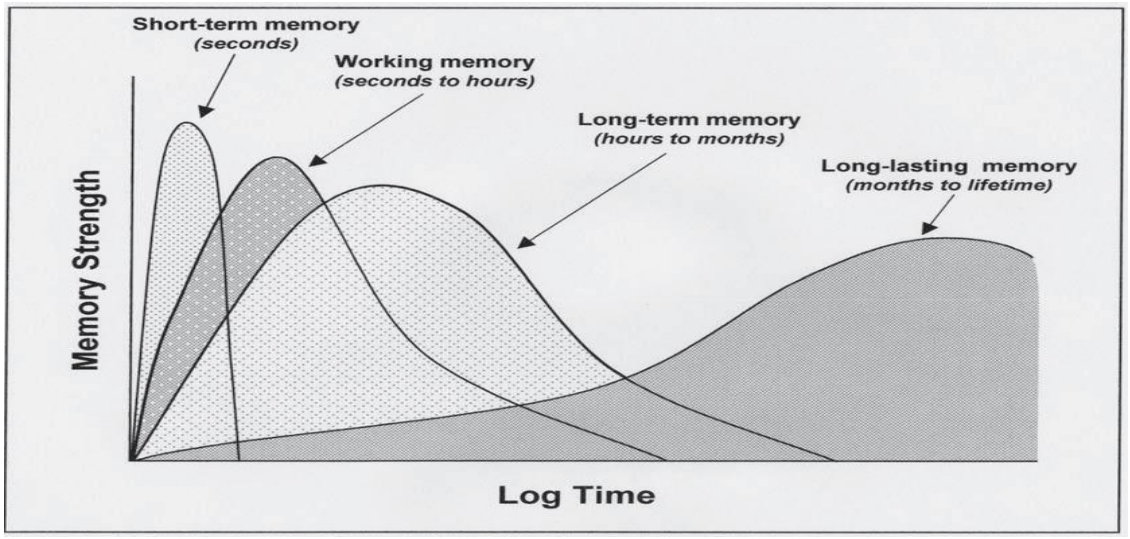
Transferring information from short-term into long-term memory

According to Squire (1992), the hippocampus transfers explicit information to permanent storage sites throughout the cerebral cortex. Since new memories build on prior memories, the hippocampal formation may play a role in the development of patterns of connections. The connections are reinforced, and our memory becomes deeply embedded in our brain by further repetitions of newly learned skills or information.

Robertson (2002) illustrated a time-dependent process underlying the creation of different stages of memory.

Figure 5

Modified from McGaugh JL, Memory: a century of consolidation



According to Robertson (2002):

> Short-term memory involves retaining information or events only for seconds. Working memory involves the online processing of information to accomplish a particular task. Long-term memory includes a relatively permanent type of memory storage that lasts from an hour to months, although some memories last a lifetime (p. 32).

Gathercole (1999) emphasized that "we can get facts and events into long-term memory simply by rehearsing them. The brain strives to make associations if you already have an established neuronal circuit for a particular type of information, then the hippocampus effectively stores related information alongside the previous information. It is essential, however, to allow the brain time to transfer the information from working memory into long-term memory. The traditional, one-hour didactic lecture potentially fills working memory, but allows little opportunity for the consolidation of the information into long-term memory" (p. 25).

Holding information in working memory is effortful, attention-demanding, and prone to failure when the information load or other cognitive demands are high

(Robertson, 2002). Downing (2000) states that we can increase the acquisition of information into working memory. The first step is to complete attention. Attention filters incoming information, allowing only relevant information into working memory. Schacter (1969) who conducted experimental research reported that students' retention of events and facts was increased when they were compelled to pay particular attention or when their attention was directed to understanding concepts.

Memory is impacted by the sensory modality in which the information is presented. Involving multiple sensory systems such as visual and auditory can improve the retention of the information. For instance, using dual-mode instruction like auditory information *with* visual illustrations results in improved memory performance compared to single modality formats. (Brand & Jolles 1985)

It is necessary to refresh the decaying working memory by providing an opportunity for students to rehearse the gained information. Working memory is less efficient when instruction contains too many divergent points or is immediately followed by another new information. Using some techniques for teaching second language vocabulary can provide a way for students to rehearse material both mentally and verbally and transfer it into their long-term memory by experiencing it. Understanding the concepts of the various types of memory and the underlying cellular and molecular mechanisms may enable language teachers to have a better understanding of their language learners' learning capacities. Vocabulary instruction techniques based on cognitive, metacognitive and sociocultural theories also would help ESL learners' memories maximize mental agility by obtaining, retaining and recall English vocabulary.

Section II: Expanding on Elements of the Conceptual Framework

As was mentioned in Chapter I, this dissertation is based on three prominent theories: (a) Mayer's (2005, 2014) cognitive theory of multimedia learning, (b) metacognition in relation to language awareness (Haukås, 2018), and (c) sociocultural theory (Vygotsky, 1978).

Cognitive theory and memory processing in second language acquisition

In 1990 Anderson and Pearson explained the relationship between second language acquisition and cognitive theory continuing to date as the traditional theoretical foundation of the cognitive second language learning approach. In their view, the storage of information in memory has two forms: declarative knowledge is defined as knowledge of given content; procedural knowledge as knowledge of the method. Declarative knowledge, aligned as the memory of images and sequential events, is represented in long-term memory as meaning-based concepts rather than precisely replicated events or a specific language. That concept is formed through nodes associated with other nodes in connecting associations or links, with the strength of associations between nodes based upon prior learning experiences.

In first and second language acquisition, memory has been a long role of researcher interest (Baddeley, 1999; Ellis, 2001). In keeping with an established belief that short-term memory is more accountable for language development, SLA research has maintained a focus on short-term memory rather than long-term memory. This approach is founded on a belief that it is short-term memory which presents an immediate capacity for the process and analysis of new words as second language grammatical structures.

Consequentially, the larger immediate capacity of an individual then transfers into long-term memory. (Ellis, 2001)

As viewed by Preston (2007), memory is the brain's ability to recover, retrieve, and remember past events, impressions, and facts. The formation processing and retrieval of memory has three phases: (1) the encoding or registration in the brain's receiving, processing, and combining of received information; (2) the storage of information, which encompasses creating a permanent record of the encoded information; and (3) the retrieval, recall or recollection, which includes retaining the stored information in response to some cues for use in a process or activity (Preston, 2007).

The next section first discusses different memory types and then relates memory retention to vocabulary learning. Zhang (2004) divided memory into three types: sensory memory, short-term memory, and long-term memory. Sensory memory is "the shortest-lived memory that lasts for milliseconds to a few seconds" (Zhang, 2004, p. 1). Following a range from several seconds to a few minutes, the memory is then called short-term memory (Zhang, 2004). Preston (2007) refers to short-term memory as primary/active/working memory. Short-term memory keeps the information which is already being processed such as a new word encountered for the first time (Baddeley, 2002). While short-term memory is fast, short-term memory has only a limited ability for a very short time to hold information as active and readily available. (Amiryousefi & Ketabi, 2011).

The counterpoint is long-term memory, which lasts anywhere from an hour to a lifetime (Zhang, 2004). Sweller and Chandler (1994) have demonstrated the unlimited storage capacity of long-term memory as well as the ability of long-term memory to

retain an indefinite amount of information. The learning of any material, for example, a list of vocabulary words, is accomplished through a change in a learner's long-term memory. This data indicates that such alterations to long-term memory should be the primary aim of instruction in vocabulary learning environments (Pass & Sweller, 2012; Sweller, 2011). Nevertheless, there has been rather slow processing concerning long-term memory

It is now generally accepted that short term memory and long-term memory are different structures with different properties. According to Baddeley and Wilson (2002), who validated the Atkinson and Shiffrin (1968) model for human memory, there are three main blocks of memory and each plays a specific role. The supporting evidence presented also shows that the components of human memory have at least some physical equivalent in the brain. Short term memory is often referred to as working memory because it is this component that is used during conscious decision making and problem-solving activities.

Recognition memory is viewed as remembrance or recognition of a past event. Craik and Lockhart (1972) have proposed that the levels of processing, or depth of encoding, determines the amount of data remembered or recognized. This idea was examined by Craik and Tulving (1975) in a series of experiments wherein participants were induced to process words at different depths and were then tested on recall or recognition. Conducted under these recognition conditions, the evident result was that a deeper processing of semantics results in the higher and more accurate recognition of items.

Significance of memory in second language vocabulary processing

In learning new vocabulary, memory processing plays a crucial role in absorbing this new information, then, in turn, restoring and retrieving the information as may be necessary. It is indeed quite common among second language students to complain that they know the newly learned vocabulary but cannot remember it. They mostly attribute this issue to poor memory. From the recognition memory perspective, they have bad memory *habits* which can be the reason for poor recall (Vallar and Papagno, 2002).

The act of recalling words is as significant as the process of learning them. Indeed, the ability to recognize and recall words is a prerequisite to communicating in a second language. As described by Banisaeid (2013), given the importance of retaining novel words, cognitive techniques and memory processes should be more integrally incorporated as a part of second language vocabulary learning and teaching. Second language acquisition has of course always maintained an unavoidable focus on ways and procedures for presenting lexical items, and on techniques for practicing, remembering and increasing word retention, all given that vocabulary itself is vital for communication as well as essential for language and skills learning. Cohen (1996) believes that cognitive strategies usually involve the identification, retention, storage, or retrieval of words, phrases, and other elements of the second language. Nation (2001b) proposed that three general psychological processes contribute to the retention of words: (1) noticing; (2) generative use, and (3) retrieval. *Noticing* involves the learner paying attention to a word as a unit of language, which has a meaning outside of its immediate context. *Generative use* refers to the use or recognition of words in varying contexts to enrich word knowledge. Concerning the process of *retrieval*, Nation distinguished *receptive retrieval*

as the act of form reception of a word in reading or listening and *productive retrieval* as "wishing to communicate the meaning of the word and having to retrieve its spoken or written form." (2001b, p. 67). Nation identified the mental search for words forward as a crucial mechanism to enhance the retention of words over time. Nation claimed that "each retrieval of a word strengthens the path linking form and meaning and makes subsequent retrieval easier." (p. 67). Such benefits of retrieval have not been documented extensively in vocabulary learning research (Barcroft, 2015; Folse, 2006; Nakata, 2017).

Memory techniques are based on simple principles such as making an association and using different modality to process them. For example, the words and phrases can be associated with visual images as well as verbalizing them. While many learners do make use of visual images, some find it easy to connect words and phrases with sound, motion or touch (Oxford, 2001). Language instructors should pay attention to these methods and techniques in teaching new vocabulary and try to maximize opportunities when links are made as an aid for later retrieval of information. The cognitive approach has provided a significant change to our understanding of the teaching-learning process in several ways. Rather than viewing learners as passive listeners recording stimuli from the teacher, under the cognitive approach learning is now viewed as an active process occurring within and subject to the influence of a learner. Learning depends jointly on both the information presented and the learner's processing of that information (Mayer, 1992). From a schematic perspective, when a learner focuses memory the learner actively builds schema subject to continual revision with new information. Each individual's schema is unique and dependent on that individual's experiences and cognitive processes. Knowledge under schema theory, however, is not necessarily stored hierarchically. It is,

in fact, meaning-driven and probably represented propositionally, and the networks of propositions are actively constructed by the learner. For example, in recalling a story that we were told, we are able to reconstruct the story's meaning but usually not with the exact same sentences or even often the exact order. We have remembered the story by actively constructing a meaningful representation of the story in our memory (Price and Driscoll, 1997).

Leikin et al. (2005) examined the factors that influence the process of learning to read in a second language as well as the learners' working memory and short-term memory capacities. At the start of Grade 2, the Hebrew reading comprehension skills of a group of 68 Russian-speaking children (with a mean age of seven years and six months) were screened. From this sample group, 40 participants were selected: (a) 20 successful learners and (b) 20 unsuccessful learners. These two groups were then tested in both Hebrew and Russian on a wide range of language skills, including phonological processing, vocabulary, syntactic and morphological awareness as well as reading speed and accuracy skills. The study showed that the poor readers were characterized more by a meta-linguistic rather than a linguistic deficit in their native tongue, and working memory is essential in performing L2 development.

In another study, Michael Carrell (2000) associated vocabulary instruction with both students' prior knowledge and other pre-reading activities to construct students' background knowledge and activate working memory practices that could help students logically infer the meaning of the newly encountered vocabulary items. The results of this study confirmed the students' ability to successfully find new lexical items in vocabulary activities, effectively contributing to increase their second language learning outcomes.

Various memory-related strategies enable learners to learn and retrieve information in an orderly string (*e.g*., acronyms), while other techniques create learning and retrieval via sounds (*e.g*., rhyming), images (*e.g*., a mental picture of the word itself or the meaning of the word), a combination of sounds and images (*e.g*., the keyword method), body movement (*e.g*., total physical response), mechanical means (*e.g.*, flashcards), or location (*e.g.*, on a page or blackboard) (Oxford, 1990). Memory-related strategies have been shown to relate to the proficiency of native-English speaking learners of foreign languages (Oxford and Ehrman, 1995). Memory-related strategies have been shown increased proficiency in a course requiring the memorization of large numbers of Kanji characters (Kato, 1996).

Many studies have shown the efficacy of putting word meaning into a graphic form such as a map or web (Heimlich and Pittelman, 1999), a semantic feature chart (Johnson et al., 1997), an advanced organizer (Herber, 1978), or other graphic forms. One must bear in mind, however, that mere construction of such graphic forms without discussion does not achieve an effective result (Stahl and Vancil, 1986). Additional approaches which stress the learner actively relating words to one another include clustering strategies that require students to group words into related sets through brainstorming, grouping and labeling (Marzano and Marzano, 1988), designing concept hierarchies or constructing definition maps related to concept hierarchies (Schwartz and Raphael, 1995; Bannon et al., 1993), and mapping words according to their relation to story structure categories (Blachowicz, 1986). All these approaches are designed to maintain the student's involvement in constructing maps, graphs, charts, webs, or clusters that represent the semantic relatedness of words and concepts. Discussion, sharing, and

use of the words are necessary components of active involvement in ESL reading comprehension which can increase apprehension and vocabulary recall and retention (Herber, 1978).

Nation (2001) proposes a taxonomy of a variety of these vocabulary learning strategies to emphasize the importance of memory activation and language retention for learners' attention. The strategies in the taxonomy are divided into three general classes of planning, source, and processes, each of which is divided into a subset of key strategies. The taxonomy separates different aspects of vocabulary knowledge (*i.e.*, what is involved in knowing a word).

The first category, which is planning, concerns the decision on where, how and how often the student focuses attention on the particular vocabulary item. The strategies for this category are word choice, the choice of aspects of word knowledge and the choice of repetition planning.

Nation's second category, which is a source, involves gathering information about the particular vocabulary item. This information may include all aspects involved in knowing the word. It can come from the word form itself, from the context containing the word, from a reference source such as dictionaries or glossaries, and analogies and connections with other languages.

Nation's last category, which is a process, includes establishing word knowledge through noticing, retrieving and generating strategies.

One of the rather controversial issues in applied linguistics scrutinizes the reason for poor recall by language learners with bad memory habits (Vallar and Papagno, 2002). Memory strategies are based on simple principles like laying things out in order, making

an association, and reviewing, all of which may be used when a learner for vocabulary learning. The target words can be linked to visual images that can be stored for successful retrieval in communication. Many learners use mental pictures and visual images, but others think it easy to connect words and phrases with sound, motion or touch (Oxford, 2001). However, successful memory processing usually involves the learner's method for receiving, restoration and retrieval of information. This requires language teachers to think of ways to present information to increase the likelihood of establishing meaningful links to facilitate later retrieval of information. These considerations and procedures can be prepared for language classroom management and teaching (Carpenter et al., 1994). Moreover, working memory activation will enable students to precisely infer the meaning of the newly encountered vocabulary words.

Michael Carrell (2000) performed a study associating students' vocabulary instruction with both the students' prior knowledge and other pre-reading activities intended to construct background knowledge. The findings of the study supported the proposition that students were able to identify new words encountered in their lexical learning activities which in turn could increase their second language learning outcomes. Therefore, dependence on solely providing word lists would fail to help students link the new word concepts to their previous knowledge and incorporate these new words into their vocabulary. In keeping with this, Carrell notes that research findings offer that with higher working memory and short-term memory capacity, native speakers will perform at a better rate in various cognitive abilities, among them, listening comprehension. Besides, memory strategy use has shown superiority in short- and long-term retention in second language learning.

Houston (2001) analyzed the basis of human learning and memory presented in theoretical and experimental psychological research. According to Houston, retention processes cannot be separated from the acquisition and transfer parts of the entire learning process defined as "a relatively permanent change in behavior potentiality that occurs as a result of reinforced practice" (2001, p. 4).

All of these processes are interconnected and distinctions among them are somewhat arbitrary. The information-processing approach to memory is based on the separate-storage model and the levels-of-processing approach. In the separate-storage model, the individual second language learner is seen as an information-processing system. Once an item is perceived, it enters primary memory (PM) with short-term storage. Rehearsal is necessary for the item to remain in PM and, if rehearsal is long enough, the item may enter secondary memory (SM), which is long-term storage.

Bruning, Schraw, and Ronning (1999) state that metacognition – the knowledge people have about their thought processes – guides the flow of information through the three consecutive memory systems, that is, sensory memory, short-term memory, and long-term memory. Long-term memory consists of declarative knowledge that is the knowledge about facts, and procedural knowledge, the knowledge about how to perform tasks. Houston (2001) argues that in the levels-of-processing approach, "the durability of a memory trace is determined by the depth to which it is processed" (p. 270). Semantic-network models of memory deal with the storage of semantic, meaningful material. According to this model, knowledge is stored through multiple interconnected associations, relationships, or pathways (Houston, 2001).

Ellis (2001) described the types of memory used in second language learning. He proposed a working memory (WM) model, in which a supervisory attentional system (SAS) regulates information flow within the working memory. Ellis applied a constructivist approach to second language acquisition, which holds that general processes of human inductive reasoning lead to language learning. "There is no language acquisition device specifiable in terms of linguistic universals, principles, and parameters, or language-specific learning mechanisms" (Ellis, 2001, p. 38).

Marefat (2003) examined the effect of teaching direct learning strategies (memory, cognition, and compensation) and their subcategories on the short- and long-term vocabulary retention of EFL learners. Participants of the study were 60 Iranian female English language learners between the ages of 15 and 17. Before the treatment phase of the study, a questionnaire was given to the participants to see if they already use these strategies even before receiving any instruction as well as to raise their consciousness on the use of them. After the study treatment, the participants took two equivalent tests with an interval of two weeks to find out the difference between their short-term and long-term retention of vocabulary. The results indicated that learners' strategy use in short-term retention far outweighs that in long-term retention. The results also presented the superiority of memory strategy use both in short- and long-term retention. The next most frequently used strategies were cognitive and compensation strategies respectively.

Banisaeid (2013) performed research comparing the effect of memory and cognitive strategies training on the vocabulary learning of an intermediate proficiency group of Iranian learners of English as a foreign language. This study investigated how

memory and cognitive strategies training affect word learning of sixty intermediate ESL learners divided into two experimental groups. For omitting the words learners know, a pre-test of vocabulary was taken. In the first experimental group, thirty students were trained to use memory strategies including keyword and semantic map in word learning and, in the other experimental group, thirty students were taught to learn the same new English words through cognitive training with flashcards and repetition. The course consisted of eleven sessions (two two-hour sessions per week). At the end of the sessions, the data was collected using a post-test prepared by the teacher, which included sixty open-ended items. The results of the independent t-test showed that there is no significant difference between the effects of cognitive and memory strategy training on intermediate ESL learners' word learning. In general, the finding suggests that memory strategies training and cognitive strategy training respectively enhance memory and cognitive strategy uses.

Fortkamp and Verçosa (2019) examined the relationship between working memory capacity and vocabulary retention for ESL learners. Seventeen participants, who were students in the Graduate Program in English Language and Literature at Federal University, had a high level of competence in English and were able to listen, read, write and speak fluently in the language. Statistical analyses revealed that working memory capacity correlates significantly with L2 vocabulary retention. This correlation was interpreted as an indication that higher spans are better to comprehend and produce new vocabulary items in an L2 than lower spans. The results revealed differences in the performance of higher spans and lower spans when transferring L2 vocabulary items to long-term memory.

Justification of the current study

The aforementioned studies indicate how memory processing tends to involve the way L2 learners assimilate, restore and retrieve information. This requires educators and language instructors to consider the best ways to present information and how to increase the possibility that meaningful links are made to enable later retrieval of information. These procedures can be taken into consideration in L2 vocabulary instruction. In addition, second language learning activities that make learners construct maps, graphs, and charts, representing the semantic relatedness of words and concepts may facilitate and increase their language learning outcomes. The author of this study believes that discussion, sharing, and use of words are crucial components of active involvement in L2 vocabulary development. Moreover, the aforesaid studies assert the importance of verbal reports in second or foreign language learning as a memory activation and language attention raising procedures that may lead to language storage, retention and an increase in second language vocabulary development.

The present study aims to indicate that activation of working memory can help students obtain, retain, recall and use new vocabulary in their speaking and writing. The author of this study has decided to use the cognitive theory of multimedia learning as a theory for the development of ESL vocabulary. Mayer's (2005, 2014) cognitive theory of multimedia learning states that people have separate channels for processing verbal and visual material. Learners can process only a finite amount of information in a channel at a time. Meaningful learning occurs when learners engage in appropriate cognitive processing during learning. Learners thus are able to make sense of incoming information by actively creating mental representations. Mayer (2001) also discusses the role of three

memory stores: (1) sensory, which receives stimuli and stores it for a very short time; (2) working, where we actively process information to create mental constructs (or "schema"); and (3) long-term, being the repository of all things learned. In the cognitive theory of multimedia learning, Mayer presents the idea that the brain does not interpret a multimedia presentation of words, pictures, and auditory information in a mutually exclusive fashion; rather, these elements are selected and organized dynamically to produce logical mental constructs. Furthermore, Mayer (2001, 2009) underscores the importance of learning, as based upon the testing of content and demonstrating the successful transfer of knowledge, when new information is integrated with prior knowledge. Design principles include providing coherent verbal and pictorial information, guiding the learners to select relevant words and images and reducing the load for a single processing channel, and so forth.

Schmitt (2010) also mentioned that at the initial stage of vocabulary learning the forming of meaning and links between words are the primary aspect of vocabulary knowledge. The researcher of this study also agrees with Nation (2001) that students should know the form of a word in the spoken and written form. They should also know the meaning and the use of words. In this study, specifically, the author is interested to infer whether or not the application of the cognitive theory of multimedia learning principles will have an effect on the vocabulary retention and recollection of the students or not.

Metacognition in second language learning

Of the several aspects involved in successful second language learning, the metacognitive component has been readily considered as the most significant component

(Pintrich, 2002). Many scholars have all extensively discussed the importance of metacognition in elevating language learning (*e.g.*, Anderson 2002, 2008; Chamot 2005; Wenden 1998).

Haukås (2018) has identified Wenden (1987) as the first researcher to emphasize the importance of metacognition in language learning and teaching. The term metacognitive domain knowledge is defined as the background knowledge that learners *already* possess about the subject topic (Wenden, 1998). Metacognitive strategies are the skills employed by a learner to manage, direct, regulate, and guide the learning process about a topic, *i.e*. the learner's planning, monitoring and evaluation (Wenden, 1998). According to Haukås (2018), as based on Wenden (1987), metacognitive knowledge and metacognitive strategies present significantly different modalities. Haukås (2018) points out that Wenden (1987), based on Flavell's theory of metacognition, and categorized the area of metacognitive knowledge into three distinguishable areas: (1) person knowledge, (2) task knowledge, and (3) strategy knowledge. In contrast, Anderson (2002, 2008) believes that the designation "metacognition" consists of five primary components, or skills, for learning to be considered in the language classroom, yet certainly highlights the teacher role as most prominent. Per Anderson, these metacognition components are distributed between (1) preparing and planning for learning, (2) selecting and using learning strategies, (3) monitoring strategy use, (4) orchestrating various strategies, and (5) evaluating strategy use and learning.

Anderson (2002, 2008) states that "the metacognitive ability to select and use particular strategies in a given context for a specific purpose means that the learner can think and make conscious decisions about the learning process." In order to encourage

students' own self-monitoring, the language instructor may train students to keep track of the effectiveness of strategies selection and to what extent these strategies work for them. The students' feedback then allows the instructor to orchestrate various strategies to maximally benefit students in the learning process. Lastly, the instructor will evaluate the given strategy use and learning by asking the following questions persistently during the learning process: (a) what am I trying to accomplish; (b) what strategies are being used; (c) how well are these strategies being used; and (d) what additional or alternative strategies may be effectively employed for the teaching process. Anderson considers these questions as intricately intertwined between all the components of the learning process (*citing* Haukås, 2018).

In her investigation of the metacognitive method in second language classes, Diehb-Henia (2003) explored metacognitive training as an aid for students' enhancing their language skills and concluded that metacognitive-strategy training substantially improves ESL readers' declarative and procedural knowledge and proficiency in reading. Importance of metacognitive strategies instruction on the learners' learning progress has been also emphasized by Coskun (2010), Wichadee (2011), and Tabeei, Tabrizi, & Ahmadi (2013).

In their study, O'Malley and Chamot (1990) report that the students who received metacognitive strategy instruction performed better than the control group. In the study conducted by Thompson and Rubin (1996), the approach was to investigate the influence of metacognitive and cognitive strategy instruction on the listening comprehension performance of American university students learning the Russian language. Following two years of instruction, the listening scores of the experiment group who had been

receiving systematic training in listening strategies were then compared to the listening scores of a group, with similar backgrounds, who received no instruction over the two years. Tests conducted both before and after the two years demonstrated that the students who received strategy instruction in listening to video-recorded texts had indeed improved significantly over those who had received no such instruction over that same time frame.

In a study by Vandergrift (2003), students were trained in the use of prediction, individual planning, and peer discussions, as well as post-listening reflections that comprised the metacognitive strategies in beginner elementary school through to university contexts in France. Students in both of those groups centered on advantages presented by predictions for successful listening, the place of collaboration with a partner for monitoring, and the confidence-building function of this approach for developing listening comprehension ability.

In another study, Tabeei, Tabrizi, and Ahmadi (2013) investigated the influence of teaching metacognitive strategies on listening comprehension for Iranian students of English as a foreign language (EFL) at the Iran Language Institute (ILI). The findings of this study demonstrated the positive effect of metacognitive strategies instruction on listening comprehension among Iranian learners.

To assist teachers and learners in their metacognitive reflections, the most well-known tool is Oxford's (1990) Strategy Inventory of Language Learning (SILL), a questionnaire which consists of fifty statements divided into six categories – memory, cognitive, metacognitive, social, compensatory and affective strategies – and learners are asked to determine how frequently they use each strategy. The criticisms of Cohen (2011)

and Woodrow (2005), however, offer that Oxford's SILL provides an overview of learners' strategy use only as a very general model.

The Metacognitive Awareness Listening Questionnaire (MALQ) by Vandergrift et al. (2006) is another metacognition tool which can be used in the language classroom for listening comprehension. The most recent metacognition questionnaire is the Language Learners' Metacognitive Writing Strategies in Multimedia Environments (LLMWSIME), a questionnaire created by Zhang and Qin (2018) to promote learners' metacognition of their writing processes.

In order to foster learners' metacognition, Haukås (2018) advocated The Common European Framework of Reference for Languages (CEFR) (Council of Europe 2001a) to help language learners be attentive to and thus gain knowledge of the target language amid intercultural encounters. According to Haukås (2018), the European Language Portfolio (ELP) introduced by the Council of Europe in 2001 (2001b) encourages learners to document their linguistic resources for each of the languages which they know and/or are learning and to reflect in a rigorous and systematic manner on language learning and intercultural awareness. Heyder & Schadlich (2014), Larssen & Hoie (2012), Little, Goullier & Hughes (2011), and Mikalsen & Sorheim (2012)), all pointed out that while the ELP was implemented in several countries, it remained unknown to many language instructors and is not common in the language learning classroom.

Haukås (2018), Vold (2018), Hasselgard (2018), and Hiver & Whitehead (2018), all also explained metacognitive knowledge in language learning and teaching as what both the language instructors and the language learners know or do not know about languages and language learning, and the perspective each learner or teacher had about

their abilities to learn and/or teach languages. Haukås (2018) discusses distinctive principles as a part of most metacognitive instructional models, referring to the activation of learners' prior knowledge, reflections on what learners know and want to learn, explanations and modeling of learner strategies by the teacher, and the learners' own involvement in making goals for monitoring and evaluating the learning process.

Metacognition in second language vocabulary learning

This section now turns to the metacognition method in second language vocabulary acquisition. Many researchers such as Schmitt (1997); (Anderson (1999), Zhao (2009), Tabeei, Tabrizi, & Ahmadi, (2013) and O'Malley & Chamot (1990) considered metacognitive strategies as the most fundamental strategy for learners

Cohen (2011) states that metacognitive strategies are typically associated with reflective practice and can be sub-categorized into strategies connected with the planning, monitoring, and evaluation of learning. A number of studies have reported that metacognitive training impacts positively on students' acquisition of vocabulary. For example, Zaki and Ellis (1999), and Eslami-Rasekh and Ranjbari (2003), found positive effects of metacognitive training on vocabulary acquisition in both ESL and English as a foreign language (EFL) contexts, respectively (Cohen, 2011). Moreover, Macaro (2006) and Plonsky (2011) both agree that instruction including some metacognitive element as very useful for successful language learning. The literature suggests that metacognition is helpful in the acquisition of vocabulary both directly and indirectly since metacognition is beneficial for the learning process as an important component of self-regulated learning. Likewise, metacognitive strategy instruction has been considered as a significant tool in the teaching and/or development of L2 vocabulary (Schmitt (2010)

Cook and Mayer (1983) classified vocabulary learning into two categories: *determination* or *consolidation* strategies. Determination strategies comprise discovering a word's meaning based on background knowledge, contextual clues, and/or reference materials which aid in reaching a solution to figure it out and/or asking someone else; while consolidation strategies are those that aid in remembering the meanings of a word through social, memory, and metacognitive processes.

Rasekh and Ranjbary (2003) investigated the effect of metacognitive strategy training through the use of explicit strategy instruction on the development of lexical knowledge of EFL students. Through ten weeks of instruction, only the experimental group received metacognitive strategy training during the semester. Their training model was based on the Chamot and O'Malley's (1994) framework for direct language learning strategies instruction. The result of the study demonstrated a significant positive effect of explicit metacognitive strategy training on the vocabulary learning of EFL students.

The students of Cubukcu (2008) were taught metacognitive strategies for reading for five weeks. The reading comprehension and vocabulary achievement of 130 third-year university students were investigated and determined to incorporate metacognitive strategies led to an increase in the reading comprehension as well as the impact of the metacognitive strategies on vocabulary.

Na Zhao (2009) investigated the relationship between metacognitive strategy training and vocabulary learning of college students through a five-week training program. In this study, both questionnaire and tests were used for one hundred and thirty-four students. The experimental group received both cognitive vocabulary training and metacognitive training, while the control group received only cognitive strategy training

without the metacognitive component. The experimental group outperformed the control group in the post-training vocabulary test. The metacognitive strategy training for vocabulary learning of these students proved to be effective.

Another study by Asgari and Mustapha (2011) documents the type of vocabulary learning strategies used by Malaysian ESL students. The researchers conducted an open-ended interview that was conducted individually with each of ten students. Their conclusion showed that strategies such as the learning a word through reading, the use of a monolingual dictionary, the use of various English language media, and applying newly acquired English words in their daily conversation related to memory, determination, metacognitive strategies are popular strategies among the ESL students.

Al-Khasawne and Huwari (2014) identified the effects of metacognitive strategy instruction on vocabulary learning of Jordanian university students through a ten-week instruction program. Only the experimental group received explicit instruction on using metacognitive strategies. The instruction model was based on the cognitive academic language learning approach (CALLA) proposed by Chamot and O'Malley (1994). The result showed that the explicit instruction on using metacognitive strategies proved to be effective. The experimental group performed better in the post-instruction vocabulary test compared to the control group. In their study, Al-Khasawne and Huwari (2014) suggested that metacognitive strategies instruction should be integrated into regular vocabulary classes to help students become more autonomous learners.

Trujillo, Alvarez, Morales & Zamudio (2015) conducted a study regarding the development of metacognitive strategies as effective influences on vocabulary learning. These researchers suggest the incorporation of metacognitive strategy training within the

EFL classroom is an effective tool to control of students' learning and to help them transfer those strategies to other learning situations.

Itala Diaz (2015) examined the effects of metacognitive strategies to help young language learners with difficulties increasing and retaining vocabulary. The participants received metacognitive strategy instruction, following which the language learners received a set of five interventions based on the CALLA instructional model. Progress journaling was also used to train the learners in the use of the metacognitive strategies of planning, monitoring, and evaluating. The findings showed that metacognitive strategy training had positively contributed to vocabulary acquisition skills.

In their study, Trujillo, Becerra, Álvarez Ayure, Zamudio Ordoñez & Morales Bohórquez (2015) investigated the effect of training in the use of metacognitive strategies through learning journals to improve the participants' vocabulary learning. Students' learning journals and teachers' field notes, questionnaires and mind maps served as the source of the data collection. The results of the study admit that the training helped participants to develop metacognitive awareness of their vocabulary learning process as well as their lexical competence regarding daily routines.

Álvarez Ayure (2018) claimed that a combination of cognitive strategies, such as meaning-oriented note-taking strategies (writing down meanings and synonyms and illustrating meaning with a drawing) followed by learning words from context and metacognitive strategies such as monitoring, planning, and evaluation support learners' vocabulary learning processes. Álvarez Ayure's (2018) selection of these strategies were based on the understanding that real vocabulary learning comes through use, both receptive use and productive use.

Schneider and Ming (2019) employed multisensory structured metacognitive language (MSML) instruction to actively engaging adolescent learners in acquiring, remembering, and using academic vocabulary in reading, writing and speaking tasks across disciplines. The researchers introduced a variety of such MSML strategies with specific examples relating to content disciplines.

Recent research by Teng & Reynolds (2019) emphasizes the value of providing metacognitive guidance for learning ESL in a small group setting. This study highlighted the effects of metacognitive instruction on reading comprehension and the incidental learning of vocabulary through reading. Participants were 171 university students and the result of this study showed that learners in the collaborative learning with metacognitive prompts group outperformed the learners of the other groups on both reading comprehension and incidental vocabulary learning assessments. The vocabulary knowledge acquired by students in the collaborative learning with metacognitive prompts group was highest for meaning recognition, followed by form recognition, meaning recall, and finally, form recall. These findings suggest that the use of metacognitive prompts in a group setting is effective to boost EFL reading comprehension and the incidental vocabulary learning for Chinese university students.

Justification for the Study

As discussed and illustrated in previous studies, most of the research on metacognition focused on learning strategies as one of the important language skills. In addition, most of the research on vocabulary learning and teaching strategies has focused on tools such as a questionnaire to determine if language learners are using metacognition strategies to learn new vocabulary. Most of the previous studies also focused on

metacognition strategies for reading and listening which are receptive language skills. The number of studies centered on language productive skills, that is speaking and listening, is noticeably rare.

To the best knowledge of the researcher and based on the previous studies, there is a wellspring of vocabulary instruction methodology focusing on metacognitive techniques for use by language instructors in the classroom. Due to the importance of the metacognitive method in vocabulary learning and teaching, the present study will focus on explicit metacognitive technique instruction and its impact on lexical knowledge improvement of adult ESL students. There is no doubt that metacognitive strategies have been emphasized by many researchers such as O'Malley, Chamot, Stewner-Mazanares, Russo & Kupper (1985), and according to these scholars "students without metacognitive approaches are essentially learners without direction or opportunity to review their progress, accomplishment, and future directions" (p. 561). In addition, vocabulary development plays a key role in the individual's proficiency in second language learning. As a result, more attention should be paid to finding whether explicit metacognition techniques to teach second language vocabulary can help adult language learners to process, retain, recall and use new vocabulary in their speaking and writing.

Because metacognition has been considered an important component in successful learning per previous studies, it is critical to employ metacognitive techniques in the language classroom and determine how language learners can be taught to better apply their cognitive resources through metacognitive control while learning and using new vocabulary. In this study, the researcher will introduce explicit metacognitive

techniques to teach ESL vocabulary and explore the effectiveness of these techniques and their contribution to the improvement of students' vocabulary learning.

In most of the above studies, the language learners are typically the main focus of the studies and overviews on metacognition but in this dissertation, both the language learners and the language teachers will be at the center of study since language teachers primarily rely on course textbooks (Bachmann 2004). From this researcher's point of view, it is vital to consider some metacognitive techniques in language textbooks to encourage students to be metacognitively active. For instance it would be useful to teach a new vocabulary with a cultural subject, thus encouraging students to explore similarities and differences between languages and cultures as well as activating their prior knowledge.

Sociocultural theory of mind in second language learning and teaching

The most significant challenge for ESL community college students is learning English as a primary language in the United States. They immigrate into this new culture and community with the hope of mastering English efficiently to achieve their academic and career goals. However, many immigrants experience some barriers as a result of being unable to use the newly learned ESL vocabulary to communicate with peers and individuals outside their own cultural and linguistic group.

This section reviews existent research on the sociocultural theory of mind (SCT) about second language acquisition and vocabulary learning. Since being first proposed by Vygotsky (1987), SCT has been a predominantly influential theory in the field of language teaching and learning pedagogy. Resulting from SCT's effect on study parameters of second language acquisition following its introduction, scholars such as

Lantolf (2000) have since coined the term “Sociocultural SLA”. In his description, Lantolf proposes that a kind of mediation occurs in higher mental activities propelled by the driving force of social activity.

Later researchers such as Lantolf, Donato, Thorne, Pavlenko, Swain and Lapkin and others (see Lantolf, 2000b) extended Vygotsky’s theory on second language acquisition, with the research focus using mainly a sociocultural perspective to explain second language acquisition, namely, how second language learners acquire language by collaborating and interacting with other speakers. The core premise of this sociocultural theory is that social interactions compel learning and cognitive development including language capabilities. As one illustration, Lantolf and Thorne contend that “while human neurobiology is a necessary condition for higher-order thinking, the most important forms of human cognitive activity develop through interaction within social and material environments” (Lantolf & Thorne, 2006a, p.2001).

As Lightbown and Spada (2001) have explained, under the doctrine of sociocultural theory speaking and thinking are “tightly interwoven” (p.47). Further to this point, people internalize that which is being conveyed to them in the communicative process, and it is through this action that people stay in control of their mental processes.

According to SCT theorists, the origin of language is in the mind – SCT theorists simply propose that language learning is similar to other forms of learning. Sociocultural theories thus use the term “participation” rather than “acquisition" since they believe that language learning finds a center in the art of a learner participating in social activities. As was noted by Nunn (2001), regulation, activity theory, mediation, private speech, and the zone of proximal development each connect as the central components under SCT.

Vygotsky (1987) proposes that the *ability* to convey language can no longer be purposefully distinguished from the *utility* of conveying language. The tools of language are certainly not a fixed commodity. They steadily derive new forms of expression through the course of human history and its cultural development. Vygotsky goes as far as claiming that external social speech is internalized through mediation and, as such, society is connected to the mind. Similarly, Artigal (1992) sets forth social interaction as a new language acquisition device. Social interaction forms the prerequisite to cognitive development for the transference of an interpersonal process into an intrapersonal one (Nunn, 2001).

When all forms of learning may be derived from this study of interaction, one must agree that language learning can be no exception. As again based on the sociocultural theory of SLA, such social context interactions mediate the process of language learning and, consequently, are considered a significant part of the SLA process (Ellis 2008). The person and the world are connected in an inseparable relationship (Lantolf 2005). As a result, context-dependent social interactions are most important in SLA because these provide second language learners with essential scaffolding in the L2 acquisition (Vygotsky 1978). Swain (2000) suggested that language learning occurs both inside the head of the learner and in the world in which the learner experiences the learning. In short, internal mediation (mental activity) is originated through external mediation (Ellis 2008). Under the sociocultural theory, mediations in second language learning result from the combination including (a) mediation by others, (b) mediation by self, and (c) mediation by artifacts. (Lantolf, 2000).

The concept of the ZPD further provides a central component of SCT by identifying the limit to which a learner can acquire the new knowledge of a second language with the assistance of an expert, such as a teacher, or a person at the same level or slightly higher level of competence than that learner. It is then scaffolding and private speech which are used in intervention for the assistance of learners below. Accordingly, in SCT language development learners can achieve targeted goals by scaffolding while interacting with others; while through inner speech such learners try to regulate their thoughts.

Kumpulainen & Mutanem (2000) suggested that the interpretation of learning processes can be considered in the immediate social situation and the sociocultural context in which learning activities take place. According to this view, the language learning process occurs when learners first produce linguistic forms and functions at the time of interacting with others such as teachers, peers or native speakers. The learner then eventually internalizes these forms and functions for independent use. Said in other words, in SLA each individual learns the target language through the process of mediation with and by others in language learning as the prerequisite for language internalization. Referred to as "scaffolding" by Vygotsky and "cooperative learning" by Brown (2001), this concept emphasizes the role that interaction plays in SCT. As Jacobs *et al*. (2002) have asserted, the link between second language learning and SCT is a perspective which highlights the way through which L2 learners enhance learning according to the context and their relationship with other peers.

Adult second language learners can benefit from private speech and mediate themselves in language learning. The private speech provides another way of providing

language learners the ability to mediate themselves. Vygotsky defines inner speech as the internalization of external forms of dialogic communication (Nunn, 2001). Inner speech, used as another term of reference for private speech, is considered somewhat analogous to thinking aloud tasks as well as having close meaning to metatalk (Ellis, 2003). Inner speech means to talk to oneself in order to express the actions required to complete a task successfully. A person may thus carry out an activity which may otherwise fall beyond their actual current competence through this guide of self-mediation.

Frawley and Lantolf (1985) refer to a principle called continuous access and point out that adults continue to adopt the strategies which they already had been used to employing in the past. Therefore, in SCT, the interpersonal interaction should not be considered as the only realized way for language learning mediation. However, private speech is not simply an act of talking to oneself in front of the mirror. As discussed by Ohta (2001), private speech includes imitation, mental rehearsal, and responses provided by the language learner in her or his mind when taking notice of questions which the teacher is asking another student. Ohta went on to theoretically explain some concepts to validate the place of private talk in SCT and to pave the ground for introducing studies which at least experimentally have succeeded to place this component into real practice.

In a study by Winsler (2004) regarding the effectiveness of private talk in regulating one's thought, it was found that more than 95% of adults talk to themselves. Furthermore, Winsler categorized findings of other studies of private speech studies including the conclusion reached by Broner and Tarone (2001), as well as that of Ohta (2001), that adult second language learners use private speech in their primary language as a help mechanism for the acquisition of the second language. Winsler also cites the

study by Lantolf (1997) which had found that private speech in the learner's second language acquisition process is more common for the advanced learner than for a beginning second language learner. All in all, the results of these and similar studies reveal that private talk accelerates learning and results in observable socio-linguistic development.

Eun & Lim (2009) considered Vygotsky's sociocultural theory the greatest motivating force in human development and learning. In their theoretical framework, the concepts of meaning and mediation are emphasized as the two essential elements affecting an individual's learning of a second language. These researchers believe that applying sociocultural theories to practice can promote students' second-language learning in regular classrooms by focusing on pragmatics and the teacher's role as a facilitator mediating between students and their second-language learning environment.

In their book "*Theories in Second Language Acquisition*", Lantolf, Thorne & Poehner (2015) explored sociocultural theory in depth. The authors explained how SCT focuses on the way that language(s) are learned through a mediated process of human mentality with a learner's participation in cultural activities, including interaction. They emphasized that the SCT constructs are (a) mediation, (b) internalization, and (c) imitation.

Behroozizad, Nambiar, and Amir (2014) addressed some of the major challenges faced by EFL learners and suggested the Vygotskian approach as a solution to language learning. In their empirical research, second language learners receive interaction-based instruction on which they may then build the social construct of knowledge. These researchers believe that in the Vygotskian classroom, a learner's learning activities are

mediated by the teacher's scaffolding of that learner's ZPD. The result of this research shows that manipulating the sociocultural context of the EFL classroom aids learners to attain better communication, be trained in a strategic orientation to learning, and become capable communicators in a social community.

In some empirically designed studies, the role of collaborative learning has been considered a most useful method to take place in second/foreign language settings. For example, in their research Dongyu, Fanyu, & Wanyi (2013) discuss the sociocultural theory with regard to second language acquisition. They focused on three significant concepts from Vygotsky's theory: self-regulation; ZPD; and scaffolding. While highlighting the psychological foundation for collaborative learning, SCT was examined within the Chinese context of teacher-student collaboration. Dongyu, Fanyu, & Wanyi (2013) concluded that the perceived dichotomy of learning and teaching should be replaced by a teacher-student relationship in order to implement collaborative learning.

Sociocultural theory of mind in second language vocabulary learning and teaching

Most of SCT is predicated on an examination of the theory of practice in language learning as a general matter, but unfortunately, it still remains a lack of cumulative research addressing second language vocabulary instructions based on SCT. Ellis and He (1999) found that the dialogic construction in peer interaction provided far more opportunities for learners to learn new words. This, in turn, led to new opportunities for use, and negotiation of meaning. These dual counterpointed results characterize dialogically based interactions.

In a study of the issue of second language vocabulary learning from a distinctly sociocultural point of view, Mendoza (2004) observed that the participants shared their

knowledge and used both linguistic and non-linguistic forms of assistance in their conversations. Mendoza also concluded that the participants concentrated on meaning by utilizing all three aspects of word knowledge, namely, form, meaning, and use. (Nation, 1990). Mendoza (2004) identified clear evidentiary points of learning in the study since learners demonstrated knowledge development when questioned through the reviews, quizzes and games. The participants had utilized the advantage of internalizing their knowledge about the subject words. According to Mendoza, suggested scaffolding and/or collaboration and dialogic interactions provided useful tools in prioritizing the interactions as meaningful and shared between all members of the group. This resulted in a recognizable benefit for learners practicing the language while they are using it and investing in each other's abilities. The outcome demonstrated that learners are more socially knowledgeable when they have been engaged in integrated knowledge of the language and social interaction through the learning process.

Tahmasebi and Yamini (2011) linked sociocultural theory and task-based language teaching based on private speech and scaffolding in reading comprehension. Their study investigated the contribution of scaffolding and private speech in improving EFL learners' reading skills. The participants in the study were two randomly divided groups consisting of a total of fifty-four EFL freshmen taking a reading comprehension course. In the control group, the teacher paraphrased, summarized and provided the meaning of the new words and expressions, while in the experimental group the teacher did the same tasks through collaboration, private speech, and artifacts. Two means of measurement were employed: (1) a final test of reading comprehension, and (2) an oral presentation of text with a readability level matching the texts used during the

experiment. The data analysis revealed no difference between the two groups in the final test. However, in an oral presentation, the experimental group outperformed the control group. Different researchers have discussed the effect of collaborative learning, and almost all of them report positive evidence.

Ahmadian, Amerian & Tajabadi (2014) considered collaborative dialogue associated with Vygotsky's sociocultural theory and its effect on EFL learner's vocabulary acquisition and retention. In their study, a collaborative dialogue is highlighted as a teaching technique for facilitating the vocabulary acquisition and retention of EFL learners. Sixty-four Iranian lower intermediate EFL learners participated in this study and a number of six tasks were developed and implemented at the three stages of pre-task, during-task, and post-task. In the collaborative group, learners performed these tasks in groups of three to four each; the counterparts in the individual group performed all the tasks individually. An assessment of the learners' vocabulary knowledge was made using a researcher-made constructed-response vocabulary test. This test was administered three times, again the pre-test, the post-test, and a follow-up test. A set of independent-sample t-tests was run to compare the groups' respective performance. The results revealed that the collaborative technique had significantly immediate as well as delayed effects on vocabulary acquisition and retention by the collaborative group.

In the study "*An Overview of the Sociocultural Theory and Vocabulary Development*", Alkurtehe & Dzakiria (2018) discussed Vygotskian theory as paramount for the impact of vocabulary development on cognitive-affective contextual aspects and social interaction. According to Alkurtehe & Dzakiria, the interrelation between SCT mediation and environment serves to enhance vocabulary development in teaching EFL

students while further helping students to use the target language in their daily life. The authors emphasized that, with the help of sociocultural theory, the students could master vocabulary while concomitantly improving overall social language capabilities. Per example, the researchers also recommended the use of SCT in teaching Libyan EFL learners in order to enhance the learners' English language vocabulary.

Justification for the study

Reviewing previous studies based on sociocultural theory of mind as well as second language acquisition in general, it has become obvious that the number of studies on second language vocabulary acquisition is limited. Further to this point, even while sociocultural theory in second language practice has been somewhat considered in the EFL setting, any such analyses remain distinctly infrequent in the ESL setting particularly in community colleges settings.

A considerable amount of studies has identified several components of sociocultural theory of mind related to second language learning; however, little attention has been given to sociocultural factors such as empirical research for ESL community college students in regard to vocabulary and SCT techniques.

Many students who attend community colleges are nontraditional students, whether first-generation college students, students of low socio-economic status, minorities, immigrants, students needing remedial help, older students desiring to upgrade their employment opportunities, and/or students with learning disabilities. (Dougherty & Townsend, 2006). As these students pursue their goals in college, one of their primary challenges is activating newly learned ESL vocabulary through the interactional skills such of speaking and writing.

In summary, with an obvious need for further investigation on the effect of sociocultural theory in practice with ESL vocabulary instruction and despite limitations heretofore presented in previous research, the researcher of this study plans to investigate the differential effects of techniques based on sociocultural theory for acquisition of second language vocabulary in a community college ESL setting. Both receptive and productive, and oral and written measures will be utilized in the assessment of acquisition and retention, recalling and use of the target vocabulary.

Section III: Community College Context in English Teaching and Learning

ESL is one of the rapidly growing areas of demand in community colleges in the United States. There are lots of adult ESL learners who enroll in community colleges to learn and improve their English. There are some of the adult English learners who have literacy deficiency; meanwhile there are others who were well-educated at their home countries and they lack English proficiency. According to Bailey, & Santos (2009) *citing* Blumenthal, 2006, Allison, 2006, the population of "immigrants, refugees, and international students who pass through the doors of community colleges" is large, diverse, and growing. The number of researches on community college ESL students is not considerable especially compared to research on ESL students at other levels and imn other contexts. We have also witnessed an increased interest in evidence-based practice in community colleges.

Watkins (2014) identified strategies for ESL students in community colleges in order to develop their public speaking skills. In this project, Watkins (2014) focused on the ways to reduce the fear and anxiety associated with public speaking; the role of small groups in planning and presenting oral presentations; and the use of feedback and self-

help strategies to improve public speaking skills. A handbook of strategies was provided for ESL student to use as a resource in developing these skills.

Gardiner (2014) designed a sample syllabus, lesson plans, and coursebook for California Community College ESL Teacher Educators. This project was based on the critical language teacher education critical awareness, critical self-reflection, and critical pedagogical reflection. According to Gardiner (2014), validating the efficacy of culturally relevant pedagogy in the community college ESL classroom may provide the impetus for an increased focus on the need for culturally responsive ESL teacher training programs and materials.

In her dissertation, Guan (2014) provided a mixed-methods study investigating the effects of explicit listening strategy instruction on community college ESL learner's listening comprehension. Data sources in Guan's study included interviews, a listening test, background surveys, and classroom observations. Fidty-two community college ESL learners participated in her research divided into a treatment group and a control group. After the strategy instruction, Guan's study showed a positive effect on students' listening abilities and other areas as a result of the listening strategies which was the result of the explicit teaching of listening strategies on community college ESL students' listening comprehension.

Wyman (2015) created a handbook for ESL teachers identifying a few important language learning strategies for English learners' learning, retention, and comprehension at the college of Alameda in Northern California. The author based her project on Flavell's Metacognitive Model (1979) and strategy-based instruction theory. Wyman's (2015) handbook is limited to beginning-to-intermediate level students and written for the

ESL teacher in a friendly non-academic format. Her handbook accompanies short, specific techniques to integrate teaching these skills *within the existing syllabus of the teacher's ESL class*.

The effective teaching techniques and study strategies for English language learners in ESL community college classes were investigated by Steiner (2018). A handbook was designed as a resource of common challenges in the ESL classroom such as diverse needs, low literacy levels, building academic rigor and vocabulary, communicative language teaching, increase engagement and a sense of community, and teaching strategies and habits to promote the transfer of learning and retention of information. In this handbook by Steiner (2018), which is a basic overview of second language acquisition, important approaches to teaching English models for vocabulary, and ways to build fluency in the areas of reading, writing, listening, and speaking were provided.

Alghamdi (2019) studied exploring how foreign language learners learn vocabulary in ESL in an advanced ESL reading class at Edmonds Community College in Lynnwood, WA. This researcher used a questionnaire to investigate the students' vocabulary learning methods. The results of the study showed that ESL learners learn more vocabulary from reading classes by engaging in group work activities.

Sanchez & Pulles (2019) provided a thorough perspective entitled "English as a Second Language in California's Community Colleges". These scholars noted that California's community colleges are accessible and affordable for ESL learners. According to Sanchez & Pulles (2019), there are many motivations for ESL learners to learn English, economy benefits for ESL learners, and the important role ESL programs

play in facilitating social and economic mobility for non-native English speakers and their families. Community college ESL students are diverse mix of adults students who are immigrants with high school, college, or graduate degrees from their home countries, In the 2016–17 academic year alone, more than 58,000 students enrolled in one or more ESL courses at community colleges across the state (Sanchez & Pulles 2019). Some ESL students need to improve their English to progress toward associate degrees, career certificates, or transfers to four-year schools.

Sanchez & Pulles (2019) noted that "ESL programs are typically designed to teach a range of language skills – listening, speaking, reading, grammar, writing, vocabulary – at a variety of proficiency levels. Traditionally, each language skill was taught discretely in a standalone course. For example, a student might enroll concurrently in a reading course and a writing course, and the two courses would have largely unrelated content" (2019).

Raufman, et al. (2019) emphasized that the proportion of community college ESL students will continue to grow in the coming years. They stated very clearly that there is limited research on the outcomes of these English learners. In their research, Raufman, et al (2019), provide perspectives from the research literature on ESL assessment and placement, instructional delivery, and student identity.

Summary

Based on the purpose of the study, in this chapter three main literature themes were reviewed: (1) brain mechanism in the creation of memory; (2) expanding on elements of the conceptual framework; and (3) significance of community college context in English teaching and learning.

In the first section on *brain mechanism in the creation of memory*, where related studies were covered, the authors indicate how memory processing tends to involve the way L2 learners assimilate, restore and retrieve information. These procedures can be taken into consideration in L2 vocabulary instruction. In addition, second language learning activities that make learners construct maps, graphs, and charts, representing the semantic relatedness of words and concepts may facilitate and increase their language learning outcomes. The author of this study believes that discussion, sharing, and use of words are crucial components of active involvement in L2 vocabulary development. Moreover, the aforesaid studies assert the importance of verbal reports in second or foreign language learning as a memory activation and language attention raising procedure that may lead to language storage, retention and an increase in second language vocabulary development.

In the second section of this chapter, *the expanding on elements of the conceptual framework* – cognitive, metacognitive and social cultural theories – were explained, and different studies related to second language vocabulary learning and teaching were covered. The present study aimed to indicate that activation of working memory can help students obtain, retain, recall and use new vocabulary in their speaking and writing. The author of this study had decided to use the cognitive theory of multimedia learning as a theory for the development of ESL vocabulary. Mayer's (2005, 2014) cognitive theory of multimedia learning states that people have separate channels for processing verbal and visual material. Learners can process only a finite amount of information in a channel at a time. Meaningful learning occurs when learners engage in appropriate cognitive processing during learning. Learners thus are able to make sense of incoming information

by actively creating mental representations. Mayer (2001) also discusses the role of three memory stores: sensory, which receives stimuli and stores it for a very short time; working, where we actively process information to create mental constructs (or "schema"); and long-term, being the repository of all things learned. Schmitt (2010) also mentioned that at the initial stage of vocabulary learning the forming of meaning and links between words are the primary aspect of vocabulary knowledge. This researcher also agrees with Nation (2001) that students should know the form of a word in the spoken and written form. They should also know the meaning and the use of words.

In this study, specifically, the author was interested to infer whether or not the application of the cognitive theory of multimedia learning principles had an effect on the vocabulary retention and recollection of the students or not.

As discussed, and illustrated in previous studies, most of the research on metacognition focused on learning strategies as one of the important language skills. Most of the previous studies also focused on metacognition strategies for reading and listening which are receptive language skills. The number of studies centering language productive skills such as speaking and listening is rare.

To the best knowledge of the researcher and based on the previous studies, there is a wellspring of vocabulary instruction methodology focusing on metacognitive techniques for use by language instructors in the classroom. There is no doubt that metacognitive strategies have been emphasized by many researchers such as O'Malley, Chamot, Stewner-Mazanares, Russo & Kupper (1985, p. 561). According to these scholars "students without metacognitive approaches are essentially learners without direction or opportunity to review their progress, accomplishment, and future directions."

As a result, more attention should be paid to finding whether explicit metacognition techniques to teach second language vocabulary can help adult language learners to process, retain, recall and use new vocabulary in their speaking and writing.

Because metacognition has been considered an important component in successful learning as previous studies, it is critical to employ metacognitive techniques in the language classroom and determine how language learners can be taught to better apply their cognitive resources through metacognitive control while learning and using new vocabulary. In most of the above studies, the language learners are typically the main focus of the studies and overviews on metacognition but in this researcher's present dissertation, both the language learners and the language teachers were at the center of study since language teachers primarily rely on course textbooks.

In this study, the researcher introduced explicit metacognitive techniques to teach ESL vocabulary and explore the effectiveness of these techniques and their contribution to the improvement of students' vocabulary learning. Reviewing previous studies based on sociocultural theory of mind as well as second language acquisition in general, it has become obvious that the number of studies on second language vocabulary acquisition is limited. Further to this point, even while sociocultural theory in second language practice has been somewhat considered in the EFL setting, any such analyses remain distinctly infrequent in the ESL setting including particularly community colleges settings.

A considerable amount of studies has identified several components of sociocultural theory of mind related to second-language learning. However, little attention has been given to sociocultural factors such as empirical research for ESL community college students in regard to vocabulary and SCT techniques. With an

obvious need for further investigation on the effect of sociocultural theory in practice with ESL vocabulary instruction, the researcher of this study investigated the differential effects of techniques based on sociocultural theory for acquisition of second language vocabulary in a community college ESL setting.

Finally, in this chapter *the significant of community college context in English teaching and learning* as well as research related to ESL were addressed. Many students who attend community colleges are nontraditional students, whether first-generation college students, students of low socio-economic status, minorities, immigrants, students needing remedial help, older students desiring to upgrade their employment opportunities, and/or students with learning disabilities (Dougherty & Townsend, 2006). As these students pursue their goals in college, one of their primary challenges is activating newly learned ESL vocabulary in the interactional skills such of speaking and writing.

Based on the literature review, this study sought to investigate whether utilizing and interconnecting neurocognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance vocabulary acquisitions of ESL learners. The researcher's goal was to determine if these new vocabulary instruction methods can help the ESL students to recall and use new second language vocabulary effectively in their speaking and writing. The contribution of the present study was to teach these new vocabulary techniques in a community college ESL context and help ESL community college language learners transform their passive vocabulary into active vocabulary.

CHAPTER III

METHODOLOGY

Introduction

This study sought to investigate the effectiveness of new vocabulary instruction techniques based on neurocognitive, metacognitive and sociocultural theories on L2 learners' vocabulary learning with regard to transferring passive vocabulary to active vocabulary and long-term recalling. This research utilized a mixed design with quantitative and qualitative methods. The use of quantitative and qualitative methods together aid the development of a more comprehensive research analysis and allow the researcher to obtain a deeper understanding of the research problem than either approach on its own (Tashakkori & Teddlie, 2003a, 2003b; Venkatesh, Brown & Bala, 2013).

This chapter expands on the reasons behind my choice for this particular research design as well as all other related tools and methods.

Restatement of Purpose

The purpose of this mixed methods study was to investigate whether the inclusion of neurocognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance the vocabulary acquisition of community college adult ESL learners and thus help the ESL students to recall and use new vocabulary effectively in their speaking and writing. The main purpose of this study was to help ESL community college language learners transform their passive vocabulary into active vocabulary by using methods informed by neurocognitive, metacognitive and sociocultural concepts.

The research questions for this study are as follows:

1. How do community college ESL students exposed to neurocognitive, metacognitive and sociocultural vocabulary instruction techniques perform on vocabulary tests as compared to students exposed to existing/traditional vocabulary instructional methods?
2. How do teaching methods based on neurocognitive, metacognitive and sociocultural theories facilitate vocabulary acquisition of ESL learners at a community college in Northern California?
3. After engaging the community college ESL students with new techniques, how do they describe the effectiveness of that in mastering ESL vocabulary?

Both quantitative and qualitative data was collected in a consecutive order. The researcher developed and provided explicit instruction of vocabulary techniques based on neurocognitive, metacognitive and sociocultural theories. Pre- and post-tests were administered to examine whether explicit instruction of vocabulary techniques had an impact on ESL learners' vocabulary acquisition.

Research Design

This study employed a mixed method design which includes both quantitative and qualitative methods. As Johnson and Onwuegbuzie (2004) have stated, "The class of research where the researcher mixes or combines quantitative and or qualitative research techniques, methods, approaches, concepts, or language into a single study" (p. 17). The benefit obtained in using mixed method research as opposed to the single method approach in a study was that this methodology provided an opportunity for a researcher to examine the research questions through one research method lens (*e.g.*, quantitative

research method) and complement the findings with another (*e.g*., qualitative research method) (Venkatesh et al., 2013; Teddlie & Tashakkori, 2009).

According to Venkatesh *et al*. (2013) and Teddlie & Tashakkori (2009), the advantage of using mixed method research over a single method approach is that the mixed method provides an opportunity for a researcher to examine the research questions first through one of the research method lenses like the quantitative research method and then complement the findings with the qualitative research method.

Employing mixed methods provided the author of this study with new insight and strong interpretations of the result of the vocabulary instruction. According to Yeasmin & Rahman (2012), the use of findings from both the quantitative and the qualitative data have been shown to increase validity of both the quantitative and the qualitative findings and improve both the internal consistency and generalizability of the results.

Research Setting

This study was conducted in a community college in northern California (hereinafter referred to as the "Community College"). The Community College ESL program is designed to help non-native English speakers to learn English to communicate effectively in order to access degree or transfer programs, academic programs, and vocational programs to be prepared for employment. According to Rodriguez et al. (2019):

> Community college ESL programs serve a large and diverse mix of students, including young adults who attended California's K–12 schools, immigrants with high school, college, or graduate degrees from their home countries, and working-age immigrants in California's labor force. Some ESL students need to improve their English in order to progress toward associate degrees, career certificates, or transfers to four-year schools. Others enroll in ESL for personal reasons or to improve their job prospects. (p. 5)

Based on the Community College Review (2020**),** 5,712 students are enrolled in the Community College where the present research was conducted. Fifteen percent of the students at the Community College are currently full-time in the year of 2020. The student body's minority enrollment is 87%, including students of Asian, African-American and other backgrounds, which is above the California state average of 68%.

The Community College offers courses and programs that satisfy the transfer requirements of four-year colleges and universities. In addition, a range of vocational/technical programs prepares students for today's complex workplace. The ESL program serves non-native English speakers who need to learn sufficient English to communicate effectively and overcome their difficulties in reading, writing, speaking and understanding English.

As part of the admission process, the Community College requires all ESL course applicants to take the Combined English Language Skills Assessment (CELSA)[1] test and a locally validated test to evaluate the student's English grammar, vocabulary and reading skills. The CELSA test itself has 75 questions total. There is a writing test portion used for placement with a writing prompt for holistic grading purposes as provided by three proctors. To assess the student's listening and speaking level, there is also an oral interview with holistic grading assessed by one proctor.

[1] The CELSA test is an assessment tool used to evaluate the reading and comprehension as well as the grammatical ability of ESL students. CELSA is designed to assess high school, college, and adult ESL students in order to place the students into the appropriate ability level of multiple skill, grammar (structure), and reading ESL classes. CELSA assigns the student's skill level to one of seven ranges from low beginning to advanced plus. The test has seventy-five items including four-choice multiple choice test in the CLOZE format.

Each student's starting level is determined by the student's cumulative testing score. There are four levels of difficulty in the ESL program at the subject Community College, with the levels generally defined as follows regarding the CELSA placement score value:

1) High Beginning, advised for students with a CELSA placement score of 35-45;
2) Intermediate, advised for students with a CELSA placement score of 46-55;
3) High Intermediate, advised for students with a CELSA placement score 56-65; and
4) Advanced, for students with a CELSA placement score of 66 and over.

Participants

All participants in this study were ESL students from two high intermediate level reading and writing classes at the Community College in Northern California. Thirty-nine (39) students were enrolled in the Monday/Wednesday class, and twenty-six (26) students were enrolled in the Tuesday/Thursday class. The learning environment for the two sets of classes was the same, and both classes met in smart classrooms equipped with laptop connections, a smart board with touch screen, data projectors, speakers, and overhead transparency projectors. Both classes had the same weekly instructional time of 180 minutes, and they were taught by two different ESL instructors.

The original participants were composed of sixty five (65) high-intermediate level students, including thirty nine (39) students in the experimental group and twenty-six (26) students in the control group. The total number of participants was reduced to 51, with 27 in the experimental group and 24 in the control group, due to absences from

some instructional sessions and/or on the days of the pre-test and/or the post-test. Demographic data collected from participants included age, gender, educational level, first language, and number of languages that the student spoke. Among the 27 participants in the experimental group, the ages ranged from 18 to 65 years old, including 6 male students and 21 female students. The students' respective first languages included: Urdu, Arabic, Chinese, Amazigh, Dari, Mongolian, Farsi, Portuguese, Spanish, and Vietnamese.

On the other hand, there were 24 students in the control group, including 17 male and 7 female students. Students' ages ranged from 18 to 65 years old and their first languages included Arabic, Berber, Chinese, Korean, and Wolayta.

The researcher sought the consent of individual participants. The researcher also obtained permission from the Co-Chair of the Community College ESL Department in order to gain access to the research participants in accordance with the Community College's ethical policies in Northern California. The participants' identities are concealed and protected through the use of pseudonyms.

Protection of Human Subjects

Prior to visiting the ESL classes in the community college and collecting data, the researcher submitted an application for approval to conduct this research to the Institutional Review Board for the Protection of Human Subjects (IRBPHS). The application was submitted after formal approval of this doctoral dissertation proposal is obtained from the dissertation committee.

The researcher kept all data and records confidential. No individual identities will be used in any reports or publications resulting from the study. Participation in the study was voluntary, and signed consent forms from all participants were acquired.

Research Instruments (Vocabulary Instruction Techniques)

The author of this dissertation has proposed the four vocabulary instruction techniques: (1) the Pictorial-Auditory Technique; (2) the Multi-Sensory Drawing Technique; (3) the Circle Rotation Technique; and 4) the Storytelling Technique. The following section introduces each of these respective techniques.

The pictorial-auditory technique

The Pictorial-Auditory technique is a cognitive vocabulary teaching technique that presents a new word with visual tools (picture, video, or animation) along with the written form of the new word's definition and the oral pronunciation of the word. An example of the new word in the sentence relevant to the picture/video is provided as well. The Pictorial-Auditory technique is a multisensory technique which the researcher proposed as based on Mayer's (2014) cognitive theory of multimedia learning. The researcher believes that this technique may help language learners learn the target vocabulary deeper since learners may create meaningful connections between a word and a its relevant visual tool and process them actively in long-term memory.

In this technique, the researcher considered three principles. The first principle is the visual/pictorial and auditory/verbal principle. Based on Mayer (2014, 2005), humans have two separate information processing channels (auditory/verbal and visual/pictorial), the researcher proposed a Pictorial-Auditory technique with the auditory/verbal form of the target word in both the spoken and written word. Language learners may process this

information through the auditory/verbal by the ear, as well as through the visual/pictorial channel with pictures, videos and on-screen texts to process the information with their eyes.

The second principle that the researcher relied on through the Pictorial-Auditory technique is the temporal contiguity principle. This principle is designed to reduce extraneous overload of materials in a language learner's working memory. It suggests that learners can learn more deeply from learning tools when the text, audio, pictures, and video/animation are presented simultaneously rather than successively or sequentially (Mayer & Fiorella, 2014).

According to the cognitive theory of multimedia learning (Mayer, 2008), "learners must have corresponding words and images in working memory at the same time in order to make connections between them" (p. 764), meaning simultaneous presentation is expected to result in better learning than successive and separate presentation. Relying on the temporal contiguity principle, the researcher presented a new word and its definition as well as a sentence example all on one screen for the L2 learner. In other words, the researcher integrated the verbal and pictorial representations with each other and with relevant example in order to help language learners to activate their prior knowledge from their long-term memory and also to help them to eliminate the need to hold the information in working memory for a lengthy time. In general, to propose the Pictorial-Auditory technique the researcher drew on Mayer's Cognitive Theory of Multimedia Learning (2014). This technique may provide support for the effectiveness of simultaneous cognitive vocabulary instruction on L2 learners' vocabulary learning with regard to abilities of short and long-term word recall. In this

study, the researcher sought to justify that learners were more apt to recall vocabulary items when they had both verbal and visual formats available at the same time rather than one of these formats alone. The presence of these sources of information helped L2 learners to establish a direct mental connection between visual and verbal models in short-term memory, which in turn paved the way for effective retrieval of words stored in the long-term memory (*i.e.*, cognitive processes) (Mayer, 2014, 1997). Having two separate but interrelated verbal and visual systems allowed the learners to benefit even more if they received the target words through the verbal tools of text with audio as well as the visual tools of text with picture/video or animation.

The second principles of the Pictorial-Auditory technique based on Mayer (2005, 2014) and the temporal contiguity principle as set forth by Mayer & Fiorella (2014) justify the rationale for the application of a simultaneous Pictorial-Auditory technique in this research. In this study, the researcher employed the two modes of L2 vocabulary definition (text & spoken words) as along with a text example and picture or video/animation (text & picture) to present the target words to the L2 learners. It was assumed that L2 learners could learn the target words better and more effectively when presented in dual modes rather than through a single mode, because the use of both words and pictures allows the brain to process more information in working memory (Sweller, 2005), and it can be recalled from long-term memory when required.

The theoretical implication of the temporal contiguity principle for word learning in the Pictorial-Auditory technique was to reduce any overloading of the learners' cognitive capacity. The definitions and written forms, examples and pictures or video/animation clips were shown together, without keeping them separate. If L2 learners

were presented with the definitions of the target words before or after they heard the spoken words, they had to hold all of the relevant target words in the working memory until the spoken words were presented resulting in the task overloading students' working memories.

The multi-sensory drawing technique

The researcher proposed the Multi-Sensory Drawing technique as an integrated technique to teach new vocabulary to second language learners. This technique is a combination of neurocognitive, metacognitive and sociocultural techniques. The research has named the technique "Multi-Sensory Drawing" because it helps the language learner to process information using several senses. The researcher of this study created this multisensory technique to design an experiment in which participants encode words by visualizing and drawing a picture in their mind. The researcher sought to investigate if the participants' engagement in mental image drawing would result in the best recall performance.

This vocabulary instruction technique consists of several steps. In the first step, limited new vocabulary is presented to the language learners by using pictures or video/animation as well as the definition and sentence examples. After making sure that language learners learned the meaning of the new vocabulary items, the instructor then can distribute that vocabulary list as a handout with definitions to the students. At this point, student are expected to work individually and internalize the new vocabulary. Every student may have different strategies to process the information and internalize the list of new vocabulary.

The next step is a mental picture-drawing exercise in which the instructor can pair the language learners and have them close their eyes and draw a picture of each word one-by-one while pronouncing it aloud. The significance of this step is the process of pronouncing the word with closed eyes while drawing. Therefore, this activity is conducted with the eyes closed in order to enforce the mental connection between the hand and the mouth. The instructor should also certainly assure the students that learning the new vocabulary items is at the center of this technique and *not* the quality of their drawing.

After each student has completed the mental-image drawing of each of the newly learned words one-by-one as the second step, for the third step the language learners may open their eyes and say what they just drew. Then the students should write down each new word next to their drawings and ask their partner to read it. This step should be repeated for the other member in each group.

Fernandes, *et al*. (2018) in their research "The Surprisingly Powerful Influence of Drawing on Memory", showed that drawing a picture can boost memory learning and recall processes. Based on theoretical reasons, the researcher of this dissertation believes that the Multi-Sensory Drawing technique helps students to remember new vocabulary words. Fernandes, et al. (2018) showed that drawing is an effective way to remember words because it helps the student to process information in multiple ways: visually, kinesthetically, and semantically.

In this technique the benefits of drawing may be due to the additional motor component of moving a pencil, and the elaborate process that occurs when creating and drawing an original picture. Having a mental picture with closed eyes and moving a

pencil to draw a word's picture is an interconnected sensory technique that links hand movement and speech throughout the process of speech production. Based on the Multi-Sensory Drawing technique, the hand movement and speech will co-occur during production. According to Iverson & Thelen (1999), there is "converging evidence of links between language and movement at the neural level." Neurophysiology and neuropsychology research has shown that some language and motor functions share underlying brain mechanisms, *e.g.*, motor cortex, premotor area, and cerebellum. These mechanisms are involved in language tasks, and more importantly, the classical "language areas" such as Broca's area are activated during motor tasks. Iverson & Thelen (1999) argued in their research that there is also some indication that the hands and arms and the vocal tract may be represented in neighboring sites in certain brain regions. These findings point strongly to connections between the cerebellum and classical "language areas" such as Broca's area. Indeed, such connections have been identified anatomically (Leiner *et al*., 1989; 1993).

In their research, Iverson & Thelen (1999) found that the systems of movement for mouth and for hand cannot be separated from one another and are intimately linked in the production of language, the pinnacle of human cognition. Based on the above research's findings, the author of this dissertation also suggests that drawing can result in better vocabulary recall because of the way that the information is encoded in memory. When a student draws a concept image, the student is required to elaborate on the item's meaning and semantic features. The student must engage in the actual hand movements which are needed for drawing as a motor action as well as visually inspect the pictorial processing. Therefore, when language learners draw a word, they encode the memory

effectively by processing vocabulary learning with the visual memory of the image, the kinesthetic memory of their hand drawing the mind's image, and the semantic memory's engagement as to the meaning of the word's concept. This rich connection increases the ability to recall this new vocabulary item.

The author of this dissertation believes that the proposed Multi-Sensory Drawing technique is a reliable vocabulary instruction technique which provides a significant boost to ESL learners' ability to remember the vocabulary and use it in their speaking and writing. Multi-sensory drawing techniques can be considered as a sociocultural technique since for the very last step, the instructor has each language learner share their newly learned vocabulary with their partner. The core premise of this sociocultural theory is that social interactions compel learning and cognitive development including language capabilities. As one illustration, Lantolf and Thorne contend that "while human neurobiology is a necessary condition for higher-order thinking, the most important forms of human cognitive activity develop through interaction within social and material environments" (Lantolf & Thorne, 2006a, p.2001).

The researcher also believes that the Multi-Sensory Drawing technique is a metacognitive technique since it gets language learners to listen and cooperate with each other. According to Paris *et al*. (1990; 1991) cooperative learning through such metacognitive exchange will lead to discussion and interaction between students in a shared learning environment. It provides opportunities to reduce anxiety and provide positive support among peers.

Through the technique of Multi-Sensory Drawing, the language learner may observe their peer's actions of drawing and pronouncing the new vocabulary. This is a

practice which includes both scaffolding and private speech used in intervention for the assistance of learners as based on sociocultural theory. Through this technique, a language learner can achieve targeted goals by scaffolding while interacting with others; at the same time, through inner speech the learner manages thought regulation.

The circle rotation technique

The Circle Rotation technique is a combination of neurocognitive, metacognitive and social cultural techniques aimed at assisting the language learner to recall new vocabulary and activate the learner in speaking and writing. The instructor may teach the vocabulary through the Pictorial-Auditory technique and assure that the language learner has been familiarized with the new words and concepts, and then the instructor may have each student write one of the new vocabulary items on a piece of paper. The next step is to divide the class into two groups and have them stand in an oval shape facing each other. Each student should use that word in a sentence or a short conversation with the student they are facing so that the two students facing each other use their word in at least one sentence. Then students rotate to the right and repeat the process with the new student they are facing. This step should be repeated until everyone has returned back to their original partner. The last step is to have each student give the piece of paper with the word to the student on their left to use them in a following interaction. This step can be repeated until all students receive and use all of the new vocabulary.

The role of the instructor in the Circle Rotation technique is to make sure that language learners use and demonstrate different sentences as examples of the particular words. The researcher proposed the Circle Rotation technique as a neurocognitive, metacognitive and sociocultural technique given that through this technique language

learners have the opportunity to obtain, rehearse and recall the new vocabulary items with both verbal and written formats available at the same time rather than one of these formats alone. The presence of these sources of information helped L2 learners to establish a direct mental connection between written and verbal models in short-term memory and to facilitate a way for effective retrieval of words stored in long-term memory.

Cook and Mayer (1983) classified vocabulary learning into two categories: *determination* and *consolidation* strategies. The determination strategy comprises discovering a word's meaning based on background knowledge, contextual clues and/or reference materials which aid in reaching a solution to figure out the word and/or asking someone else, while the consolidation strategy functions as an aid to remember the meaning of a word through social, memory, and metacognitive processes.

The storytelling technique

The Storytelling technique is based on creativity and association. The instructor first teaches the new vocabulary through the Pictorial-Auditory technique in order to ascertain that the language learner has become familiar with each new vocabulary concept. The instructor can then put students into two or three member groups and have each group write a story using the new vocabulary. In the next step, the student groups can practice and share their story with the entire class. The researcher believes that storytelling is an ideal teaching and learning tool, for it takes seriously the need for students to make sense through experience, using their own culturally generated means. Storytelling also has the capacity to support and enhance the relationship between the students so as to create new knowledge and learn from others. In addition, sharing and

reflectively processing stories provides students with opportunities to develop authentic relationships with their peers.

Storytelling offers a good benefit for use in the teaching-learning process. As stated by Ismawati (2011), storytelling is an excellent teaching technique because stories help a student create vivid mental images and activate the student's thinking process. It allows the learners to activate their imagination about the new vocabulary which they have already learned and to help them to come to terms with the new vocabulary items using their own feelings.

The Storytelling technique has many benefits for vocabulary learning because of the level of active engagement which it creates for the student. With this technique students can use new vocabulary to create and write a story and then the student can tell their stories in front of the class. In this manner the student will get used to talking in front of the public and also be able to increase vocabulary through an understanding of the very meaning of the story. The proposed storytelling technique suggests scaffolding and/or collaboration and dialogic interaction provides useful tools for the language learners' prioritization of interactions as something meaningful that is shared between all members of the student group. This provides a recognizable benefit for the learner to practice the language through using it and investing in each other's abilities.

The Storytelling technique is also centered on the idea of ZPD, which provides a central component of sociocultural theory. ZPD connects the concept of a learner acquiring new knowledge of the second language with the assistance of the teacher or a person at the same level or slightly higher level of competence than that learner.

Through the Storytelling technique, a language learner is able to learn how to successfully implement metacognitive strategies in order to discover and recall the meaning of initially unfamiliar vocabulary items. Therefore, metacognitive techniques will provide a student the opportunity to independently identify the meaning of a word and apply that word appropriately in a variety of contexts. Storytelling is an explicit metacognitive practice in that the student becomes aware of the strengths and the weaknesses which are associated with any learning task -- here comprehending and using the new vocabulary words. The student is then better able to transfer and adapt this newly gained knowledge, identify any misunderstandings in the learning process, and effectively apply more advanced thinking skills by figuring out the meaning of initially unfamiliar words through the learned vocabulary strategies. (Dunning, Johnson, Ehrlinger, and Kruger 2003; Zohar and David 2009).

Data Collection Instruments

Data for this study was gathered through the following instruments: (a) a demographic information form; (b) a vocabulary pre-test; (c) a vocabulary post-test; (d) a questionnaire; and (e) a focus group semi-structured interview. Each instrument subsequently is described in detail.

Demographic information form for both quantitative and qualitative data

While different instruments were used to collect quantitative data separately from qualitative data, a demographic form was used for collecting both quantitative and qualitative data. The researcher observed two ESL classes at the community college and randomly chose one class as a control group and the other one as an experimental group.

Study participants were asked to fill in a demographic information form including their age, gender, educational level, first language, and how many other languages they know. The reason for collecting demographic information was to better understand the background of the participants when interpreting the data/findings. The form took five minutes for the participants to complete.

Quantitative data instruments

Quantitative data collected through pre-test and post-test for all participants (control and experimental groups).

Vocabulary pre-test and post-test

The researcher created a vocabulary test designed to include (a) productive recall vocabulary questions, and (b) recognition vocabulary questions.

Milton (2009) states that there are two categories for word knowledge: receptive/passive versus productive/active vocabulary knowledge. Receptive/passive word knowledge, by definition, refers to the words that are understood when heard or read, whereas a learner's productive/active word knowledge entails the words that need to be recalled when one is using them in speech or writing (Milton, 2009).

Nation (1990) and Read (2000) also agree that receptive word knowledge refers to the ability of the language learner to recognize and recall the meaning of a word, while the productive word knowledge refers to the ability of the learners to use the target words in speech or writing. Therefore, this study followed Milton's (2009) receptive and productive classification of vocabulary knowledge, as well as the definition proposed by Nation (1990) and Read (2000).

Webb (2005) states that employing both receptive and productive tests to gauge an aspect of word knowledge provides "a much more accurate assessment of the degree and type of learning that has occurred" (p. 50). The researcher named the combination of the measurement test as "productive" because the participants had to recall the target words from memory (Cabeza, Kapur, Craik, McIntosh, Houle, & Tulving, 1977) and write them in the spaces provided (for productive questions) and recognize the target words and choose them from the options given (for the multiple-choice productive recognition) (Laufer & Goldstein, 2004; Nation, 2001). Also, with regard to the *recognition* and *recall* categories, Read (2000) defines recognition as when "test-takers are presented with the target word and are asked to show that they understand its meaning" (pp. 155-156); whereas, in recall, "they are provided with some stimulus designed to elicit the target word from their memory" (p. 155). However, Nation (2001) believes that "a recognition vocabulary test format involves the use of choices …" while "a recall item requires the test-taker to provide the required form or meaning" (p. 359). To Nation (2001), multiple-choice productive recognition vocabulary tests "involve going from the meaning to the word form" (p. 359). Thus, based on Nation's (2001) category of a receptive recognition/productive recall vocabulary test type, this study used the term multiple choice recognition vocabulary format to require the recognition of the word form in the options provided. Recognition tests may be designed in a contextualized format, with written context in the form of a sentence, or in a decontextualized format, with content out of context or in isolation (Öztürk, 2007).

In this study, vocabulary tests were bonded into the category of receptive and productive word knowledge which is meaning tests measuring L2 learners' ability to recognize and recall the target words.

Productive recall vocabulary pre- and post-test

Production vocabulary tests are more challenging for FL/L2 learners compared to recognition word tests (Nation, 2001). One common recall vocabulary test is in the definition-stem format, where the learners are asked to either provide the definition of a target word or recall it based on its definition in the stem (Öztürk, 2007). The productive recall test has two parts. The first part of the productive recall test is designed to get the language learners to recall a word based on the word's definitions because the purpose of this research is to help ESL students to recall newly learned vocabulary in their writing and speaking. The researcher designed the first part of the Productive Recall vocabulary test, for example shown as follows:

Example: A person who is present at an event or incident but does not take part

B _____ (n) (*Response*: Bystander)

The second part of the Productive Recall test required matching each word with its correct definition from the list of definitions presented in a cumulative format. The test contained 38 word-item questions (See Appendices C).

Recognition vocabulary pre- & post-test

The researcher created a Recognition Vocabulary test also containing two parts. The first part of the Recognition Vocabulary test was prepared as multiple-choice questions. For this segment, the student participants were required to complete a sentence contained one blank word by choosing the correct alternative from a group of four items.

The multiple-choice recognition vocabulary test segment is prepared in a decontextualized format, where "the word is removed from its message context" (Nation, 2013, p. 103). The second part of the Recognition Vocabulary test was in the "fill in the blanks" format, whereby the participants were required to fill in each blank with a choice from the cumulative vocabulary as provided in a word box. The test contained 38 word-item questions (See Appendices E).

The vocabulary measurement tool (both productive recall and recognition questions) were based on the chosen target words from the Community College's ESL textbooks. The purpose of the pre-test was to ascertain that the participants are not familiar with the target words. The reason to administer the same test as the pre-test was to determine the amount of vocabulary the participants were able to recall after the vocabulary instructions a few weeks later.

The two tests were administered in pencil-and paper format. Timing for each pre-test and post-test was around 40 minutes.

Scoring criteria

The scoring criteria used for the productive test portion of the present research at the subject Community College was as follows: null (0) for wrong, blank, or incomprehensible responses; one full credit (1) for a generally correct response (such as including minor misspellings or the substitution of one letter for another so long as it did not distort the meaning). The justification for this scoring criterion was based on Peters (2014), Türk and Erçetin (2014), and Al-Seghayer (2001), whereby Peters (2014) scored all the post-test productive vocabulary tests dichotomously. Also, similar to the productive test, the scoring procedure for recognition test was as follows: null (0) for

each incorrect response; and full credit (1) for the correct response (*see, e.g.*, Perez et al., 2014).

Target word selection

The selection of 38 target words for classroom vocabulary instruction in accord with neurocognitive, metacognitive and sociocultural techniques was based on the following criteria.

The target words were selected from the target Community College's writing and reading class materials of the High Intermediate level. The selected words were principally apportioned among nominal, adjectival, verbal, and adverbial forms; and between words with an abstract meaning or a concrete meaning. The researcher provided English definitions for the target words from (a) *Dictionary*.comi2020 – the world's leading online source for English definitions, synonyms, word origins and etymologies, audio pronunciations, and example sentences, as well as (b) the Cambridge Advanced Learners' Dictionary (2013, 4th edition), (c) the Oxford Learner's Dictionaries online, and (d) Babylon Version 7 (*See* Word Definitions in Appendix I). These dictionaries offered concise, clear, and simple definitions for the words with several sentence examples. The definitions were reviewed by three native English speakers for further assurance of appropriate level and length to determine a participant's potential ability to understand (or not) the word meanings accurately and clearly enough for the High Intermediate level. The video/animation clips were selected from animation websites such as YouTube (www.youtube.com).

Participants' privacy identification and coding

With the cooperation of the Community College ESL instructors, the researcher identified each participant by using a specific coding number randomly assigned to each individual participant. In order to ensure the privacy of each participant, the test sheets were numbered by the researcher so as to match the particular number of each test sheet with the number on the actual class list. In the implementation of the vocabulary test, each participant was given a number based on the order on the class enrollment list. When the instructor called each name, the researcher handed the test sheet which corresponded with the assigned list number. After finishing the productive test, the researcher replaced it with the recognition test portion. For the recognition test, each participant had the same number based on the class list order number.

Qualitative Data Sources

Questionnaire

The questionnaire include nine open and close-ended questions such as rating questions and open-ended questions. As for the four rating questions, the participants were asked to rate the degree of helpfulness of the vocabulary instructions in the 5-point Likert questions, with 1 being strongly agree and 5 strongly disagree (*i.e.*, 1 = strongly agree; 2 = agree; 3 = neither agree nor disagree; 4 = disagree; 5 = strongly disagree). In addition to the previous questions, the other four follow-up open-ended questions sought the participants' opinions on the type(s) of vocabulary techniques they received that may have assisted them to learn and remember the target words. The purpose of the questionnaire was to ask the experimental group's opinions on effectiveness of the

vocabulary instructions and the type(s) of vocabulary techniques that they found helpful to learn and remember the target words.

Semi-structured focus group interview

Interviews are prominent data gathering methods in qualitative research in as much as they access "people's perceptions, definitions of situations and constructions of reality" (Punch, 2011, p. 144). Interviews also have great flexibility for use in a variety of research situations (Punch, 2011) and can yield in-depth responses about people's experiences, perceptions, opinions, feelings, and knowledge (Fontana & Frey, 2005; Patton, 2002). In general, interviews provide an opportunity for researchers to obtain crucial data which the researcher might not have been able to obtain from observation alone (Gay, Mills, & Airasian, 2009; Patton, 2002).

However, in the present study, the focus group interview was used as a complement for supporting the findings of the quantitative stage of data analysis. The researcher followed Fontana and Frey's (2005, 1994) category of interviewing, and the researcher used a semi-structured interview guide to gather information about participants' experience of learning and recalling new vocabulary techniques based on cognitive, metacognitive and sociocultural theories. The researcher asked seven open ended questions. The researcher asked additional follow-up questions as well.

Expert Panel Review

In order to verify the validity of this form of mixed method research, the researcher assembled an expert panel review for the data instrument in order to assess the content validity for pre-test, post-test, questionnaire and focus group interview question segments. Dr. Didem Ekici and Professor Brian Ng agreed to serve as my dissertation

expert panel members. The expert panel members both teachers for Teaching English as Second/Foreign Language (ESL/EFL) at a community college in the Bay Area and are experts in the field. This researcher contacted the proposed expert panel through e-mail and by telephone and requested their assistance and solicited their expertise as reviewers for this study.

This researcher requested detailed responses concerning clarity, relevance, and quality of items. The reviewers were provided with a letter explaining the intent of the study as well as the process of framing questionnaires and the measurement scale. Indeed, several items were revised through their commentary as well as several new items added. Items were rewritten due to feedback concerning the design of items rather than content. The expert panel reviewed and evaluated each item of the research instruments for content validity, linguistic sensitivity, and cultural relevance.

Data Collection Process and Timeline

This study is comprised of several stages in order to collect data for quantitative and qualitative methods.

Quantitative data collection process and timeline

Observation and selection of target words (Week 1)

The researcher observed the two ESL classes in which participants were studying at the intermediate levels. After assessment of the two classes, one class was determined as the control group and the other one as the experimental group. At this stage, the researcher selected target ESL vocabulary from the Community College's ESL materials and books.

Pre-Instructional session (Week 2)

One week prior to the vocabulary instruction, participants in both the control and the experimental group were given a consent/agreement form to sign. The purpose of the consent form was to ensure that the participants agree to participate in the study voluntarily. The estimated time to complete the form was five minutes. In this stage participants also filled out the demographic information form; the participants then were asked to take pre-tests. The pre-tests required 40 minutes for completion.

Instructional sessions (Week 3, Week 4 & Week 5)

The vocabulary instruction techniques and materials, created as discussed based on neurocognitive, metacognitive and sociocultural theories, then became a part of vocabulary instruction over three weeks in six consecutive sessions. Each of the instruction sessions lasted 30 minutes, with the length of the instruction totaling 180 minutes for the experimental group. The number of individual vocabulary items was 38 in total. In each of the six instruction sessions, six to seven vocabulary items were taught. The target words remained the same for both the control group and the experimental group.

The control group. The control group received regular vocabulary instruction from the class instructor. The following describes in detail the method that the instructor for the control group used in each of the six sessions. The instructor of the control group class divided the number of the target words from the total vocabulary list into six sessions. This way, the students had six or seven vocabulary items to learn in each class. The instructor introduced words in each class by giving the definitions and the pronunciation of each word. The instructor also confirmed the understanding of each

control group by asking them if there were any words for which they were uncertain about meaning. Students were expected to internalize the meaning of the words by the time of the upcoming class. In the next session, the participants were given the vocabulary exercise for which they were required to fill in the blanks with the suitable words. Then the instructor paired the participants together and had them discuss their answers. The instructor checked in with each group to ascertain that their answers to the vocabulary exercises were correct. All the definition and sentence examples were taken from an authentic source or from a dictionary.

The experimental group. On the other hand, the researcher of this study went about teaching the same new vocabulary items to the experimental group class through the course of the six sessions. The class ESL instructor had provided 30 minutes time in each of the six sessions to the researcher in order to teach this new vocabulary to the experimental group. The researcher used the Pictorial-Auditory technique as a primary technique in all six sessions, which were formatted through the Adobe Spark page. According to the web page of Adobe Spark, the Adobe Spark system provides an integrated web interface enabling instructors to create and share visual stories. Through the Adobe Spark page, teachers are able to bring words and images together to format these visual stories. Adobe Spark is available for use as an educational tool that gives visual selection options from online images, allowing for text to then be added on the same screen. In this study, the researcher used Adobe Spark to create the vocabulary lesson plan in order to teach new vocabulary to ESL community college students.

Other proposed vocabulary instruction techniques were used in each of the instructional sessions as well. The following describes each instructional session for the experimental group.

Instructional session one. In the first part of the Instructional Session, vocabulary was taught according to the Pictorial-Auditory technique in presenting new words through Adobe Spark using visual tools (picture, video, or animation) along with the written form of the new word's definition and the oral pronunciation of the word. An example of the new word in a sentence relevant to the picture/video is provided as well (See Appendices G).

While teaching each new word to the experimental group, the researcher requested that three participants (at the least) bring in one example of each new word. The researcher then distributed the vocabulary list to the students as a handout with each new word's definition. At this point, the participants were required to work individually and internalize the new vocabulary item by associating the new word with their previous known words, by making a short story with it, or by using another strategy.

For the rest of the session, the researcher applied the Multi-Sensory Drawing techniques in which the researcher paired the participants together and had the first person in each group close his/her eyes and draw a picture of each word one-by-one while pronouncing it aloud. In this step the participants had to pronounce the word with closed eyes while drawing. In the next step the participants could open their eyes and say what they just drew. Then the participants had to write down each new word next to their drawings and asked their partner to read it. This step repeated for the other member in each group (See Appendices H).

Instructional session two. In this session vocabulary items were taught first in accord with the Pictorial-Auditory technique. After the researcher confirmed that the participants had a good understanding of the meaning of this Second Session's words, the researcher applied the Storytelling techniques. The researcher put the participants into three-member groups designed so that each group would write a story using the new vocabulary items. In the next step, the participants could then practice and share their story with their group, followed by one in each group voluntarily sharing their story with the entire class (See Appendices H).

Instructional session three. In this session, the researcher again started the vocabulary instruction by the Pictorial-Auditory technique.

After conveying the meaning and concept of all vocabulary items, the researcher employed the Circle Rotation technique by which each student was to write one of the new vocabulary items on a piece of paper. For the Circle Rotation, the next step was to divide the class into groups (two groups of six to eight from the subject class) and have the members of each group stand in an oval shape facing each other. Each student had to use the word in a sentence or a short conversation with the student whom they faced. In that manner, the two students facing each other used their word in at least one sentence each. Then students rotated to the right and repeated the process with the new student whom they were facing. This step repeated until everyone had returned back to their original partner.

The last step was to have each student give the piece of paper with the word to the student on the left to use in a following interaction. This step repeated until all students receive and used each item of the new vocabulary.

Instructional session four. In this session, the researcher first reviewed all vocabulary which had been in use from Sessions One to Three before teaching the new words. To engage the participants in vocabulary review, the researcher divided student into four groups and gave each group a number.

The researcher prepared four slides in PowerPoint format which included the vocabulary from Sessions One to Three. With using the "Animations" feature of PowerPoint each word's definition appeared on the screen first, then participants had to say the word related to that definition. If the answer was correct, the researcher made the word appear on the screen. Group one was asked to answer all vocabulary on Slide One. If the group was correct, their team would earn one point. If incorrect, the other groups had a chance to earn that point. This vocabulary interview game in a circular fashion repeated around Group Two, Three and Four. At the end, the group with the most points won.

After reviewing the previous vocabulary items, for the rest of Session Four the researcher taught new vocabulary through the Pictorial-Auditory technique.

For the rest of this session, the instructor applied Multi-Sensory Drawing techniques. The vocabulary techniques employed in this Session Four were completely on par with those of Session One; however, of course a different, new vocabulary selection had been taught under Session Four.

Instructional session five. Like the previous session, the researcher used the Pictorial-Auditory technique to teach new vocabulary. After the researcher taught the new words introduced in this session's presentation, the researcher applied Storytelling techniques very similar to Session Two.

Instructional session six. Since this session was the last instruction session, the researcher first reviewed the vocabulary of Sessions Four and Five by engaging each student participant in the competition game (*see* Session Four review activity). After reviewing that previous vocabulary, the researcher taught the new vocabulary using the Pictorial-Auditory technique followed by the Circle Rotation technique in accord with Session Three.

Delayed post-tests (Week 6-7)

The interval between the last instructional session and the post-tests was two weeks.

Post-instructional session (Week 8)

Two weeks after the instruction, the participants in both groups performed the post-test. The purpose of this post-test was to measure the long-term targeted word recall for both the control group and the experimental group.

Qualitative data collection process and timeline

After collecting the quantitative data, the researcher had planned to collect qualitative data over the next session; however, at that time the emerging spread of the Covid-19 virus strain and the proclamation of a global pandemic severely countered the plans as arranged. The proclamation of a shelter in place ordinance took place for the six Northern California Bay including Alameda County, forcing institutions to close their campuses and convert all in-person classes to online formats. Therefore, the researcher set about collecting the qualitative data virtually. The interval between quantitative data collection and qualitative data collection was approximately one month in length.

Questionnaire

The questionnaire was prepared through *Qualtrics*, a web-based software program for researchers to create surveys and generate reports. This platform enables individuals to do surveys, feedback and polls using a variety of distribution means. *Qualtrics* provides the survey results for viewing in reports. The questionnaire was distributed to the participants of the experimental group online. The ESL instructor put the link to the questionnaire in the students' canvas, and the participants volunteered to respond to the questions. Then all of the online questionnaires were saved anonymously in the researcher's *Qualtrics* account. The questionnaire included open- and close-ended rating questions.

Focus group interviews

The experimental group participants also attended a focus group interview virtually. The researcher met with the volunteers through *Zoom*, a video-conferencing platform that still allowed for conversations to take place.

The purpose of this semi-structured focus group interview was to ascertain which vocabulary techniques the participants preferred and why. The priority for participant selection was given to those who completely attended all the study phases including pre-test, instructional, and post-test sessions. From among the experimental participants, 11 participants were selected for the focus group interview in order to seek their opinions and get a sense of their experience with vocabulary learning over the course of the test period and whether it appeared to have been influenced, or in any way different, via the new vocabulary instruction techniques. The focus group interview was conducted in the

online class of the community college, and the interview length was approximately 30 minutes.

Data Analysis

Quantitative data analysis

This section introduces the overall statistical procedures used in order to analyze the quantitative data. As to the quantitative analysis of the research data, the test results have been collated on a univariate basis for descriptive statistics in preparation of the principal component analysis. The software used for the preparation of the data for analysis was the SPSS Software Version 24,[2] with relevant statistical data presented by tables and graphical figures. The test research questions were reviewed and analyzed under two comparisons on a between- and within-participant basis respectively. Data from pre- and post-achievement tests were collected. Furthermore, the number of the test items as well as the test contents were the same for both the pre-test and the post-test in order for a comparison of the vocabulary test scores from each student's pre-test to those from the subsequent post-test to provide an indication of each student's long-term word retention. The level of significance was set at an alpha level of .05. In order to investigate the impact of neurocognitive, metacognitive and social cultural vocabulary instructional techniques on ESL learners' vocabulary learning a 2 × 2 covariance analysis (*i.e.* two groups in the study × two tests), or split-plot ANOVA, of all the between-participant comparisons was run.

[2] The software package SPSS Statistics is a widely used for interactive, or batched, statistical analysis in social science as well as by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. *KDnuggets Annual Software Poll: Analytics/Data mining software used?*" (2013).

The current research analyzed the data set in sequential procedures, while measuring both between- and within-participant comparisons.

Between groups

This study compared the performance of the two groups of participants, *i.e.* the control group and the experimental group, on the post-test vocabulary test. The researcher investigated the issue as to whether different vocabulary instructions, *i.e*. traditional method versus the subject new vocabulary instruction techniques) had any positive impact on ESL students' vocabulary learning and recalling.

Within groups

This study measured the effectiveness of the vocabulary modes of instruction, both the traditional and the new techniques, across instructional sessions on ESL students' vocabulary learning in terms of long-term word recall. In other words, the control group's pre-test performance was compared to that group's post-test, and the pre-test performance of the experimental group as well was compared to that group's post-test.

From the quantitative perspective, data analysis procedures were in the form of descriptive statistics. Relevant statistical data was analyzed using SPSS version 24 and is presented through tables and graphical figures. As stated earlier in this chapter, two types of between- and within-participant comparisons were carried out to investigate the research questions; and data from pre- and post- tests were collected. Furthermore, the number of the test items as well as the test contents was the same for both the pre-test and post-test.

Variables

The independent variable (IV) in this study is neurocognitive, metacognitive and sociocultural vocabulary instruction techniques in a between-participant design.

There are four dependent variables (DVs) in this study. The dependent variables are:

1) Productive pre-test;
2) Productive post-test;
3) Recognition pre-test; and
4) Recognition post-test

This section discusses the rationale to conduct the statistical testing method of split-plot ANOVA for this research.

In accord with the present split-plot ANOVA-based assessment, normality of all data scores was confirmed and preliminary assumption testing was conducted. Each of the statistical analyses was conducted twice: initially for the productive vocabulary test; and then subsequently for the recognition vocabulary test.

Split-plot ANOVA (SPANOVA)

Split-plot ANOVA sometimes is referred as mixed factor ANOVA or mixed design ANOVA. It is a particular type of a two-way repeated measures ANOVA that has one independent variable as between the subjects (neurocognitive, metacognitive and sociocultural techniques) and another dependent variable as within the subjects (pretests and posttests). It is referred to as a mixed design because there is a mixing of a between subjects independent variable with a within subjects dependent variable. In the current study, between the subjects has one level, cognitive, metacognitive and sociocultural

vocabulary instructional techniques. On the other hand, within subject factors in this study has two levels, a pretest and a posttest.

Rationales to use split-plots

The rationale for using split-plot ANOVA (referred to as mixed ANOVA or "SPANOVA") in this study was based on the need for controlling initial pre-test differences, while also comparing the post-test scores across each of the two groups (*i.e.*, the control and the experimental groups). In order to measure the effect of neurocognitive, metacognitive and sociocultural techniques as to vocabulary long-term recall and recognition of the ESL student participants, a split-plot ANOVA was conducted to uncover whether there was any significant development – in transferring ESL learners' passive vocabulary to active vocabulary – taking place from the pre-test to the post-test time within any of the groups.

The split-plot analysis allowed the researcher to compare the growth of the control group to the growth of the experimental group. The split plot analysis results examined whether there was a difference in the growth between the two groups. The researcher initially checked on the split-plot ANOVA assumptions such as homogeneity of variances and inter-correlations. The split-plot ANOVA was also aimed to research whether the neurocognitive, metacognitive and sociocultural techniques have had any significant effect on L2 learners' vocabulary learning with regards to long-term word retention and recalling.

The assumptions of ANOVA

Conducting ANOVA as a parametric test required the fulfilment of a number of main assumptions pertinent to the analysis of this project. For the purposes of this study,

the following statistical assumptions were monitored: (a) the normality of data; (b) homogeneity of variances (Levene, 1960); and (c) homogeneity of regression slopes (Field, 2009; Pallant, 2013; Tabachnik & Fidell, 2007). As follows is brief explanation with regard to each of these items.

*Normality of data***.** This assumption verifies whether the population from which thesamples are taken is normally distributed around the means (Martin & Bridgmon, 2012; Field, 2009). Either one or both of two procedures is normally followed in order to check item normality. The first of the two procedures is to look at the values of skewness and kurtosis in the SPSS statistics package (*i.e.*, per descriptive tables). The usual reason to do this is to get an idea of whether the data is normally distributed. Looking at the graphed layout of the data distribution, skewness tells the amount and direction of skew, the term for departure from horizontal symmetry, and kurtosis tells how tall and sharp the central peak is, relative to a standard bell curve. One application is testing for normality: many statistics inferences require that a distribution be normal or nearly normal. A normal distribution has skewness and excess kurtosis of 0, so if your distribution is close to those values then it is probably close to normal.

The second of the two procedures is comparing the scores in the sample to a normally distributed set of scores with the same mean and standard deviation via the one sample Kolmogorov–Smirnov normality test (Field, 2009). In the present study, the normality of the data was assumed through both skewness and kurtosis ratios, and the Kolmogorov–Smirnov test.

With regard to the skewness and kurtosis ratios, the data was deemed normal where the ratios fitted between the range of ± 1.96, (Pallant, 2013; Field, 2009). With

regard to the second, Kolmogorov–Smirnov test assessment, if *p* value is greater than .05 (p > .05), then the data is normal (Field, 2009). Accordingly, with regard to the present study, the Kolmogorov–Smirnov test exhibited that all of the data were normal for the pre- and post-tests.

Levene's Test for homogeneity of variance. Levene's test is equivalent to a 1-way between-groups analysis of variance with the dependent variable being the absolute value of the difference between a score and the mean of the group to which the score belongs. The assumption was checked via Levene's Test (Levene, 1960). The specific purpose was to ascertain group homogeneity, that is, there being equal variances among the group in the subject distribution (Pallant, 2013) as well as throughout the data especially "in designs with several groups of participants" (Field, 2009, p. 150). In other words, each of these samples should come from populations with the same variance.

Levene's Test of homogeneity of variance was applied for between-participant comparisons in this study. For the homogeneity of variance to be assumed, the *p* value should be greater than .05 (p > .05) (Pallant, 2013; Field, 2009). In accord with Pallant, 2013, the alpha level was met in checking Levene's Test throughout the data analysis.

Independent sample t-test

The t-test was used to assess whether the means of two groups of the study were statistically different from one other. T-tests are useful for analyzing experiments or comparing levels of the Independent Variable. There are two types of the t-test described in the following:

- The paired-samples or related t-test (also known as the repeated-measures t-test) is used when the same participants in one group are assigned to the two

experimental conditions in pair at different time intervals (Field, 2013; Pallant, 2013).

- The independent t-test is used in a condition when there are two separate groups of individuals or cases in a between-participants design (for example, experimental versus control group). Based on University of Arizona Military Research (2009), cited by Gerald (2018), the independent sample t-test is used to compare two groups whose means are not dependent on one another.

According to Gerald (2018), an independent sample t-test determines whether there is a statistically significant difference in the mean scores for the two groups or not. In other words, the probability that the two sets of data came from the same population is tested. The independent sample t-test is useful when the participants in each group are independent from each other. In situations where there are two independent samples, like the one in the current study, and an independent sample is the sample in which the participants in each group are independent from each other. The independent samples t-test is used to compare two groups whose means are not dependent on one another.

Rationale to use independent sample t-test. The rationale to employ the independent sample t-test analysis in this study had to do with examining if neurocognitive, metacognitive and social cultural techniques were effective for ESL learners' vocabulary learning in terms of long-term word recall and retention. Thus, the performance of the control group and the experimental group was compared from the pre-tests to the post-tests. Since each group was compared separately on two different methods of vocabulary teaching, the independent samples t-test was applied as an appropriate technique of analysis for the participant comparison in this research.

Based on Gerald (2018), an independent sample is the sample in which the participants ineach group are independent from each other. In this study, the groups are independent from each other and comparison is between the control group which was taught vocabulary using traditional vocabulary teaching methods and the experimental group which was taught using cognitive, metacognitive and sociocultural techniques. In this study, the factor that differentiates the two groups is the teaching method. It is clear that the scores from the control group taught using traditional vocabulary teaching methods are *not* dependent on scores from the experimental group taught using neurocognitive, metacognitive and sociocultural techniques.

The assumption of paired samples t-tests. To analyze the data through the independent t-test, a researcher must first test the dependent variable by group for normality. Samuels (2015). In this study, the variances of the two groups' equality were checked and normality of the data was ascertained throughout the data analyses.

Qualitative data analysis

The qualitative perspectives of this study are further discussed with regard to the attitudes and perceptions of the subject ESL learner as to neurocognitive, metacognitive and sociocultural vocabulary techniques instruction via a questionnaire and focus group interviews.

As for the questionnaire, from the total of 27 participants in the experimental group only 17 participants answered the questions in the questionnaire as administered. The questionnaire responses were then analyzed to examine if learners' attitudes and perceptions regarding word learning, recalling and retention had been influenced through cognitive, metacognitive and sociocultural techniques. As for the focus group interviews,

11 participants volunteered to attend the focus group interview. The researcher audio-recorded the interviewees' discussions for further data analysis. The focus group interview was transcribed in full.

To code the data, the researcher has followed manual coding, extracting the themes which are recursively occurring throughout the document. The most frequent themes were coded and were kept for further analysis (inductive coding) (Brundrett & Rhodes, 2014; Miles, Huberman, & Saldaña, 2014). Then the researcher sub-categorized the themes in order to find the themes that were related to the research questions and to further clarify the findings of the quantitative part of this study.

Background of the Researcher

The researcher obtained a master's degree in Teaching Persian to Non-Persian Speakers from Allameh TabaTaba'I University, Tehran, Iran, where her research led to the investigation of second language learning and teaching obstacles from the perspective of both the language learner and the language teacher. The researcher worked as a language teacher for nearly seven years. Prior to the researcher's doctoral study in the United States, the researcher taught Farsi/Persian to international students at the University of Tehran, where the researcher was able to gain significant experience in the area of language teaching.

The researcher has published and presented several papers in national and international conferences related to second language acquisition, applied linguistics, sociolinguistics, cognitive and neurolinguistics and social justice. The researcher was a Graduate Visitor at University of California, San Francisco (UCSF), where the researcher undertook studies regarding bilingualism and brain aging issues. The researcher's current

scholastic research interests include: Multicultural Education & Cross-Cultural Linguistics, Linguistic Rights & Bilingualism, Applied Linguistics & Sociolinguistics and Neurolinguistics & Psycholinguistics.

The researcher's motive to conduct this study has been driven from her personal and professional experiences. As a former English learner, the researcher struggled to use English vocabulary learned in the classroom. Although having obtained a considerable amount of vocabulary, the researcher had difficulty to use new vocabulary simultaneously in interactions, specifically in writing and sin peaking. Later, as a language instructor, the researcher noticed the same issue among the students. Digging deeper into the methods of language instruction, the researcher realized that most of these methods only help students to learn and internalize the vocabulary while they lack techniques to help language learners transfer this passive vocabulary into active vocabulary. From the researcher point of view, language instruction methods mostly emphasize on one modality of vocabulary learning whereas they have not provided techniques to aid language learners to recall their vocabulary and use it efficiently in their writing and speaking. From the researcher's perspective, effective second language vocabulary learning does not happen only inside one's head, there are other aspects that should be taken into account. For the above reason, the author of this study is investigating the effect of new techniques based on neurocognitive, metacognitive and sociocultural theories in vocabulary learning.

CHAPTER IV

RESULTS

This study seeks to investigate the effectiveness of new vocabulary instruction techniques based on cognitive, metacognitive and sociocultural theories for a community college ESL learners' vocabulary training, with regard to transferring passive vocabulary to active vocabulary and long-term recall. This research utilizes a mixed design with quantitative and qualitative methods.

The purpose of this mixed methods study was to investigate whether the inclusion of cognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance the vocabulary acquisition of community college adult ESL learners and thus help the ESL students to recall and use new second language vocabulary effectively in their speaking and writing. The main purpose of this study is to help ESL community college language learners transform their passive vocabulary into active vocabulary by using methods informed by cognitive, metacognitive and sociocultural concepts.

This chapter presents the analysis of the results based on the two vocabulary measurement tools of productive recall and recognition tests as well as the questionnaire and semi-structured interview to address the research questions.

Quantitative Research Analysis

In order to analyze the quantitative data, split-plot ANOVA was run through SPSS Software Version 24 in order to compare the performance of the groups on vocabulary productive and recognition in the pre-test and post-test. The rational to select split-plot ANOVA for analyzing the present study's data was because it compares the mean difference between groups that have been split on two "factors" (known as

independent variables) -- the first being the "between subjects" factor (in this study, cognitive, metacognitive and sociocultural vocabulary instruction techniques) and the second being the "within-subjects' factor (the participants' performance from pre-test to post-test).

Results of Testing the Normality Assumption for Groups

Before analyzing the obtained data, the normality of the distribution of the groups' scores was ascertained by using Kolmogorov-Smirnov test (K-S test). The results of K-S test (Table 1) indicated a normal distribution of the scores for the groups since the *p* value exceeded .05.

Table 1

Kolmogorov-Smirnov Test on Distribution Score Normality

		Kolmogorov-Smirnov[a]		
Test	**Group**	**Statistic**	**df**	**Sig.**
Productive Pre-test	Control	0.137	24	.200*
	Experimental	0.128	27	.200*
Productive Post-test	Control	0.138	24	.200*
	Experimental	0.110	27	.200*
Recognition Pre-test	Control	0.147	24	0.192
	Experimental	0.155	27	0.094
Recognition Post-test	Control	0.092	24	.200*
	Experimental	0.166	27	0.054

After ensuring the normality of the distribution of data, split-plot ANOVA was run in order to examine the statistical significance of the difference in the mean scores of the groups.

Between-Group Comparison (Research Question One)

The following section addresses Question One of this study which is as follows:

1. How do community college ESL students exposed to cognitive, metacognitive and sociocultural vocabulary instruction techniques perform on a vocabulary test as compared to students exposed to traditional vocabulary instructional method?

The purpose of this comparison is to investigate if cognitive, metacognitive and sociocultural techniques were significantly effective for long-term vocabulary recall and retention of ESL learners across control and experimental groups (*i.e.,* between-participant comparison).

Productive test (between-group)

Table 2 presents the descriptive statistics of this comparison, including the means of the two groups on the productive vocabulary tests. To investigate the impact of cognitive, metacognitive and social cultural techniques on ESL learners' vocabulary recalling and retention, the performance of the two groups (control and experimental) is compared in the following.

Table 2

Descriptive Statistics; Groups

Test	Group	N	Mean	Std. Deviation	Std. Error Mean
Productive Pre-test	Control	24	3.71	2.216	0.452
	Experimental	27	3.37	2.467	0.475
Productive Post-test	Control	24	14.63	3.899	0.796
	Experimental	27	29.67	4.690	0.903

According to Table 2 for the productive post-test, the control group received lower mean scores (M=14.62, SD=3.899) while the experimental group received higher mean scores (M=29.67, SD=4.690). To compare the means of control group and the experimental group, Cohen's *d* results from the productive test scores were analyzed as well. Cohen's *d* and the effect size difference between these two groups was 3.489715. According to generally accepted guidelines, the norms for Cohen's *d* is: small= 0.2; medium= 0.5; large= 0.8. The analysis of this project indicates that the effect size of the post-test between the participating control and experimental groups is huge. This statistical significance means that the use of cognitive, metacognitive and sociocultural techniques helped ESL learners in the experimental group achieve significantly higher growth than those in the control group.

It is interesting to note that, according to Table 2, participants' mean scores in both groups (control and experimental) increased from the productive pre-test to the productive post-test. However, split-plot ANOVA was conducted to examine if the mean differences among the groups were statistically significant. In this analysis, the two groups formed one IV, the post-test scores formed one DV, and the initial pre-test scores

acted as a covariate. Split-plot ANOVA compared the participants' scores on the productive pre-test to the corresponding productive post-test. All ANOVA assumptions were also controlled. Findings of the split-plot ANOVA are demonstrated in Table 3.

Table 3

Split-Plot ANOVA Results on Productive Test for Between-Group Significant Differences

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	16764.871	1	16764.871	1326.789	0.000	0.964	1326.789	1.000
Group	1373.499	1	1373.499	108.700	0.000	0.689	108.700	1.000
Error	619.148	49	12.636					

The productive test scores of the control group and the experimental group were analyzed through split-plot ANOVA. Table 3 for the productive test score of the two groups yielded the following results: F = 108.700, $p < .001$, $\eta_p^2 = .689$. The norms for partial eta-squared is: small = 0.01; medium = 0.06; large = 0.14. The above F results indicate a high level of statistical significance.

Overall, the between-participant comparison (Table 3) revealed that the cognitive, metacognitive and sociocultural techniques were effective for ESL learners' long-term vocabulary retrieval and recall whereas the traditional method was less influential for ESL learners' long-term vocabulary retrieval and recall.

Recognition test (between-group)

The purpose of this comparison under the recognition vocabulary test was to investigate the growth of an experimental group exposed to cognitive, metacognitive and sociocultural vocabulary instruction techniques as compared to a control group instructed

under the traditional vocabulary teaching method. Table 4 presents the descriptive statistics of this comparison, including the means of the two groups on the recognition vocabulary test.

Table 4

Descriptive Statistics; Groups

Test	Group	N	Mean	Std. Deviation	Std. Error Mean
Recognition Pre-test	Control	24	6.63	1.689	0.345
	Experimental	27	5.78	2.225	0.428
Recognition Post-test	Control	24	26.75	3.662	0.748
	Experimental	27	33.19	3.089	0.594

According to Table 4, the control group received lower mean scores on the recognition post-test (M= 26.75, SD=3.662), as compared to experimental group (M= 33.19, SD=3.089). It is interesting to note that, according to Table 4 above, participants' mean scores in both the control group and the experimental group increased from the recognition pre-test to the recognition post-test. To compare the means of control group and the experimental group, Cohen's *d* results from the productive test scores were analyzed as well. Cohen's *d* and the effect size difference between these two groups was 1.90103. According to generally accepted guidelines the norms for Cohen's *d* is: small= 0.2; medium= 0.5; large= 0.8. The analysis of this project indicates that the effect size of the post-test between the participating control and experimental groups is remarkably large. This statistical significance means that the use of cognitive, metacognitive and sociocultural techniques helped ESL learners in the experimental group achieve significantly higher growth than those in the control group.

However, an inferential test of split-plot ANOVA was conducted to examine if the mean differences among the groups were statistically significant. Split-plot ANOVA compared the participants' scores on each recognition pre-test to the corresponding post-test across groups. In this analysis, groups formed one IV, the recognition post test scores formed one DV, and the initial pre-test scores acted as one covariate. All ANOVA assumptions were checked. Table 5 demonstrates the findings of the ANOVA results for this comparison.

Table 5

Split-Plot ANOVA Results on Recognition Test for Between-Group Significant Differences

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	33243.549	1	33243.549	4483.790	0.000	0.989	4483.790	1.000
Group	198.373	1	198.373	26.756	0.000	0.353	26.756	0.999
Error	363.294	49	7.414					

The recognition test scores of the control group and the experimental group were analyzed through split-plot ANOVA. Table 5 for recognition test scores of the two groups yielded the following results: F = 26.756, p <.001, η_p^2 = .353. The norms for partial eta-squared is: small = 0.01; medium = 0.06; large = 0.14. The above F results indicate a high level of statistical significance.

These results indicate a high level of statistical significance.

Overall, the between-participant comparison (Table 5) shows that the control and experimental groups were significantly different from each other on the recognition post-

test. In other words, results in Table 5 indicate that the cognitive, metacognitive and sociocultural techniques were effective for ESL learners' long-term vocabulary learning and retention in comparison to the traditional method.

Within-Group Comparison (Research Question Two)

The following section addresses Question Two of this study which is as follows:

2. How do teaching methods based on cognitive, metacognitive and sociocultural theories facilitate vocabulary acquisition of ESL learners at a community college in Northern California?

Productive test (within-group)

The purpose of this comparison was to investigate the Community College ESL learners' long-term vocabulary retrieval and recall. In this analysis, the productive pre-test score was compared to the productive post-test score, with each group compared separately from each other (*i.e.*, within-participant comparison) across the two test sessions (productive pre-and post- tests). Table 6 presents the descriptive statistics of this comparison.

Table 6

Within-Group Comparison on Productive Pre-Test and Post-Test

Test	Group	N	Mean	Std. Deviation	Std. Error Mean
Productive Pre-test	Control	24	3.71	2.216	0.452
	Experimental	27	3.37	2.467	0.475
Productive Post-test	Control	24	14.63	3.899	0.796
	Experimental	27	29.67	4.690	0.903

Table 6 presents the descriptive statistics, displaying the mean score of each group on the productive pre-test and post-test. Based on Table 6, there is a difference between the

control group productive pre-test (*M*= 3.71, SD = 2.216) and productive post-test (*M*= 14.63, SD = 3.899). For the experimental group, there is also a significant difference between the productive pre-test (*M*= 3.37, SD = 2.467) and post-test (*M*= 29.6, SD = 4.690).

In order to find out which group obtained a better achievement on the productive test, the result of split-plot ANOVA is presented in table 7.

Table 7

Split-Plot ANOVA for Productive Test Within-Group Significant Differences

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time Linear	8797.582	1	8797.582	751.365	0.000	0.939	751.365	1.000
Time * Group Linear	1502.680	1	1502.680	128.338	0.000	0.724	128.338	1.000
Error (Time) Linear	573.731	49	11.709					

The productive test scores of the control group and experimental group were analyzed through split-plot ANOVA. Table 7 for the productive test score of the two groups yielded these results: F = 128.338, $p < .001$, $\eta_p^2 = .724$. These results indicate a high level of statistical significance, meaning cognitive, metacognitive and sociocultural techniques helped the ESL learners of the experimental group achieve significantly higher growth than those in the control group.

Overall, the between-participant comparison (Table 7) shows that the control and experimental group were significantly different from each other on productive post-tests. In other words, Table 7 reveals that the cognitive, metacognitive and sociocultural

techniques were effective for ESL learners' long-term vocabulary retrieval and recall whereas the traditional method was less influential for ESL learners' long-term vocabulary retrieval and recall.

Recognition test (within-group)

The purpose of this comparison was to examine the Community College ESL language learners' vocabulary long-term learning and retention. To do so, the recognition pre-test score was compared to the recognition post-test score. Each group was compared separately from each other (*i.e.*, within-participant comparison) across each of the two test sessions (pre-and post-test). Table 8 presents each group's performance on the recognition pre-test and post-test.

Table 8

Within-Group Comparison of Recognition Pre-Test and Post-Test

Test	Group	N	Mean	Std. Deviation	Std. Error Mean
Recognition Pre-test	Control	24	6.63	1.689	0.345
	Experimental	27	5.78	2.225	0.428
Recognition Post-test	Control	24	26.75	3.662	0.748
	Experimental	27	33.19	3.089	0.594

Table 8 presents the descriptive statistics, displaying the mean score of each group on the recognition pre-test and post-test. Based on Table 8, there is a difference between the control group recognition pre-test (M= 6.63, SD =1.689) and post-test (M = 26.75, SD = 3.662) results; for the experimental group, there is also a significant difference between the recognition pre-test (M = 5.78, SD = 2.225) and the post-test (M = 33.19, SD = 3.089) results.

The mean differences in the descriptive table were statistically measured via split-plot ANOVA to ascertain if the two groups were significantly different from one another on the recognition post-test. Table 9 presents the split-plot ANOVA for the within-group recognition test.

Table 9

Mixed-Design ANOVA for Recognition Test Within-Group Significant Differences

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Non cent. Parameter	Observed Power[a]
Time Linear	14353.389	1	14353.389	1814.673	0.000	0.974	1814.673	1.000
Time * Group Linear	336.918	1	336.918	42.596	0.000	0.465	42.596	1.000
Error(Time) Linear	387.572	49	7.910					

Table 9 for the recognition test score of the two groups yielded these results: F = 42.596, $p < .001$, $\eta_p^2 = .465$. These results indicate a high level of statistical significance different between two groups.

Overall, the within-participant comparison (Table 9) shows that the control and experimental group were significantly different from each other on recognition post-tests as ($p > .05$). In other words, Table 9 revealed that the cognitive, metacognitive and sociocultural techniques were effective for ESL learners' long-term vocabulary learning and retention whereas the traditional method was less influential for ESL learners' long-term vocabulary learning and retention.

Altogether, after preliminary checks on the assumptions of split-plot ANOVA and

the means for initial pre-test differences, according to Table 9, *and in line with productive vocabulary test results,* the results showed that there was a statistically significant difference among the two groups in the recognition post-test scores.

In sum, according to the above tables and split-plot ANOVA results, the experimental group achievement increased more in both the productive and the recognition vocabulary tests than the control group.

Independent t-Samples Test

To find out whether the observed difference between the control group and experimental group on the four tests (productive pre-test; productive post-test; recognition pre-test; and recognition post-test) is statistically significant, an independent t-samples test was run for each of the four tests. Table 10 presents the main findings of the independent t-samples test:

Table 10

Independent t-Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed	Mean Difference	Std. Error Difference	Lower	Upper
Productive Pre-test	Equal variances assumed	0.914	0.344	0.512	49	0.611	0.338	0.660	-0.988	1.664
Productive Post-test	Equal variances assumed	0.471	0.496	12.363	49	0.000	-15.042	1.217	17.487	-0.275
Recognition Pre-test	Equal variances assumed	3.695	0.060	1.517	49	0.136	0.847	0.559	-0.275	1.970
Recognition Post-test	Equal variances assumed	0.650	0.424	-6.806	49	0.000	-6.435	0.945	-8.335	-4.535

Based on Levene's Test for equality of variances, the variances for the control group and experimental group were assumed equal. In other words, the homogeneity of variance was assumed since the *p* value is greater than .05 ($p > .05$) for each of the four group comparisons, meaning based on assumption of the independent t-test, the two groups have a similar dispersion of scores.

Productive pre-test

To assess whether the means of the control and experimental groups on the productive pre-test were statistically different from one another, the independent t-

samples test results were interpreted. According to descriptive statistics in Table 2, the mean pre-test score for the control group is *M*= 3.71, SD = 2.216, and the mean pre-test score for experimental group is *M*= 3.37, SD = 2.467. This data was subjected to the t-test for independent samples, with the results showing there is no statistically significant difference: t (49) = 0.512, p > .05. The independent t-test finding indicates that this pattern is not significant, and both the control and experimental groups had similar results in the productive pre-test.

Productive post-test

To assess whether the means of control and experimental groups on the productive post-test were statistically different from one another, the independent t-samples test results was interpreted. According to descriptive statistics in Table 2, the control group who learned vocabulary through traditional teaching method had lower scores on their productive post-test (M=14.63, SD=3.899) than experimental group who learned words through cognitive, metacognitive and sociocultural techniques (M=29.67, SD=4.690).

The result of the independent samples t-test on productive post-test between the two groups was significant: t (49) = 12.363, p< .05 (Table 10). The retrieval and recall of words of the experimental group (productive post-test: mean = 29.67) outperformed the control group (productive post-test: mean =14.63). It indicates that the participants in the experimental group were more successful in recalling a significant number of the target words under long-term retrieval as compared to the control group. Therefore, a significant recall of the learned words in the productive vocabulary post-test is revealed.

All in all, it can be concluded that the cognitive, metacognitive and sociocultural techniques did significantly contribute to the vocabulary retrieval and recall of the ESL learners in long-term in comparison to the control group.

Recognition pre-test

To assess whether the means of control and experimental groups on the recognition pre-test were statistically different from one other, the independent samples t-test results were interpreted. According to Table 4, the mean pre-test score for the control group is M = 6.63, SD = 1.689, and the mean pre-test score for experimental group is M = 5.78, SD = 2.225. This data was subjected to the t-test for independent samples, with the results showing there is not a statistically significant difference: t (49) = 1.517, p > .05. The independent t-test finding indicates that this pattern is not significant, and both the control and experimental groups had similar results in their recognition pre-test.

Recognition post-test

The independent samples t-test also assessed the means of the control and experimental groups' difference on the recognition test. According to the descriptive statistics in Table 4, the control group which learned the test vocabulary through the traditional teaching method had lower scores on the recognition post-test (M=26.75, SD=3.662) than the experimental group which learned the test vocabulary through cognitive, metacognitive and sociocultural techniques (M=33.19, SD=3.089). The result of the independent samples t-test on the recognition post-test as between the two groups was significant: t (49) = 6.806, p< .05) (Table 10). The vocabulary recognition and

retention of the experimental group (recognition post-test: mean = 29.67) outperformed the control group (recognition post-test: mean =14.63). This result indicates that the participants in the experimental group were more successful in learning and retention with the resulting significant number of the target words in long-term as compared to the control group. Therefore, a significant recognition of learned words in the recognition vocabulary test is revealed. All in all, it can be concluded that the cognitive, metacognitive and sociocultural techniques did significantly contribute to the word retention and recognition of the ESL learners in long-term in comparison to the control group.

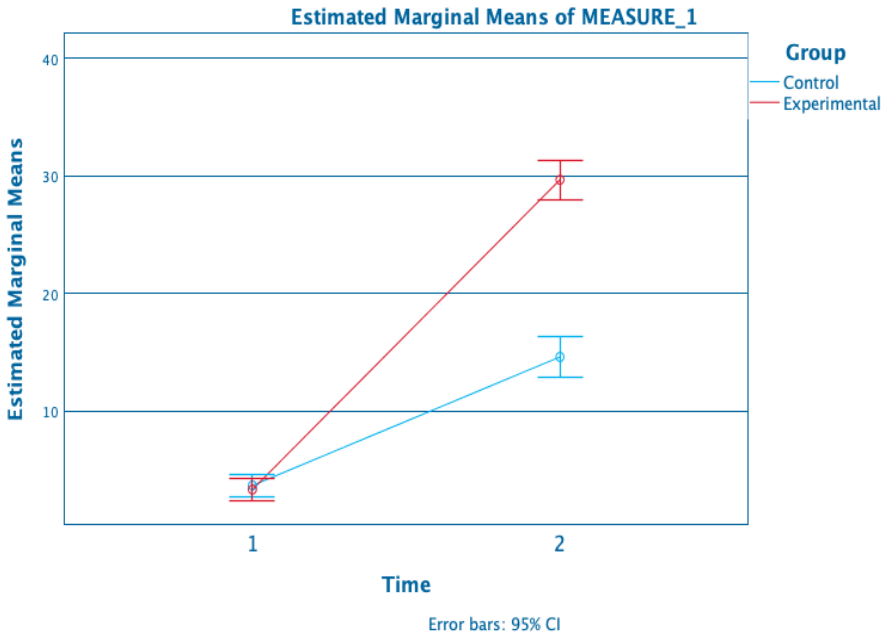
Quantitative Results Summary

Productive recall test

In this chapter the findings regarding the productive recall vocabulary test are presented and analyzed. Two types of between-participant and within-participant comparisons were carried out through split-plot ANOVA and an independent samples t-test, respectively. Figure 1 summarizes the results for the productive test.

Figure 1

Control and Experimental Productive Test Results Comparison



Note: Time 1 is the productive pre-test and Time 2 is the productive post-test.

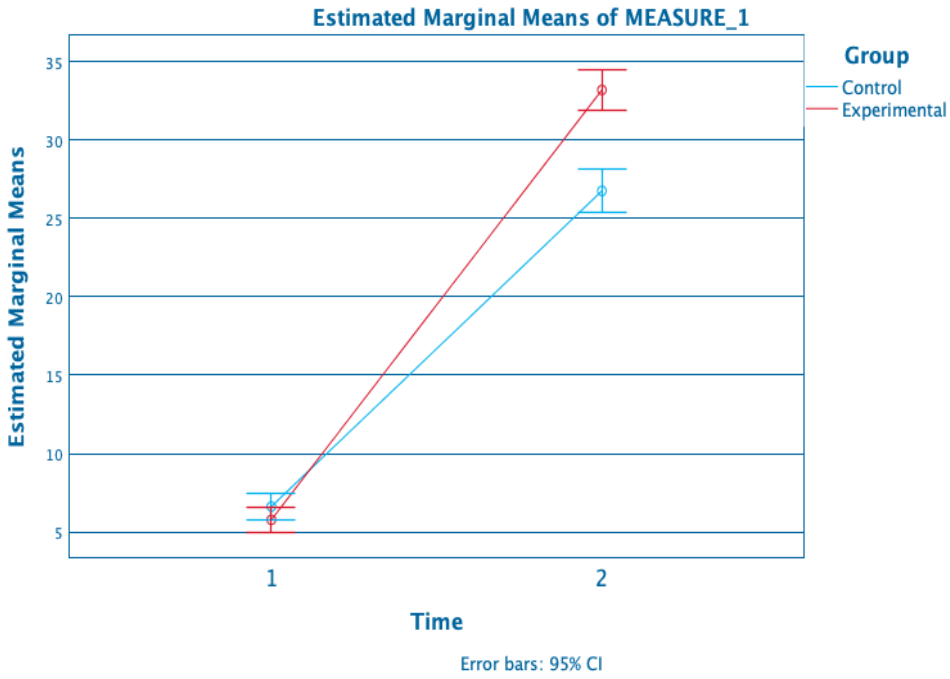
The results of both the between- and within- comparisons show that: (a) the cognitive, metacognitive and sociocultural techniques of vocabulary instruction was significantly more effective than the traditional method of vocabulary teaching for the participating community college ESL learners' long-term word learning and recall**;** (b) the traditional/existing method of vocabulary teaching did not contribute significantly to the participants' word recall in long-term when compared to the cognitive, metacognitive and sociocultural technique of vocabulary instruction. The control group participants showed more attrition of the learned words in the productive recall test than the experimental group, where the experimental group participants revealed more success in retrieving and recalling words in the same test; and lastly (c) the traditional method of vocabulary teaching was only partially effective for L2 learners' long-term word learning and recall.

Recognition test

In the previous sections, the findings of recognition vocabulary test were presented and analyzed. Two types of between and within-participant comparisons were carried out via split-plot ANOVA and independent samples t-test respectively. The following Figure 2 illustrates the results for the recognition test.

Figure 2

Control and Experimental Recognition Test Results Comparison



Note: Time 1 is the recognition pre-test and Time 2 is the recognition post-test

The results of both between- and within-comparisons showed that: (a) the cognitive, metacognitive and sociocultural technique of vocabulary instruction was significantly more effective than the traditional method of vocabulary teaching for the community college ESL learners' vocabulary learning and retention; (b) the

traditional/existing method of vocabulary teaching technique contributed partially to the community college ESL learners' long-term vocabulary retention when compared to cognitive, metacognitive and sociocultural technique of vocabulary instruction. The control group participants gained less growth in the recognition test, where the experimental group acquired more achievement of the learned words in the same test; (c) the traditional method of vocabulary teaching was only partially effective for the control group participants' long-term vocabulary learning and retention.

Qualitative Research Analysis - Questionnaire and Focus Group Interview (Research Question Three)

This section presents and interprets the findings of the third research question of this study concerning the questionnaire and the focus group interview, which follows.

3. After engaging the community college ESL students with new techniques, how do they describe the effectiveness of this technique in mastering ESL vocabulary?

Questionnaire

Seventeen participants from the experimental group participated in the questionnaire. They were asked to respond to a set of nine closed- and open-ended questions. The first four questions were close-ended questions scored on a 5-point Likert-type scale, with 1 being strongly agree and 5 being strongly disagree for questions 1-4.

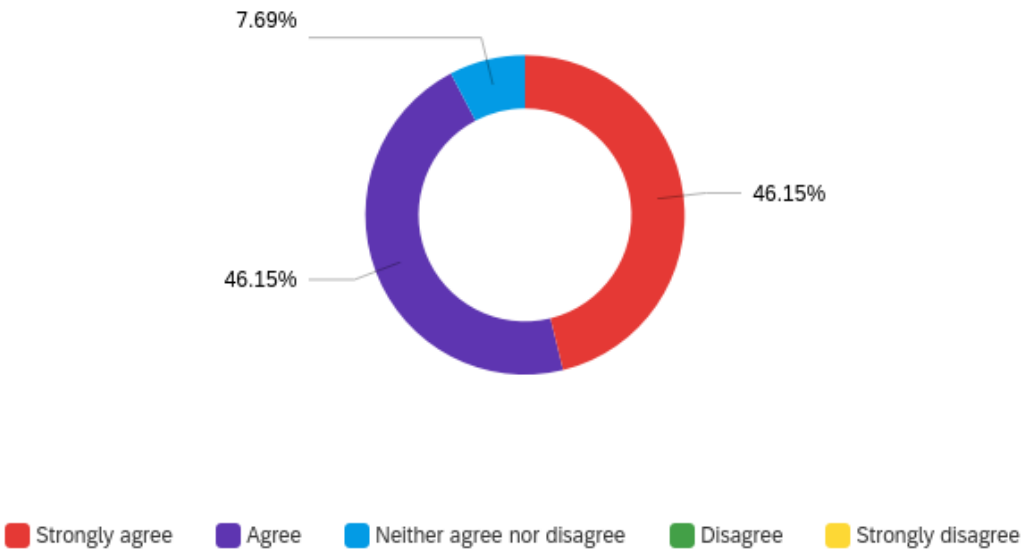
The remaining six questions (5, 6, 7, 8, 9 and 10) were open-ended questions asking the participants' opinions about the effectiveness of cognitive, metacognitive and sociocultural vocabulary techniques in this study. These questions required the participants to state their rationale in finding the vocabulary instruction helpful in

learning and remembering words. The participants' answers are analyzed and interpreted as follows.

Question 1 asked participants if it was easy for them to learn new words with text definition, examples & picture/video (Pictorial-Auditory Technique). Figure 3 presents the representation of responses from 17 participants for question 1 of the questionnaire.

Figure 3

Illustration of Questionnaire Question One

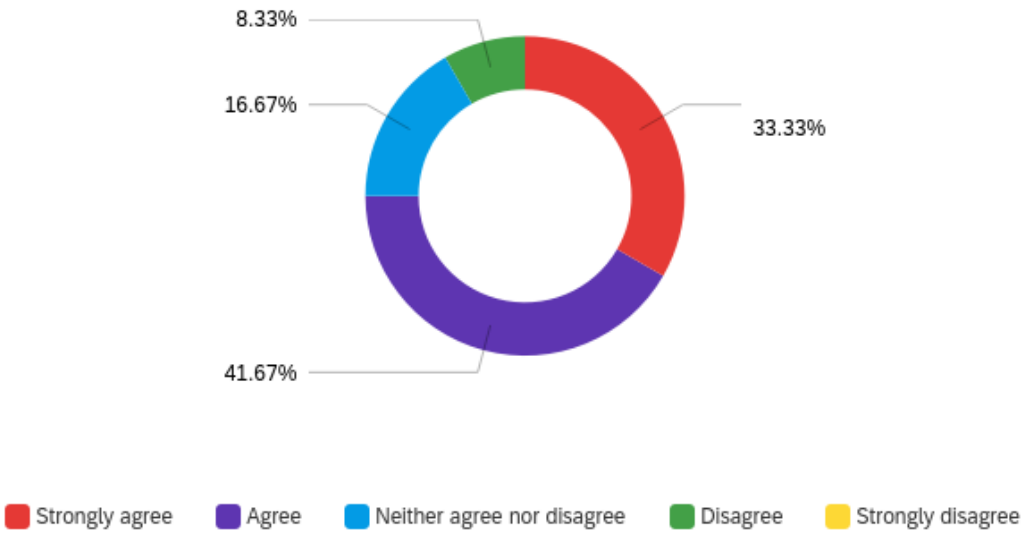


According to the figure above, 92% of the participants (46 % +46.% which constitute 17 out of 27 participants) *strongly agree or agree* that it was easy for them to learn the target words with text definition, examples & picture/video (Pictorial-Auditory Technique). Only 7.7 % of the participants answered *neither agree nor disagree* with the effectiveness of this technique.

Question 2 asked participants if it was easy for them to learn new words with closed eyes drawing & pronouncing aloud (Multi-Sensory Drawing Techniques). Figure 4 demonstrates the participants' answers to question 2 of the questionnaire.

Figure 4

Illustration of Question two in the questionnaire



Approximately 75 % of the participants (17 participants) *strongly agree or agree* that it was easy for them to learn the new words via closed eyes drawing & pronouncing (i.e., 41.67% agree, and 33.33 % strongly agree). On the other hand, around 15% of responses answered *neither agree nor disagree* and only 8 % of the participants selected *disagree*. This result shows that the Multi-Sensory Drawing Technique was not effective for several participants in learning new vocabulary.

Question 3 asked participants if it was easy for them to learn new words with storytelling & group practicing (Storytelling Technique). Figure 5 illustrates the responses of the participants.

Figure 5

Illustration of Question three in the questionnaire

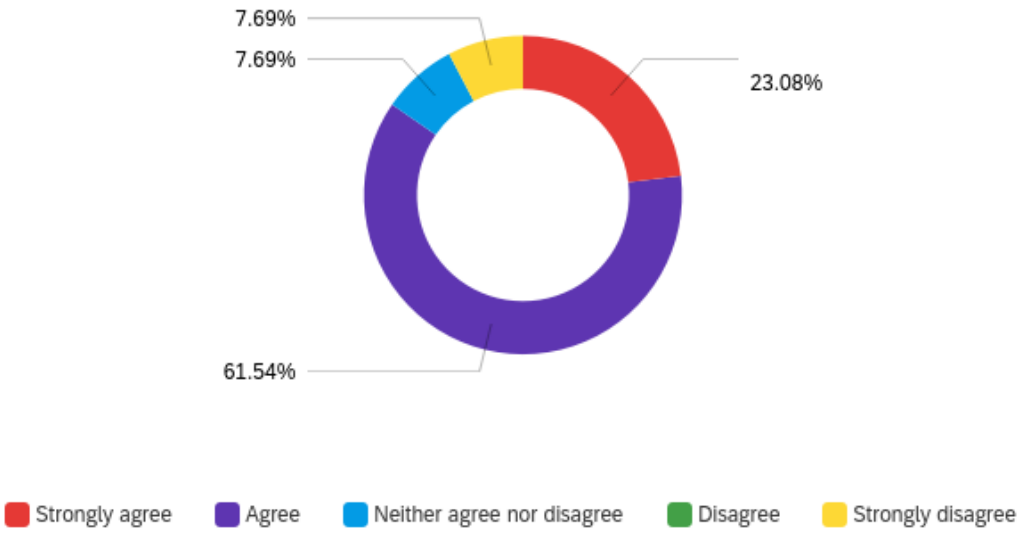
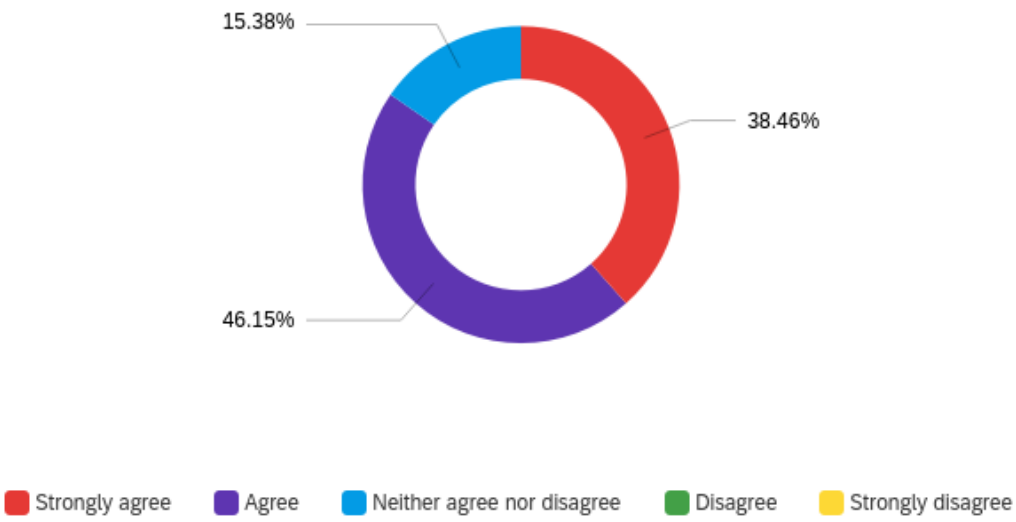


Figure 5 revealed that most of the participants (85%) selected *strongly agree* or *agree* (61.54% or 23.8%). This percentage indicates that the participants believe that storytelling & group practicing assisted them to remember the new words better in the final vocabulary tests. However, 7.69% of participants' responses were *neither agreed nor disagree* and the same percentage of responses were *strongly disagree* indicating that the Storytelling technique was not easy in order to learn new vocabulary.

Question 4 asked the participants if it was easy for them to learn vocabulary through the Circle Conversation Rotation. Figure 6 shows the result.

Figure 6

Illustration of Question four in the questionnaire



Looking at the overall responses, it is clear that approximately 84% of the participants' (17 out of 27) responses to this question was *agree and strongly agree*. Approximately, 15% of the responses to this question were close to *neither agree nor disagree* on the Likert scale, meaning the participants gave a neutral reply to the question *and they disagree* or *strongly disagree* about the efficacy of the Circle Conversation Rotation technique for their long-term word recall.

Questions 5 asked the participants if they remember the vocabulary easily after learning vocabulary through these techniques and whether they use that vocabulary in their speaking and writing.

Based on the participants' responses, the techniques helped them to not only remember the words but also to apply to speaking and writing. However, some participants had different perspectives. One participant commented that although he/she

remembered the vocabulary, it was still not easy to apply to speaking or writing. The other participants' feedbacks show that they use the new words in their speaking and writing since new instructional techniques helped them to remember and use the words actively in their communication. One participant commented that, "I think these techniques helped me a lot. Now I am using some of those vocabularies in my speaking language especially in my essay." (sic) Another participant wrote, "Yes I member them easily and with writing and speaking." (sic) All in all, the participants had a positive attitude towards these vocabulary instruction techniques. Meaning, the experimental participants found the new vocabulary instruction techniques helpful to retrieve, recall and use the new vocabulary actively in their speaking and writing.

The result of positive perspective of participants toward neurocognitive, metacognitive and social cultural techniques could be related to the communication implication of these vocabulary instruction techniques. According to Ballman, Liskin-Gasparro, & Mandell (2001) the main reason of participating in a language is that language learners want to learn how to communicate in the target language "and at the same time, by communicating students learn the language". In this study the convergence of the vocabulary techniques inspired autonomous learning that generated competent and effective communicators among ESL learners.

Question 6 of the questionnaire investigated for more detail to find which specific technique of vocabulary teaching helped the community college ESL students learn and remember words easier and why.

While all participants commented that the techniques were effective all together, some of the participants preferred some techniques over others. Learning new words

through the Pictorial-Auditory technique has been the most favorable vocabulary technique for the majority of ESL learners in the present study. For example, one participant commented, "Learn with the words and images on the board, also examples in the paragraphs or conversation. Because is easier to learn practice the examples." (sic) This response shows that the participant viewed the Pictorial-Auditory Technique as an effective way to learn new vocabulary as this technique provided the students with as much real-world and in context vocabulary exposure. Meaningful pictures/video and authentic examples aided in developing those respondents' ESL vocabulary's learning, recall, and use. The researcher believes that the Pictorial-Auditory technique taught the participants to "do" rather than teaching them only to "understand". By implementing meaningful technique which was similar to real-world context, the ESL learners' vocabulary acquisition was facilitated and the participants acquired the language in a more natural way, similar to the way individuals learn their first language (Krashen, 1981).

In other responses, participants indicated that the Multi-Sensory Drawing technique, Storytelling technique and the Circle Conversation Rotation technique were effective in remembering the vocabulary over long-term. Most participants commented that they liked the three techniques because they had to use new words and write a story or use them in a group conversation. One participant wrote, "It was easy for me to learn new words making a sentence with group members because when I can't clearly understand we can ask each other and when I hear others example sentence it helps me". (sic) By the participant's description, it is clear that neurocognitive, metacognitive and sociocultural theories advances worked within the experimental group participants' ZPD,

therefore, they were developing their vocabulary learning. The finding shows that the vocabulary instructional techniques filled the gap between what ESL learners could do on their own and what they could do with the assistance of their more capable group members. Teaching vocabulary within that ZPD provided results of progress and ESL vocabulary development.

In Question 7 of the questionnaire, the participants were asked which technique or activity they liked most about the vocabulary teaching techniques and why.

Some participants justified their reasons based on the fact that learning words via picture/video, definition and example (the Pictorial-Auditory Technique) helped them remember the words for later use; others commented that using the Multi-Sensory Drawing technique could assist them to learn new words faster, and they could recall them later; a few participants mentioned the practicality of using the Multi-Sensory Drawing technique for the correct word pronunciation. Furthermore, those who chose the Storytelling technique believed that the technique was effective for remembering the vocabulary. Finally, among the participants who adhered to the Circle Conversation Rotation technique, some stated that this technique helped them to learn new words easily, and improved speaking and writing due to expanding word knowledge. One participant commented: “I like the most making group. It was easy for me to learn new words by making a sentence with group members because when I can't clearly understand we can ask each other and when I hear others' example sentences it helps me”. (sic)

Since all the above teaching techniques engaged ESL learners in group work and got them to use new words in their writing and or group conversation, most participants indicated that they liked the new techniques. Designing the vocabulary instructional

techniques in this study with the sociocultural aspects and ZPD in mind helped the participants to focus on the social and cultural factors of vocabulary learning. Keeping the instructional techniques for the vocabulary within the participants' ZPD simultaneously can stretch language learners' current knowledge and skills as well as also promote their language development (Echevarria, Vogt, & Short, 2008; Vygotsky, 1814/1986).

Question 8 asked the participants which technique or activity they enjoyed least during vocabulary learning, and why. Answers to this question were mostly consistent. Only one participant did not find the Circle Conversation Rotation technique interesting, as was commented, "I don't like to take turns talking with my classmates. Because I can't express and answer the conversation with my classmates." (sic) The other responses to this question were positive and the participants expressed their positive attitude toward the new technique. For example, one participant responded that: "I don't think there was a bad technique because each vocabulary technique was important. Everyone's learning skill is different so we can choose which one is comfortable for us." (sic) The above response can be considered as an implication for the finding of the research as well. The Circle Conversation Rotation technique works for that particular participant who may feel more connected to their classmates. Thus, this technique was effective for the participants who could more effectively take advantage of engaged methods of language learning. According to the participants' views, it seems that neurocognitive, metacognitive and sociocultural techniques built the participants' competency in the target ESL vocabulary. All of the vocabulary instructional techniques in this study are

contingent upon the researcher's understanding and confidence in convergence of these vocabulary instructional techniques.

The term "sage on the stage" (King, 1993) creates a mental picture of a language learning setting. While ESL learners in this study learned the target vocabulary through cognitive and explicit techniques, sociocultural techniques were extensively considered as the "guide on the side" (King, 1993). The Sociocultural Theory views participation in everyday linguistic and cultural activities as not just the product of one's learning but as the process of one's learning as well (Lantolf, 2006; Zuengler, 2006). For the majority of time during vocabulary instruction sessions, a combination of neurocognitive, metacognitive and sociocultural techniques encouraged the participants' engagement for using the target words in their interactions.

Question 9 asked the participants' viewpoints about any other comments or thoughts on the new vocabulary teaching techniques. Based on participants' most cited responses, participants expressed that providing examples for new words with pictures, learning them in groups utilizing new words in real-life and practical/actual stories, and listening to the pronunciations of the new words both by the researcher and their peers, were the items considered as the most useful vocabulary learning techniques, an assessment that almost all the participants agreed on. As for participants' other choices, the comments that entailed *drawing, vocabulary story techniques, and examples with pictures* were the most frequently stated themes.

In sum, the findings of the questionnaire showed that the participants preferred to learn new words via the Pictorial-Auditory technique, with the Storytelling technique being their second-most preferred technique, and the Circle Conversation Rotation the

third selection, with the Multi-Sensory Drawing as the last choice. All participants unanimously agreed that all four techniques assisted them to learn the words in a more productive manner including to remember the target words longer for later use.

According to the questionnaire responses, the experimental group participants found the vocabulary techniques used in this research study effective to learn vocabulary. This finding may be related to the factor that these techniques involve a combination of effective and meaningful instruction, engaging the ESL learners to use the target vocabulary dynamically in the class, and therefore created a positive language learning experience for them. The researcher believes that the most vocabulary techniques were grounded in the practice of sociocultural teaching methods and has learned through this experience that many participants in this study were simply waiting for an opportunity for cross-cultural communication and were willing to take it should it cross their path. All these vocabulary techniques provided the experimental group participants with occasions to interact and learn more about each other's cultures and personalities.

Focus group interview

To understand the participants' perspective and preferences towards cognitive, metacognitive and sociocultural vocabulary instruction techniques (*i.e.,* the Pictorial-Auditory; Multi-Sensory Drawing; Circle Rotation; and Storytelling techniques), the participants were also invited to a 30-minute focus group interview. Eleven students volunteered to participate in the focus group interview. The interview was audio-recorded and transcribed, and the common themes were identified.

The following section reports the findings. For the first discussion question, the researcher asked this question: Which vocabulary learning technique did you like, and

why? The participants agreed that the Pictorial-Auditory technique was the most effective vocabulary technique that assisted the students to acquire the words faster and retain them longer. As an example, one interviewee, *Kim*, stated that presenting of the new words along with their simultaneous English definitions, example and picture/video could help him to remember the word better in the post test, as he could relate the word along with its picture: "I can remember the words when I want to use them. I can remember the pictures of those words and even in the second test, this method helped me to remember words" (Kim, Focus group interview, April 2020). Kim is a 49 years male ESL student and mechanical engineer. He attends the community college ESL classes as he immigrated to the United States and needs to learn English to find a job as a mechanical engineer. During the vocabulary teaching session, obviously, Kim was metacognitively aware and had strategies for finding out or figuring out what is needed in order to learn the target vocabulary effectively. He had a goal and learning vocabulary through the techniques that the researcher presented ignited his thinking and could lead to more profound learning and improved performance in vocabulary post-tests. The vocabulary techniques in the present study not only controlled the cognitive processes as one of the most essential skills but also the techniques helped ESL learners to develop their metacognitive skills in addition to cognitive skills. The vocabulary techniques used in this study may activated the ESL learners' background knowledge which was important to the researcher because the researcher had a very sincere appreciation for all the experiences and knowledge that ESL participants brought to this Community College class. There were so much personality in a single ESL classroom and the researcher enjoyed the abundance of diversity inherent in the target professional environment. All of

these helped the researcher of this study to incorporate the ESL learners' background knowledge in the vocabulary teaching because it helps them to make more connections in their learning. No matter what words were being covered in the vocabulary instructional session, comprehensible input and output through the inclusion of vocabulary techniques helped the learning to be successful and the instruction to be effective. Every participant in the ESL class brought individual knowledge and experiences, and background knowledge activities invoked different responses from each ESL. According to Shrum & Glisan, (2010), when instructors plan activities to bring students' background knowledge forward, a myriad of student responses should be expected. The vocabulary techniques in this study activated the participants' background knowledge which promoted cultural ties, opinions, and memories from each participant. Activating students' prior knowledge of a subject will prepare them for new and likely unfamiliar topics (Bamford & Day, 2004; Grabe, 2009; Shrum & Glissan, 2010; Spada & Lightbown, 2008). The researcher believes that activating students' prior knowledge during vocabulary instruction is especially important for adult learners. Adult learners most likely know and understand the term or concept of new ESL words in their native language. Because of the wealth of background that they have, the ESL instructor role is often to simply help them re-label the world around them into English (Pinker, 2007). Activating ESL participants' prior knowledge helped the participants of this study to make more connections to the discussions in class and make their learning more meaningful.

To *Afrooz*, a 29 years old Afghani ESL student, vocabulary learning via picture and definition and examples (Pictorial-Auditory technique) was also an effective learning experience, which motivated him to engage more in learning the target words and pay

more attention to them, as explained, “I enjoyed this experience because I was not bored. We had to repeat and give examples after while we learned them with their pictures, definition and examples” *sic* (Afrooz, Focus group interview, April 2020). Afrooz’s objective to attend the Community College ESL classes is to pursue his study at a university. Of the class students, Afrooz was considered by the researcher as a more capable ESL student who helped his peers during the group interactions. By providing an interactive learning environment the researcher tried to have the role of a mentor to students more than a traditional instructor. Vygtosky (1978) defines the mentor as the "More Knowledgeable Other" and it is possible for peers to play the role of “More Knowledgeable Other". The study’s researcher implemented this ZPD when partnering students. It helped the struggling student by offering a new perspective for learning new words and helped the knowledgeable student (such as Afrooz) further sharpen their vocabulary learning.

However, another participant, *Lilia*, a 25-years old who emigrated from China, stated that her favorite vocabulary instruction technique was the Multi-Sensory Drawing technique. This technique helped her to imagine the words in her mind, drawing and saying each at that same time. She believed this technique gave her a chance to repeat the new words and have better long-term word retention afterward, as she discussed,

> When I write down a word, I can remember it better. Drawing a picture of a word with closed eyes was very weird at the beginning but when I followed my friends in the class, I liked. I could draw my mind pictures and I was surprised that my picture were similar to the one was presented to us at the beginning. Drawing, saying the words helped me to remember them now. (Lilia, Focus group interview, April 2020).

During the vocabulary instruction specifically, the focus of the researcher was on two-way communication and interaction and comprehensible input. In terms of the students’

ZPD, a focus on comprehensible input ensured the researcher that the communication in the classroom did not cross into the participants' frustration zone but stayed within their zone of language development. The researcher believes that Lilia's achievement is related to vocabulary instructional techniques grounded in sociocultural practices and incorporating principles such as scaffolding, students' prior knowledge, and comprehensible input, all of which engaged her in effective and meaningful learning.

In a follow-up question, the researcher asked the participants what they liked most about the vocabulary teaching techniques. One of the participants, *Zara*, an ESL student from Afghanistan, expressed that she liked all techniques because they specifically engaged her in the conversation. The Storytelling technique was effective for her as she had to make a story with the new words and tell the story to her classmate with whom she had been paired. Zara said that she had the chance to hear her classmates' stories too. Zara stated that, "[C]onversation is very important and I liked that I could use words in my conversation in the class. I like it because I still can remember my story with the new words" (Zara, Focus group interview, April 2020).

To discuss the above question, most of the participants advocated Zara's opinion and they liked that the vocabulary techniques engaged them a lot in the class which helped them learn and use the new vocabulary. From this researcher's point of view, the vocabulary techniques provided opportunities for students to expand on their vocabulary knowledge and was a key top agent to give the community college ESL learners opportunities to use the target words in interaction through speaking and writing. The techniques promoted student engagement and conversation. The benefits of using a group ZPD that the researcher observed during instructional sessions were consistent

engagement among the ESL participants, as represented by attendance, comprehension of material, participation in the classroom and desire to learn (Klem & Connell, 2004; Schwarzer, 2009). The participants exhibited a comfortable working environment with their peers and other participants, from the start readily willing to participate in the instructional vocabulary sessions. Obviously, the ZPD component of the sociocultural theory created an interactive learning community that helped ESL participants to learn new ESL vocabulary at the Community College.

The researcher also questioned the participants on which vocabulary techniques were liked least. Surprisingly, the group of interviewees did not express any negative points. They did state that these vocabulary techniques were very new to them. Nevertheless, one of the participants indicated that she had difficulty at the first session of the vocabulary teaching classes. She said she was shy to engage in the class and pronounce the words aloud, but she felt more comfortable in the following sessions. The Sociocultural Theory includes a relationship between the teacher and student based on social interaction. Klem and Connell (2004) observed that when teachers create an organized learning environment, explaining classroom discussions and being sympathetic to the students, the students tended to be more engaged in the learning material. This correlated to what the researcher observed at the Community College ESL class. The researcher believes that one way to foster a positive ESL learning experience is to create an interactive learning community. After teaching ESL vocabulary to the experimental group at the Community College, this researcher did find that an interactive learning community was more effective than a traditional lecture teaching style. In the interactive learning community, the participants were working in partner and group activities, all the

while with the researcher observing and monitoring the vocabulary learning progress. This researcher observed the benefits of group interactions, such as ESL learners with greater confidence in their speaking abilities that easily facilitated the social interactions among all the participants. The researcher facilitated an interactive learning community by pairing the ESL participants based on their strengths and weaknesses. For example, a struggling student was paired with a student who could retain the target words faster. The researcher realized that ESL learners were more responsive to this process as compared to a traditional vocabulary teaching method because of the inherently increasing involvement in social interaction among the peer participants. With the experimental group ESL learners having established their friendly learning environment from the outset, they consistently worked together in order to learn the new ESL words. Therefore, the result of the focus group interview shows that facilitating an interactive learning community aided the participants to engage more during the vocabulary instruction sessions.

The other question that the researcher asked during the focus group interview was what technique helped the participants to remember the words better. All participants stated that the Pictorial-Auditory technique was very helpful to learn new words. In addition, some of the participants found the Circle Rotation technique an effective method to remember the new words. For example, *Lena*, a 32-year old women from Mongolia, expressed that,

> When we stood up in groups and used the new words every time with different people in the group, it was very helpful for me to remember the words even later. Because I could hear different examples that were made by different people. I liked that we took turn with 6 people in group and we moved to talk with different person. (*sic*) (Lena, Focus group interview, April 2020).

Lena's observations in finding the Circle Rotation technique to be an effective method relate to the implications of this technique. Through the technique, not only were the participants able to communicate about their own needs in the classroom, but they could learn about the needs of their peers as well. They could see that all learners in their classroom were different. They also learned that everyone both needs support and has strengths. In addition to what they learned about their peers, they also had opportunities in the class environment to use the new words as they discuss and exchange with the new vocabulary among their peers.

Elena, a 53 years old ESL learner, found the Multi-Sensory Drawing technique a highly effective technique as she stated,

> I think that closed eyes drawing, this technique, was very very nice because I could learn new vocabulary and practice them by having a picture in my mind. At least for me it was easy for me to remember the words after I learned them. Imaging new words and draw them was very good for me to learn new words. (*sic*) (Elena, Focus group interview, April 2020).

During the instructional sessions, the researcher detected that Elena was willing to put more effort into learning new vocabulary – in a small talk during a break, Elena happily informed the researcher that her daughter is a successful astronomy major student at a U.S. university. According to Schwarzer (2009), a language instructor must consider ESL students as adults with families, jobs, responsibilities, previous learning experiences, and dreams. Respectively, during my teaching experience at the Community College, the researcher consistently took into consideration that the participants were more than ESL learners with complex and professional lives. The researcher believes that these notably developed interpersonal skills were, along with the vocabulary techniques under examination, yet another benefit for Elena and other participants in the educational

system – creating a healthy relationship is readily acknowledged as a critical role of educators that operates in students' lives (Brophy, 1986; Klem & Connell, 2004).

At the focus group interview session, the researcher also asked the participants whether or not, after learning the new vocabulary through these techniques, anyone felt that they could indeed remember the vocabulary more easily (and efficiently). And as well, the researcher asked the participants whether they do now use those vocabulary items at times in their current speaking and writing? The answer to these questions were positive. For example, one participant who shared her opinion stated,

> Yes, it is easy to remember and I use some of them in my writing. The way that you taught those words I liked it and I missed it. You know it was easy to learn and you know it helped me to remember them and write some of them in my essay. (*sic*) (Kim, Focus group interview, April 2020).

Another participant, *Santos*, a 32 years old ESL student from an Arabic speaking country, pointed out that she can remember most of the words that were learned with new techniques but not all of them. She also raised an interesting point, "When I see a related picture somewhere, very easily I remember the words and the meanings quickly. And of course, I use the words in my speaking and it depends with who I speak and what is my conversation is about. For example, at work I usually use '*entrepreneur*'." (*sic*) (Santos, Focus group interview, April 2020).

The interpretation of Santos' and Kim's response could be related to the researcher contribution in pairing the ESL students during vocabulary instruction sessions. For example, this researcher has observed that students with a same common background language tend to gravitate towards speaking in that language with each other during break and other non-class times. In the instance of the present research, two

students with the same native language often talked in the native language, in this case Arabic, rather than English. The researcher paired those students with respective students of different language backgrounds, other than Arabic. Thus, the ESL vocabulary communicative task was more likely situated to accomplish its goal – new words and negotiation of meaning between students in English as to English. Of course, this can be unworkable in a class where the majority of students share the same background language; however, the participants in this study came from a diverse background of native languages, allowing the researcher to avoid pairing students with the same native tongue. As mentioned previously, students' English language abilities were also taken into consideration when pairing. Based on the sociocultural theory, if one student in a pair is more able in the target language than the other, the first will then teach the second while simultaneously working together to accomplish their learning.

In order to investigate the vocabulary learning strategies used by the participants before exposure to the new vocabulary instruction techniques, the researcher asked the participants what other methods the participants were using in the past to learn vocabulary. Most of the participants said they tried to use a dictionary to learn new vocabulary while others said they used *Google* translation to find the meaning of new words. *Fauna* shared her previous vocabulary learning strategy in the following:

> I usually found the translation of new words in my language first. Even when I want to use in a sentence I first translate it in my language. It helped me to understand the meaning but it was hard to remember them always. For some words that I could not find the definition I went to google and found a picture of that and I could learn a new word (*sic*) (Fauna, Focus group interview, April 2020).

Some participants added that they did not have any specific strategy to learn new vocabulary except finding meaning and an example of the new words. They mostly

agreed that the current vocabulary instruction taught by the researcher of this study was very new to them. For example, *Yuan,* a 43 years old ESL student from Bulgaria, said: "[F]or me it was the first time that somebody taught me words like this. Because of that I can remember those words. Never never I saw these techniques before" (*sic*) (Yuan, Focus group interview, April 2020).

The group was asked about any other feedback that they might like to share with the researcher about new vocabulary teaching techniques. *Sadegh,* a 28 years old ESL student from Yemen, stated that he can remember the words that are related to his work. He specifically said, "I remember "*murderer*" a lot because I am a police officer. And I use some of those words with my friends and collogues. For example, I use "*selfish*" a lot [laughing] (*sic*)" (Sadegh, Focus group interview, April 2020). Sadegh plans to be a police officer and he needs to be fluent in English in order to complete trainings for his future career.

Another participant, Maral, a 43-year old woman from Iran who needs to learn English for a future academic purpose, said that after learning new vocabulary through these current new techniques, the words come naturally to her and she uses them in her conversation and writing. As an example of the new words, she said:

> I used "*responsibility*" in my class writing, in my first essay. I understand lot of the words and now I remember lot of them like "*trend*" "*donation*" "*investment*", "*proud*", "*bystander*"… you know when you gave us the first test [pre-test] I didn't know the words but in the second test [post-test] it was easy for us to remember. Pictures, examples, stories all of that helped me learning the words very good. (*sic*) (Maral, Focus group interview, April 2020).

Using vocabulary techniques which incorporated neurocognitive, metacognitive and social cultural aspects in teaching vocabulary enabled the ESL participants to provide some specific examples of their learning in order to explain their strengths to the

researcher. Infusing these vocabulary techniques allowed the ESL students to use the target words even in the focus group interview and also gave them an opportunity to be more expressive about their strengths.

*Juan*a also shared comments about her previous strategy to learn new vocabulary. *Juana* stated that she usually wrote down the new vocabulary at least ten times and repeated it many times, but she still could not use them. She then added,

> But the techniques you used to teach us, pictures, drawing and making stories helped us to understand them and use them. For example, when I want to write an essay so many of those words come to my mind for example "*imagine*" "*disappear*" "*glamorous*". Before I had to use more time to learn new words but your techniques helped me to learn in the class and save time (*sic*) (Juana, Focus group interview, April 2020).

The finding of interview participants is in line with the Guerro & Villamil, (2000) and Nyikos & Hashimoto, (1997) who believe that the usage of ZPD in group settings generates different points of views, problem solving, and creative and reflective thinking, providing the learners with growth in subject areas.

In order to investigate the effectiveness of the cognitive, metacognitive and sociocultural vocabulary instructional techniques for the experimental group, the researcher asked the ESL instructor's opinion as well. Since, in this reading and writing class, the instructor assigned students to write essays, the researcher asked the instructor, as an experienced ESL instructor, about the impact of the new vocabulary techniques. At the end of the focus group interview, the researcher invited the instructor to join the group and share his opinion.

According to the instructor, these techniques not only exposed the students to new contexts and situations in which these words were used, but the techniques were also helpful for retention and remembering of new words. He added,

> It is great to see that the words are actually making into a production, into speaking, into writing. Even into the workplace, right. For jobs and with your coworker like "selfish" where you maybe had the idea that you knew that your coworker was selfish before that but you didn't put the word together, but now you have the word and then we're getting to from passive to active vocabulary (*sic*) (ESL instructor, Focus group interview, April 2020).

The instructor counted some benefits that his students had after they were taught vocabulary through new techniques. He believes that vocabulary is very important for the mastery of English. He added that English learning is not just for the learners' schoolwork but is moreover important for all real-life situations – because learning English is not just for the classroom use, it is for everyday survival, for work or helping the kids with homework, and so on. The instructor emphasized that vocabulary is the most important part of learning English.

For the follow-up question, the researcher asked the ESL instructor if he had yet noticed any of the target words in students' more recent writings. He responded:

> Absolutely, I would say it's not only in their writing but it's also in their speaking. This is a reading and writing class, right? It comes up when we are doing a discussion about their reading as well. So it is not only written it is oral and in our class discussion as well (*sic*) (ESL instructor, Focus group interview, April 2020).

The instructor added that when his students have a discussion in the class about different topics, the target vocabulary comes up naturally by the students. He stated that for example in one situation when the topic of the discussion was about being self-sufficient and starting a new business, related vocabulary such as "*entrepreneur*" was used by his students. He added that, even though his class does not focus on the same target vocabulary as that taught by the researcher, the newly learned vocabulary is still used naturally by the students.

During the focus group interview, the researcher received a lot of feedback from the participants that they appreciated the cultural, and linguistic aspects as contained in the vocabulary lesson plan. The participants mentioned that they felt that they learned more than words alone. This researcher believes that through the vocabulary techniques, support and empowerment were provided to the ESL experimental participants. These participants were able to make to make more connections to what they were learning, as based on the findings of the focus group interviews which have indicated that the Community College ESL learners in the experimental group perceived the cognitive, metacognitive and sociocultural techniques as most effective for word learning and retention.

Qualitative Result Summary

The results of the questionnaire, as well as the focus group interview, showed that the experimental group found the Pictorial-Auditory technique as their most effective vocabulary learning technique – helping to learn the target words effectively and to recall them better in long-term. The participants also found the Multi-Sensory Drawing Technique, the Circle Rotation technique and the Storytelling technique effective to retain and use new vocabulary both inside the classroom and in their real-life situations. All participants' responses and comments both on the questionnaire and in the focus group interview indicated that the cognitive, metacognitive and sociocultural vocabulary techniques helped the ESL learners to learn new words effectively while recalling and using them in their productive skills such as speaking and writing.

The effectiveness of the vocabulary techniques may be related to the fact that as adults, the participants of this study already had a label with the target words in their

mind, and their learning was simply a matter of relabeling the world around them. The other factor contributing to the participants' vocabulary achievements could be related to the researcher who showed high levels of emotional awareness and emotional intelligence. The researcher looked forward to the myriad of cultures, opinions, individual differences and personalities. The researcher, who is not an English native speaker but rather English as a second language, did feel able to relate quite well in this situation and truly identify with the ESL students' motivations, circumstances, and interests. The researcher was probably one of the non-native speakers that the students meet as an ESL vocabulary facilitator in their ESL classroom. Because of the initial interaction at the observation session, the researcher had the opportunity to share the researcher's own English learning experience as well as conduct this research journey with the participants so that they could come to trust, respect, and confide in the researcher. The researcher always made sure to pay attention to the human side of the ESL participants – not just the student side. Relying on the sociocultural perspective the researcher and ESL participants were not the only individuals who were teaching or learning and they weren't necessarily doing so in traditional roles – teacher teaching and student learning. The researcher viewed learning as a multi-directional process and because of that the researcher took great value in the lessons she could learn from the participants as well as what they could learn from each other. As the "guide on the side" (King, 1993), the researcher followed the sociocultural techniques and incorporated interaction and cooperation in her vocabulary instruction which was reflected in the Community College ESL students' questionnaires and focus group interviews.

CHAPTER V

DISCUSSION, RECOMMENDATIONS, IMPLICATIONS, AND CONCLUSION

Overview

The purpose of this chapter is to discuss the findings of the research in light of the current literature and the three theoretical frameworks of cognitive, metacognitive and sociocultural theories. This chapter is divided into nine sections discussing the following: (1) a brief summary of the dissertation; (2) the research questions; (3) discussion; (4) reflections on chosen theoretical frameworks in language learning and teaching; (5) significance of the community college ESL programs; (6) Emergence of a method; (7) the conclusion (8) recommendations with pedagogical implications of the study and research implications with a direction to the future; and (9) the concluding remarks.

Summary of the Study

Vocabulary is one of the most significant aspects of learning a second language by enabling the language learners to access the oral and written communication of the target language. In order to recognize and produce a language, second language learners should have considerable vocabulary knowledge development and be able to use the vocabulary in their communications. According to McCarthy "no matter how well the students learns grammar, no matter how successful the sounds of L2 are mastered, without words to express a wide range of meanings, communication in an L2 just cannot happen in any meaningful way" (1990, VIII). For this purpose, the present instruction method not only improves the second language learners' vocabulary recognition but also should promote the language learners' vocabulary retrieval for active production skills, namely speaking and writing.

As discussed in Chapter I, most of the second language teaching methods focus only on assisting language learners in recognizing and understanding the target language. As a result, unfortunately little attention has been given to assist language learners in transferring receptive vocabulary into productive vocabulary. For that reason, a language learner's receptive vocabulary count is most often much larger than that learner's productive vocabulary count.

While learning a second language, both vocabulary reception and vocabulary production are pivotal for successful communication. Wilkins states, "... while without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (1972, pp.111-112). Vocabulary reception is the ability to understand and comprehend a word in listening and reading, while vocabulary production is the ability to produce a word in writing and speaking. English Schmitt (2008), classified language skills into both receptive and expressive (productive) knowledge competence. Based on his statement, receptive knowledge competence is associated with listening and reading skills, while productive knowledge competence concerns speaking and writing skills. Much research has highlighted the importance of learning both learner facilitation and word retention a (Carter, 2012; McCarthy, 1990; Nation, 2008; Roberts, 1999); however, there is not any significant amount of research focusing on vocabulary teaching methods or techniques to activate second language leaners' productive vocabulary. While Krashen (1982, 1993) stated that implicit vocabulary learning or subconscious vocabulary acquisition during reading is more effective than learning words explicitly through vocabulary training per se, many studies have shown that extensive reading is not ample to improve second language vocabulary knowledge (Carter 2012; McCarthy, 1996; Nation 2009). However,

while it has also been proved that vocabulary development through reading may help the second language learner's ability to recognize a large number of words, yet that vocabulary knowledge is not likely to enhance the second language learner's ability to use words in a productive mode (Folse, 2004; Nation, 2008; Schmitt & McCarthy,1997). Most adult language learners, in fact, encounter difficulties in learning ESL vocabulary, especially in retrieving and recalling new words for longer periods of time. It is worth mentioning that for most adult second language learners, the most difficult task is not to learn new vocabulary but to retrieve, recall and use the vocabulary.

The inclusion of cognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance the vocabulary acquisition of community college adult ESL learners and thus help ESL students to recall and use new second language vocabulary effectively in their speaking and writing. The main purpose of this study was to help ESL community college language learners transform their passive vocabulary into active vocabulary by using methods informed by neurocognitive, metacognitive and sociocultural concepts.

In order to explore the effectiveness of the proposed vocabulary techniques, the researcher designed a mixed method study. There were two groups (the control and experimental groups) in this research study; the participants of the experimental group received six sessions vocabulary instruction with 38 English words through the convergence of neurocognitive, metacognitive and sociocultural instructional techniques (*i.e.*, the Pictorial-Auditory technique; the Multi-Sensory Drawing technique; the Circle Rotation technique; and the Storytelling Technique). The control group received their regular vocabulary instruction through traditional vocabulary teaching methods (*i.e.*,

English definition alone). The Community College ESL learners' knowledge of the target ESL words were measured via two vocabulary pre-tests, being productive recall as well as recognition tests. Two vocabulary post-tests were also used to measure the participants' vocabulary learning, recall and long-term retention. Data was analyzed both through descriptive statistics and inferential statistics (*i.e.*, split-plot ANOVA & Independent Samples t-Tests). Additionally, the experimental group's perceptions and attitudes towards the neurocognitive, metacognitive and sociocultural instructional techniques of vocabulary instruction were assessed through a questionnaire and a focus group interview following the testing portion.

The results from the descriptive statistical analysis showed that experimental group participants' vocabulary recognition and recall enhanced after being taught through the new vocabulary techniques. The data analysis revealed a great difference in gain score means of productive test between the control group (M=14.62, SD=3.899) and the experimental group (M=29.67, SD=4.690) resulting in statistical difference at the .05 level of significance $t(49) = 12.363$, $p < .05$.

On the recognition test, the mean of the experimental group was (M= 33.19, SD=3.089), higher than the control group (M= 26.75, SD=3.662). The independent test score indicates the experimental growth as well: $t(49) = 6.806$, $p < .05$). Thus, the statistical analyses indicated that the inclusion of neurocognitive, metacognitive and sociocultural techniques did have a positive effect on the Community College ESL student's vocabulary learning and recall.

The findings of the questionnaire and focus group interview showed that the neurocognitive, metacognitive and sociocultural instructional techniques (the Pictorial-

Auditory; the Multi-Sensory Drawing; the Circle Rotation; and the Storytelling techniques) were perceived as more effective for the experimental group. 92% of the participants believed that the Pictorial-Auditory Technique helped them to learn the new words easier. Approximately 75% of the participants replied that the Multi-Sensory Drawing technique assisted them to recall the new words better in long-term; approximately 85% of the participants stated that the Storytelling technique helped them to remember the words easier in long-term; and finally 84% of the participants found the Circle Rotation technique effective to learn the target word.

The results of the questionnaire, as well as the focus group interview, showed that the experimental group found the Pictorial-Auditory technique as the most effective vocabulary learning technique, by helping them learn the target words more effectively as well as beneficial for long-term word recall. The participants also found the Multi-Sensory Drawing technique, the Circle Rotation technique and the Storytelling technique effective to retain and use new vocabulary both inside the classroom and in their real-life situations. All participants' responses and comments in both the questionnaire and the focus group interview indicated that the convergence of neurocognitive, metacognitive and sociocultural vocabulary techniques helped them to learn new words effectively while recalling and using them in their productive skills such as speaking and writing.

The Research Questions

Research question one

The next section reviews the major findings on each question from the current literature. The first research question of this study was: How do community college ESL students exposed to neurocognitive, metacognitive and sociocultural vocabulary instruction techniques perform on a vocabulary test as compared to students exposed to a traditional vocabulary instructional method?

In order to respond to the first research question, the impact of the neurocognitive, metacognitive and sociocultural instructional techniques was investigated by comparing the participants' test scores (*i.e.*, between groups comparison). The findings revealed that the neurocognitive, metacognitive and sociocultural instructional techniques were effective for the experimental group participants' long-term vocabulary learning and retention in both the recognition test and the productive test.

Research question two

The second research question of this study was: How do teaching methods based on neurocognitive, metacognitive and sociocultural theories facilitate vocabulary acquisition of ESL learners at a community college in Northern California?

In order to achieve this goal, participants' scores were compared, from the pre- to post-tests for long-term word retention (*i.e.*, within groups comparisons). The findings for both the productive and recognition tests showed that the neurocognitive, metacognitive and sociocultural instructional techniques were significantly more effective than the traditional vocabulary teaching method for the participants' long-term word learning and recall, while being only partially effective for the control group learners' vocabulary

acquisition in long-term. The findings are in line with some previous research showing the success of vocabulary acquisition in long-term since words were adequately reinforced through repetition and exposure to the words (Arpaci, 2016) as well as several word-focused activities during the instruction (Newton, 2013).

Research question three

The third research question of this study was: After engaging the community college ESL students with new techniques, how do they describe the effectiveness of these techniques in mastering ESL vocabulary?

The question sought learners' preference on different vocabulary techniques and the rationale for their choice. The findings of the questionnaire and focus group interview showed that the participants found all the new techniques effective in regard to their vocabulary learning and recall and have been using the vocabulary items actively in their speaking and writing.

The rationale of the participants for finding the techniques effective was that the techniques helped them to internalize the new words for later use and were regarded as a novel, interesting, interacting and useful practice for recall even at the time of the interview session. The participants in this study appreciated the interactional aspect of the vocabulary techniques since they could engage in their vocabulary and communicate with their peers in the class. Respectively, the participants also benefited from the sociocultural aspect of the techniques. This finding is in line with the sociocultural theory, which views the participation in everyday linguistic and cultural activities as not just the product of learning, but as the process as well (Lantolf, 2006; Zuengler & Miller, 2006). Moreover, the participants, as represented by attendance, comprehension of

material, participation in the classroom and desire to learn are in line with previous research such as Klem & Connell (2004) and Schwarzer (2009).

To sum up, according to the findings of the present research, the participants in the experimental group increased their scores from pre- to post-tests in both productive and recognition tests. On the other hand, the control group gain was not as high as the experimental group. However, the control group still had some gains in scores from the pre- to delayed post-tests in vocabulary measurement tools. The results are in line with some studies suggesting that the participants revealed some improvements from the pre-test to delayed tests (Yanguas, 2009). Additionally, according to the descriptive tables shown in Chapter IV, it was revealed that the control group word gain was higher from the pre-to post-tests in the recognition test compared to the productive test. The rationale could be justified based on the types of measurements used to gauge learners' vocabulary knowledge.

The recognition test in this study was in the form of active recognition (Laufer & Goldstein, 2004) in that the participants were required to choose the correct word among the four given options. Also, the recall test was in the form of asking the learners to retrieve the words from their memory (Laufer & Goldstein, 2004), and produce them in the space provided. Control group participants seemed to have done better on the recognition test than the productive recall test. The findings are aligned with those of Abraham (2008), who reported "a comparatively larger effect for receptive than for productive tests that was sustained over time" (p. 211) and thus also suggesting that learners' receptive or passive word knowledge is greater than their active or productive vocabulary (Webb, 2005). Another possible explanation could be that with productive

recall tests, learners are dependent on memory in order to elicit the words (Turk & Ercetin, 2014), which also could affect test results; however, the recognition test is easier to process and is "more readily gained" (Yusuf et al., 2014, p. 106). In general, the productive test seemed to be more challenging than the recognition test for the control group participants of the present study as they had to struggle with retrieving the target words from memory. Since the control group received vocabulary instruction through the traditional teaching method, it sounds reasonable that the participants' scores were lower in the productive test from pre-to post-tests compared to their performance on the recognition test.

Moreover, the discussion thus far has related the findings of the present study to the current literature. The data collected through the productive test, recognition, questionnaire and focus group interview demonstrated that the instructional vocabulary techniques enhanced the participants' vocabulary knowledge for learning and using new words actively in their writing and speaking. Based on their descriptions during the focus group interview, the participants felt more motivated and better prepared to use the target vocabulary whenever the opportunity arises in their daily communication.

Discussion

In this study, the impact of the neurocognitive, metacognitive and sociocultural instructional techniques on the Community College ESL students' vocabulary learning and recall was explored. The main purpose of this thesis study was to examine the effectiveness of the proposed vocabulary techniques to aid community college ESL learners to transfer their newly learned passive vocabulary over to their active vocabulary.

The results of the present study revealed that the neurocognitive, metacognitive and sociocultural instructional techniques contributed to increased vocabulary learning and recall; and the reason might be the fact that these instructional vocabulary techniques were multisensory and thus capable of addressing different learning styles of the participants. In other words, the neurocognitive, metacognitive and sociocultural instructional techniques helped the ESL learners, with different learning styles amongst themselves, to process information (here, target vocabulary) in a way that fits their individual needs and resulted in a better processing of lexical items in mind.

Every language learner learns and processes vocabulary differently, because every individual has a different learning style with regard to items that are alternately visual, auditory, reading/writing preferential, and kinesthetic. The proposed techniques in this research study incorporated different learning styles for the ESL language learners in the Community College. As referred to in Chapter III and IV, the ESL class in the subject Community College was very diverse – the ESL learners came from different linguistic, cultural and educational backgrounds and had a considerably diverse age difference (18-65). Being aware of the ESL class's diversity, the researcher developed the vocabulary techniques that incorporated and considered different learning styles for different types of learners. In this study the neurocognitive, metacognitive and sociocultural vocabulary instructional techniques focused on the idea that ESL learners retain and process information differently since they do have a "preferred learning style" that assists them in learning and retrieving novel vocabulary in their own best fashion. Having already mentioned the students different linguistic and cultural backgrounds and different learning styles, one reason that the vocabulary techniques in this study appeared an

effective aide to the participants in learning and recalling the new vocabulary was the multisensory bases of the techniques accommodated different learning styles that participants could associate with their own natural learning style, thus increasing their vocabulary long term retention.

As one example of this, through the Pictorial-Auditory technique the researcher had presented a new word with visual tools (*e.g.*, picture, video, animation) along with the written form of the new word's definition and the oral pronunciation of the word. This technique was appropriate for those learners whose learning style was visual and/or auditory. Meanwhile, the Multi-Sensory Drawing technique as an integrated technique helped language learners to process information using several senses. This technique was helpful for the group of participants who were kinesthetic learners, those who learn better by reading and writing.

The Circle Rotation technique was beneficial for language learners whose learning styles were auditory, reading/writing preference, and kinesthetic. The technique engages the participants to listen to their partners' sentences and short conversations while standing in front of each other, then having to rotate and change partners in their groups. The Storytelling technique was also beneficial for ESL learners who were auditory, reading/writing preference and kinesthetic. Based on the Storytelling technique, the participants of this study were able to engage in writing a story and sharing each of their stories with the other group members who all attentively listened to one other.

Although the majority of the learners adhered to the neurocognitive, metacognitive and sociocultural instructional techniques for effective vocabulary learning to occur, it is imperative to take into account all of the class participants' broad range of

learning preferences and styles (Rassaei, 2018). This is because learning preferences can facilitate students' interaction with the teaching/learning material and the environment, enabling them to "extract information from it" (Plass et al., 1998, p. 27) and be left with an enjoyable learning experience. Likewise, Rassaei (2017) remarks that students with visual learning styles take advantage of visual whereas auditory style learners benefit from audio/spoken forms of words. Plass *et al*. (1998) remarked that verbalizer-visualizer dichotomy is one "dimension of learning preference" (p. 27). Indeed, looking back to the available literature on this domain, textual information such as printed copy is regarded as verbal information, and visual information such as images, animations, and video/clips are considered as visual information (Plass et al., 1998). Attending to the learners' individual learning preference(s) would also address the question, "For whom is multimedia instruction effective?" (Plass et al., 1998, p. 25). It cannot be gainsaid that matching the learners' learning style to the fitting instruction method certainly enhances learning (Rassaei, 2017).

As concerns the focus group interview, it seems that the neurocognitive, metacognitive and sociocultural instructional techniques were influential for the learners of the present study. The comments of some of the participants implied that these techniques helped them to learn and retrieve the target words better in long-term, because these vocabulary instructional techniques helped them to keep the words in their mind for later use.

The Pictorial-Auditory technique

The Pictorial-Auditory technique is a multisensory technique which the researcher proposed based on Mayer's (2014) cognitive theory of multimedia learning. New words

were presented to the experimental group with visual tools (picture, video, animation) along with the written form of the new word's definition and the oral pronunciation of the word. The target words were taught through the Pictorial-Auditory technique viewing new words in both visual and verbal modes. The researcher believes that presenting the target vocabulary using Adobe Spark Page was an effective way to integrate multimedia in the Community College ESL classroom. The researcher could flash culturally authentic pictures/ videos or animations on the screen when introducing new vocabulary, having the ESL learners follow along pronouncing the new words.

The author of this dissertation believes that using multidimensional modes of communication through the Pictorial-Auditory technique enhanced the vocabulary learning because the multisensory mode can be beneficial to facilitate comprehension and internalization of the words. Teaching new vocabulary explicitly was effective as it provided this opportunity for the participants to check out their understanding with the facilitator/researcher by providing yet more sentence examples.

Explicit vocabulary instruction is more effective in vocabulary acquisition than implicit learning, since it has been shown to result in greater and faster gains and better retention (Schmitt, 2008). In this study, the Pictorial-Auditory technique was based on simultaneous dual presentation modes. Nevertheless, the findings of the both quantitative and qualitative analysis are aligned with other studies showing that the simultaneous dual presentation modes are more effective than single mode in helping learners with vocabulary learning and retention (Sadeghi et al., 2016; Yoshii & Flaitza, 2002).

The Multi-Sensory Drawing technique

The Multi-Sensory Drawing technique, as another of the neurocognitive, metacognitive and sociocultural techniques that the researcher had proposed in this study, was shown to help the ESL participants to process information through several senses. The designing purpose of the Multi-Sensory Drawing technique was to assist the experimental group to visually encode words by visualizing and drawing a picture in their mind. Both quantitative and qualitative results indicated that the participants' engagement in mental image drawing resulted in the best recall performance since drawing forced the ESL learners to process information in multiple ways including visually, kinesthetically, and semantically. Through this experiment, the researcher found internalizing newly learned words was a powerful way to boost the participants' memory which ultimately increased their word retrieval and recall.

Fernandes, Wammes, & Meade, (2018) investigated the effect of drawing on learning process and memory enhancement. Specifically, these researchers showed that this technique can be applied to enhance learning of individual words and pictures as well as textbook definitions. Fernandes, Wammes, & Meade, (2018) found that drawing is a reliable, replicable means of boosting performance. In this thesis study, based on the mixed method results, this researcher convincingly maintains that this strategy may work for all students, not just ones who are able to draw well. The researcher also asserts that teaching vocabulary through Multi-Sensory Drawing technique resulted in better recall because of how the information was encoded in memory. The participants' successes in recalling the target words could be another example showing that "there are evidence for common mechanisms for speech production and sequential movement, but there is also

some indication that the hands and arms and the vocal tract may be represented in neighboring sites in certain brain regions"(Erhard *et al*.,1996).

In their research, Bonda *et al*., 1994 found that during the motor tasks, particularly the two tasks involving hand movement, there was that portions of Broca's areas (a region in the frontal lobe of the brain with functions linked to speech production) which were also activated. Based on their research, Iverson & Thelen (1999) showed that the speech articulators and the hands and arms are closely related.

In this thesis, the Community College ESL students described the Multi-Sensory Drawing technique as an effective technique to learn and recall vocabulary which is in line with the above research findings. During the vocabulary instructional sessions, when ESL participants drew a word, they had to elaborate on its meaning and semantic features while they were engaging in the actual hand movements needed for drawing (motor action), as well as visually inspect the created picture of their drawings (pictorial processing). Therefore, when they draw, they encoded the memory in a very effective way, layering together the visual memory of the image in their mind, the kinesthetic memory of their hand drawing the image, and their semantic memory which was invoked when they engaged in meaning-making. Based on the results of this study, it can be argued that the Multi-Sensory Drawing technique increased the likelihood that the new words that were drawn could later be recalled by the participants

The Circle Rotation technique

The Circle Rotation technique was another subdivision of neurocognitive, metacognitive and social cultural techniques incorporated into this study. The participants had to process and internalize the new vocabulary by standing in front of each other and

use the target words in a sentence or a short conversation with the student they are facing. so that the two students facing each other used their word in at least one sentence. Then students had to rotate to the right and repeat the process with the new student they were facing. The required, yet reserved, physical activity and movement during the articulation for this technique served to help the students to learn and recall the target words.

Iverson & Thelen (1999) pointed out that "additional evidence for neurophysiological connections between language and movement comes from research demonstrating that brain regions traditionally known as 'motor areas' become active in language tasks, even the cerebellum, the portion of the brain most closely identified with movement." The research findings of Petersen *et al*. (1989) pointed strongly to connections between the cerebellum and classical 'language areas' such as Broca's area. Since the Circle Rotation technique engaged the experimental group participants both in speech production and movement, it can be concluded that it helped them to learn the target vocabulary better in comparison with the control group who learned the target vocabulary passively.

From the researcher's point of view, these findings were applicable in the current study in which the Circle Rotation technique helped the participants to activate their language and movement brain areas (Broca's and cerebellum) which appears to play a critical role in the generation of coherent sequences of body movements and word production. There is thus compelling evidence in this study that the Community College ESL students' learning and recall of the target words through the Circle Rotation

technique is aligned with neurophysiological evidence suggesting that, in adults, physical movement and speech are inextricably linked in the brain.

The Storytelling technique

The Storytelling technique was also employed when the researcher taught the vocabulary to the Community College ESL learners as well. This technique is based on creativity and association. The researcher put the participants in the experimental group into two or three member groups and asked each group to write a story using the new vocabulary, and they could then practice and share their story with the entire class later. This interactive technique is used effectively in vocabulary teaching, while the participants are also required to create a story using their new words for that purpose. Indeed, by creating the stories, the participants had to have and retain the concept in their background knowledge through their own culture and language, and from that jumping off point they could focus on new ESL vocabulary decoding and rehearsing. The dynamic and interactive aspect of the story telling techniques offered this opportunity for the participants to use and recall new words in their oral and written skills.

During the vocabulary instructional sessions, the researcher observed how the experimental group was creative and had semantic maps to connect the target words with related events and ideas. The Storytelling technique successfully determined the background knowledge of the participants and helped them to use their background knowledge and connected them to newly learned vocabulary. For example, the participants worked together in pairs to create a story where one partner suggested the idea of the story, and the other one outlined the ideas on a piece of paper, and both worked together to the content that was built on what they already know. Once they were

done with the story, they reviewed the story and made sure that they used the target vocabulary in their story then ultimately they had this chance to share their story with the entire class and get feedback both from the researcher and their peers.

Through the Storytelling technique, the participants actively manipulated the vocabulary several times in order to shape their stories. In this way, they actively promoted their long-term recall and retention of the new words and concepts.

The researcher found that storytelling is an ideal technique to teach ESL words since it considers the ESL students' needs by helping them use their own culturally generated story, yet in the new context of ESL vocabulary. It is worth mentioning that the Storytelling technique also supported and enhanced the relationship between the Community College ESL participants as to both creating new knowledge as well as learning from others.

The researcher believes that the vocabulary instructional techniques in this study triggered a different sense of the ESL learners and helped in the process of retaining new vocabulary effectively for the language learner. Another factor that contributes to the effectiveness of the neurocognitive, metacognitive and sociocultural instructional techniques that resulted in participants' new vocabulary learning is that these techniques helped them to accelerate word recognition and eventually assist them to allocate part of their working memory capacity for word processing by filtering the working memory capacity. In addition, the instruction of new words via the neurocognitive, metacognitive and sociocultural instructional techniques exposed the participants several times to unfamiliar words during the instructional sessions. There are several studies that showed

exposing second language learners to the target words will hence increase their word retention (Hong, 2010; Kost et al., 1999; Schmitt, 2008; Yoshii, 2006).

Thus, vocabulary techniques in this study, aimed at exposing the participants to target words through different modalities that helped them to engage in internalizing new vocabulary by rehearsing them several times in group interactions through conversation and writing, all of which led to increase their word retention. Webb (2007b) suggested that to develop full knowledge of a word, more than ten repetitions may be required. This finding of this current research is in line with Nation's (2001) that a lexical item needs to be met many times in order to be learned.

To support the prominent role of exposure and context, Schmitt (2008) states that, "Words will have to be met in many different contexts in order to develop mastery of the different word knowledge types, and this entails a long-term recursive approach to vocabulary learnin" (Schmitt, 2008, p. 335).

Keeping all of the above in mind, the rationale for why participants of this study revealed improvement or increase from pre-to post-tests might be attributed to the large number of exposures or encounters to the target words and strong reinforcement and vocabulary practices. In other words, factors such as using the target words by the participants in speech and writing (Newton, 2013) contribute positively for long-term word recalling. Putting together the findings of long-term word retention in terms of the effectiveness of the neurocognitive, metacognitive and sociocultural instructional techniques on learners' vocabulary acquisition, it can be conferred that inclusion of the neurocognitive, metacognitive and sociocultural instructional techniques provided more beneficial effect than supplying the textual definition of the words alone.

In sum, it can be concluded that the neurocognitive, metacognitive and sociocultural instructional techniques were effective for L2 learners' word learning, recall and retention. The next section discusses the efficacy of the neurocognitive, metacognitive and sociocultural instructional techniques in light of the theoretical frameworks of this study.

Reflections on Chosen Theoretical Frameworks in Language Learning and Teaching

Convergence of the neurocognitive, metacognitive and sociocultural instructional techniques over the traditional method of vocabulary teaching was shown through the result of this study. The three underlying theoretical frameworks of the present study, Mayer's (2005, 2014) cognitive theory of multimedia learning, metacognition in relation to language awareness (Haukås, 2018), and sociocultural theory (Vygotsky, 1978), supported the efficacy of the neurocognitive, metacognitive and sociocultural instructional techniques versus the traditional method of vocabulary teaching.

Mayer's (2005, 2014) cognitive theory of multimedia learning

In this study, the ESL vocabulary was presented to the Community College ESl students. The results of this study implied that the availability of visual and verbal annotations, along with textual definitions and examples, assisted the ESL learners to perform better on vocabulary tests than a solely a single annotation definition for the word. It seemed that the multi-independent, but interrelated verbal (text, spoken, audio) and visual (pictures/illustrations/videos, animations) channels helped the experimental group process the information by making referential connections between these multi-

modes of the target vocabulary. According to Mayer & Anderson (1991), the referential connection of the modes has an additive impact on learners' recall which was "complement each other in facilitating retention of information" (Akbulut, 2007, p. 500). In this study vocabulary learning occurs effectively and better since both verbal and visual information are presented to the ESL learners. Mayer (2001) pointed out that "presenting an explanation with words and pictures results in better learning than does presenting words alone" (p. 78). The participants of this study who were taught new vocabulary through the Pictorial-Auditory technique learned and recalled the new vocabulary better than the control group. The rationale for the better performance of the experimental group is in line with cognitive theory of multimedia learning.

Mayer's Theory (2005, 2014) is based on several principals and the researcher of this study considered some of these principles while creating the vocabulary instructional techniques in this study:

The Dual Channels principle

The dual channels principle suggests that humans have two separate information processing channels (auditory/verbal and visual/pictorial). Information such as spoken and written words, narrations, and sounds is received via the auditory/verbal channel through the ear; information such as pictures, graphs, and videos/animation clips, and on-screen texts is received via the visual/pictorial channel through the eyes.

In this dissertation study, the researcher believes that when the community college ESL participants encoded target words as new information in both visual and verbal formats, they successfully processed the new words in two channels and they could retrieve the vocabulary better when needed for use in their speaking or writing.

This is attributed to the fact that the experimental group first selected a relevant word(s) and/or image(s) from the input (*i.e*., text) they received in both verbal, whether written or auditory, and visual, or pictorial, channels. The experimental group then processed the information into their coherent verbal and visual representations and sent it to their working memory.

The Limited Capacity principle

The Limited Capacity Principle is based on this fact that each channel has a finite capacity or cognitive load, that is, the amount of information that learners can process in each channel at one time is limited. According to Mayer (2014) "When an illustration or animation is presented, the learner is able to hold only a few images in the visual channel of working memory at any one time, reflecting portions of the presented material." (p. 49). The same is also true when learners are presented with a narration in that they can only hold a few words in the verbal channel of working memory at any one time. (Mayer, 2014).

With regard to the findings of this study, simultaneous display of multimedia principles helped the ESL learners to learn and recall new vocabulary better since they were exposed to both verbal and visual information rather than either alone (Mayer, 2014, 2004). The findings of this study indicated that the experimental group participants showed better performance in learning vocabulary because verbal (definition, examples and audio) and visual (picture and video/animation) information were presented simultaneously, reinforcing their vocabulary learning, retrieving and recall. Therefore, based on Sweller (2005) and (Mayer, 2014, 2004), the researcher of this study argues that simultaneous definitions and video/animation allowed the brain to process verbal and

visual information in working memory, and retrieve the information faster in long-term when required.

In this study, the rationale to present the new words information at the same time was to avoid overloading learners' cognitive capacity. It has been suggested by Mayer and Fiorella (2014) that simultaneous presentation of the multimedia materials might decrease or even eliminate the need to retain the information in working memory for a long period of time. Therefor teaching new vocabulary through the Pictorial-Auditory technique was more likely to contribute to the experimental group's word learning, reduce loads of materials, and ultimately provide benefit to better recall.

Thus, the Pictorial-Auditory technique is in line with the Mayer (2008) that deems the creation of connections between words and images as pre-requisites of meaningful learning and the presentation of the materials at the same time facilitates this link and enhances long-term recollection.

The Active Processing principle.

The Active Processing principle starts with the premise that learning is based upon prior knowledge. Active processing is then the active process of filtering, selecting, organizing, and integrating the learned information. It is thus by building a connection between verbal and visual representations that the second language learner is able to arrive at an integration of these respective elements into the learner's existing knowledge. Some cognitive activities should be processed in long-term memory and brought back into the short-term memory. The following processes form respective facets of the active cognitive process: (1) selection of relevant words for processing in verbal working memory, (2) selection of relevant images for processing in visual working memory, (3)

organization of selected words into a verbal model, (4) organization of selected images into a pictorial model, and (5) integration of the verbal and pictorial representations with each other and with relevant prior knowledge activated from long-term memory (Mayer, 2014, p. 54).

In the present study, the participants were adult ESL learners at the Community College. They likely had the concept of new words on their minds based on their native language. Therefore, ESL learners might integrate the verbal and visual information of the newly introduced English words into their prior knowledge. However, for the new vocabulary to stay in their long-term memory, the participants had to actively move back and forth from long-term memory to working memory, building referential connections between the two formats (Mayer, 2014, 2001, 1997; Jones, 2004). In order to relate the findings of the present study to Mayer's cognitive theory of multimedia learning, it can be implied that the presence of the interrelated, verbal (L2 definition & pronunciation) and visual (video/animation) information aided the participants to establish direct mental connections between the two channels in short-term memory and facilitated the effective long-term word retrieval.

The results of this study revealed that combining text, audio and pictures/ video/animation helped the experimental group to have higher growth in productive recall and recognition tests; thus, the new words that were taught with the Pictorial-Auditory technique were better assimilated than new words presented with a text definition alone. These findings are in line with previous research revealing the "combining definitions of words with associated visuals regardless of the type of visual used is more effective in facilitating vocabulary learning than providing only definitions

of words" (Akbulut, 2007, p. 513). Therefore, the results of the current study are directly in keeping with Mayer's theories which conclude that the presentation of a new vocabulary word with the simultaneous presentation of verbal and/or visual cues is a more effective technique for the ESL student's learning and recall than solely presentation of the new vocabulary words with the definition alone.

The community college ESL learners in this study enhanced their input from a multisensory presentation that included both verbal and visual vocabulary information. Verbal and visual introduction of the new English vocabulary information was presented to the ESL participants at the same time in order to help prompt input of target word learning as well as to foster retention and recall of the target words when needed for use them in the the students' both in and out of the classroom.

Metacognition in relation to language awareness (Haukås, 2018)

Metacognition in relation to language awareness (Haukås, 2018) was another theoretical framework for this study. To the best knowledge of the researcher, there still remains inadequate research relating to the critical role of metacognition in second language learning and teaching. Wenden (1987) was only the first researcher to emphasize the significance of metacognition in language learning and teaching. Most recently, Haukås (2018) presented the concept of metacognition in a manner analogous to other concepts related to cognition and thinking. According to Haukas, metacognition is "an awareness of and reflections about one's knowledge, experiences, emotions and learning" in language learning and language teaching. In considering aspects of thinking about language learning and teaching, Haukås (2018) asserts that,

> Metacognition relates to an awareness of and reflection on one's knowledge, experiences, emotions and learning in all domains, whereas its subordinate

> category, Language awareness, relates to reflections on one's knowledge, experiences, emotions and learning in three subdomains: Language, Language learning and Language teaching. Obviously, these domains are closely related, and metacognition in language teaching, for instance, typically involves reflection in all three domains simultaneously. (Haukås, 2018, p. 18).

As metacognitive techniques help learners manage their own learning processes independently (Nunan, 1990), the development of the Community College ESL students learning autonomy was a central focus in instructional vocabulary techniques, which sought to raise participants' awareness of learning processes and strategies to help them learn new words effectively. Learner autonomy is "essentially a matter of the learner's psychological relation to the process and content of learning – a capacity for detachment, critical reflection, decision-making, and independent action." (Little, 1991, p. 4). All presented vocabulary techniques in this study (the Pictorial-Auditory technique, the Multi-Sensory Drawing technique, the Circle Rotation technique, and the Storytelling technique) encouraged the ESL engagement in learning vocabulary in the classroom. With the dynamic method of vocabulary instruction ESL learners exhibited a better ability for engaging with the vocabulary techniques, making more consistent use of target words to produce better learning outcomes. Moreover, the vocabulary techniques allowed the participants to shape and define their learning and to display their personal autonomy as it was revealed in their discussion in focus group interview and questionnaire. In other words, the degree of the ESL learners' achievement with this study seemed to be strongly linked to their own conceptualization of success. As a result, the experimental group involved themselves more in collaborative learning and proved more successful at learning new vocabulary.

The researcher of this study observed evidence of the distinct effectiveness of metacognitive vocabulary instruction technique, with some participants mentioning that they were aware of how the vocabulary techniques were appropriate for learning new vocabulary and they made efforts to monitor their learning. This result emphasizes the importance of including explicit teaching techniques in the classroom and supports the experimental group in the present study who were active in following the vocabulary instructional techniques more involved in their learning processes by interacting with their classmates to plan, monitor, and evaluate their progress in the vocabulary learning and recall.

Moreover, it could be argued that that metacognitive helped the participants to transfer their vocabulary knowledge in writing and speaking and this helped the Community College ESL participants to become more aware and autonomous in contexts beyond the language classroom. Since the vocabulary instructional techniques in this study successfully assisted the participants to set their own learning goals, monitor their task performance, and evaluate their results in terms of vocabulary learning, this was effective to retrieve newly learned words and use them in other contexts.

From the perspective of the participants and the researcher, it is clear that the vocabulary instructional techniques had a positive effect on both the participants' learning awareness and their vocabulary learning and recall. When the researcher contrasted the results of the questionnaire and focus group interview, it was evident that most of those Community College participants thought that the techniques helped them to learn, recall and use the target words effectively. In fact, after the pedagogical intervention, some students' perspectives revealed that they enjoyed their learning since

they had the opportunity to collaborate with their peers during the vocabulary instructional sessions. In other words, the vocabulary techniques facilitated the use of social strategies for vocabulary learning and collaborative work among participants. Collaborative work was one of the main aspects of these vocabulary lessons as the ESL participants felt confident when they had the opportunity to use target words in their story and solve problems through interaction with peers. This finding is in line with Van Boxtel, Van der Linden, and Kanselaar (2000) suggesting that 'collaborative learning activities allow students to provide explanation of their understanding which can help students elaborate and organize new knowledge" (p. 311).

The researcher of this study believes that the metacognition model by Haukås (2018) helped the researcher to create vocabulary instruction techniques that better helped ESL learners in defining their knowledge gaps and setting goals to more efficiently and adequately overcome their vocabulary learning and recall difficulties.

Sociocultural Theory (Vygotsky, 1978)

The main focus of sociocultural theory is learning and development which is embedded within social events and learning happens when a learner interacts with other people, objects, and events in the collaborative environment (Vygotsky, 1978). The knowledge that is constructed through interaction with other people during social activities is a core assumption of sociocultural theory (Alvermann &,Unrau, 2013). As noted above, according to Vygotsky (1978, 1986) sociocultural theory has several aspects such as the ZPD and scaffolding.

The ZPD was one of the prominent constructs in Vygotsky's theory of learning and development (Vygotsky, 1978). Vygotsky defined the ZPD as: "[T]he distance

between the actual developmental level (of the learner) as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). A learner's potential development refers to the gap between a learner's current capabilities and understandings and the ones that the learner has yet to achieve.

In this study, the researcher was aware of the impact of the ZPD on vocabulary learning. Having that in mind, the researcher proposed the instructional vocabulary techniques. Findings of this study showed that through the vocabulary instructional techniques, the Community College ESL students vocabulary learning has been scaffolded by both the researcher as a facilitator and by peer group interactions. In other words, vocabulary instruction was perceived as a social dialogue with new words meanings constructed via scaffolding and collaboration while ESL participants worked cooperatively to construct definitions of words and participate in collaborative discussions about new vocabulary. Given that the ESL students at the community college are adult learners, their vocabulary knowledge is already developed in their first language. Therefore, their background knowledge, world knowledge and other experiences are considered as an ESL classroom asset.

The social dialogue generated through the vocabulary instruction in this study helped students to make semantic connections and use newly-learned words in different contexts. During the vocabulary instruction sessions social conversation became habitual in classrooms.

The reliance on sociocultural theories in practice for this study was significant for word learning, as collaborative practices enabled the researcher to critique the old-

fashioned, deep-rooted notion that vocabulary instruction is merely a process of providing verbal definitions of words all the while with the language learners remaining *passive* learners. Instead, through the vocabulary techniques of this study, the experimental group was able to willingly engage in the word-learning process interactively. The researcher submits that collaborative interaction through scaffolding fostered the participants' vocabulary learning beyond their recognized current ability to solely recall meanings.

The prevalence of sociocultural theory in the current study showed the benefits of handling vocabulary instructional techniques around the activation of prior knowledge, accompanied by active use of newly learned words in meaningful productive skills such as writing and speaking. In the study several recurring techniques occurred in the six successive vocabulary instructional sessions. First, all techniques consisted of various interactional involvement. For example, the Pictorial-Auditory technique requires all participants to use their newly learned words with their peers. The words served as object mediators. Second, collaborative scaffolding was also incorporated into all techniques such as the Multi-Sensory Drawing technique, the Circle Rotation technique and the Storytelling technique. Donato & MacCormick (1994) stated that collaborative dialogues can lead to the co-construction of linguistic development and meanings. For example, the Storytelling technique required students to work in groups and write a story using new vocabulary

In the case of this study, the Community College ESL participants were bilingual or multilingual learners with different educational background knowledge. Indeed, the immense potential that they brought into the class was comprised of their overall

intellectual, linguistic, and creative strengths that they looked forward to building upon by learning English. The researcher attempted to provide the participants appropriate learning experiences and empowered them to realize their potential development. The goal of the vocabulary instruction techniques in this study was to foster the experimental group autonomy and their ability to engage in their own learning so as to promote their capability to understand and comprehend new vocabulary and use all of their vocabulary actively in their speaking and writing in various situations that the world presents.

Collaboration is a pivotal aspect in the ZPD, as Vygotsky emphasized that learning is a social process. Based on sociocultural theory, when learning occurs in the ZPD, the learners learn through dialogic interactions with peers. However, the learners still need appropriate guidance, modeling, and assistance, all of which are provided through collaboration with teachers. Bearing that in mind, the researcher deliberately constructed these collaborative structures, ensured that through the vocabulary instructional techniques the experimental group could participate in worthwhile conceptual and analytical practices. Based on that, the ESL participants were able to move through their zone of proximal development and eventually into the space of internalization and autonomy, which is the goal of learning new vocabulary actively.

In sum, according to the findings in this study, the application of Vygotsky's Sociocultural Theory was successful in vocabulary instruction and learning to the Community College ESL learners which is consistent with past educational research. An added consideration is that the sociocultural theory in practice with the vocabulary instructional techniques was effective because the theory was relevant to the adult learner. With the implication of the Sociocultural Theory, this researcher was able to

successfully teach adult learners ESL and observe their progress informally over their speaking and writing.

To sum up, this study was based on three theoretical frameworks: (1) Mayer's (2005, 2014) cognitive theory of multimedia learning, (2) metacognition in relation to language awareness (Haukås, 2018), and (3) sociocultural theory (Vygotsky, 1978). Convergence of these three frameworks has led to the combination of neurocognitive, metacognitive, and sociocultural techniques. Combination of these techniques in this study shaped the new framework that has aided the ESL experimental participants' learning and recall of the target words more effectively. And that is the overall result even though a few participants, for instance, did find one or so of their personal results having received a less favorable ranking. As such, the testing results have confirmed that the outcome of the combination of these techniques resulted in the ESL experimental group participants learning and recalling the target words better in comparison to the ESL control group, who learned the target words through a traditional method. Obviously, teaching vocabulary based on the traditional method alone does not accommodate all learners' needs. In this study, the control group learned the target words based on a traditional method, *i.e.*, using word text definition alone. Based on this study's findings, the control group learned vocabulary noticeably more passively and were not as successful in long-term recalling. Although solely relying on one mode of vocabulary learning may bring about the ESL learner's ability to *recognize* newly learned words, it is not likely to expand that learner's ability to *use* words in a productive mode. Individual learners have different styles of learning, and teaching new words based on one modality does not necessarily result in a productive and long-term retention. In the present study,

the inclusion of the three – neurocognitive, metacognitive and sociocultural – techniques led to the greater depth of processing vocabulary and secured a perceptibly longer-term retention of the test words within the experimental group.

Bringing the above-noted three theoretical frameworks together has consequently taken into consideration and offered a more holistic view of needs of all language learners. Even if a learner may withdraw from one aspect of the structure of this vocabulary instruction method, the outcome of the combination of these three frameworks into a more holistic learning experience has exhibited and confirmed the positive impact available for an ESL learner's vocabulary learning process.

Significance of the Community College ESL Programs

The importance of community college ESL programs is obvious as they serve a large and diverse mix of students, with different age range including immigrants who graduated from K–12 schools, high school, college, or international students and working-age immigrants. The number of community college ESL students is growing. For example, more than 58,000 students attended the ESL program at community colleges across California in the 2016–17 academic year (Rodriguez, Bohn, Hill & Brooks, 2019).

ESL classes in the community colleges is highly diverse. For instance, the ESL students participating in this study were very diverse. In this particular class the ESL students represented a wide range of racial, ethnic, linguistic and cultural backgrounds. For example, a large proportion of the ESL students' first language were Urdu, Arabic, Chinese, Amazigh, Dari, Mongolian, Farsi, Portuguese, Spanish, and Vietnamese. The participants' population was also made up of students with varying degrees of academic

and even English knowledge backgrounds. According to Jiang & Kuehn (2001) some of these students may or may not receive formal instruction in English in their countries of origin and therefore had varying English vocabulary, reading comprehension, writing, and other language development needs. The quality of formal instruction — whether in English or a native language — can be indicative of general academic preparation and has implications for how English language skills develop (Jiang & Kuehn, 2001; Mamiseishvili, 2012).

After observing the ESL classes at the target Community College, the researcher realized that the ESL populations in both control group and experimental group were highly diverse with regard to age, first language and culture, gender, socioeconomic status, and educational level. The observation sessions helped the researcher to prepare and design the lesson plan based on the needs of the participants who were multilingual and multicultural. While preparing the vocabulary lesson plan based on the neurocognitive, metacognitive and sociocultural techniques, through personal and credential experience, the researcher was aware of the background strength of the ESL participants as well as the challenges that they may have encountered inside the class and in the society in general. The researcher of this study was aware that holistic perspective on the ESL students' vocabulary development goes beyond theories of second language acquisition theories. ESL students "need more than academic knowledge. They need to be comfortable with hybrid identities, competent in reading power relations and challenging everyday assumptions, and agentive in the face of inequities." (Teemant, Leland, and Berghoff, 2014, p. 137).

Based on the participants' diversity and backgrounds, the researcher created the vocabulary techniques as reliable quality criterion for vocabulary instruction that inspired the students' engagement. Sociocultural theory (Vygotsky, 1978) helped the researcher to propose and enculture perspective to create the vocabulary instructional techniques based on the participants' needs. As Tharp, Estrada, Dalton, & Yamauchi (2000) stated "Students, like teachers, have much to learn from one another and expanding joint activity beyond existing affinity groups can enrich these opportunities" (p. 67).

The proposed vocabulary techniques in this study created this opportunity for the researcher to regularly advance the participants' vocabulary learning within the zone of proximal development (ZPD) (Vygotsky, 1997). Through the inclusion of vocabulary techniques, the ESL experimental group's cognitive development was advanced by social interactions between a less capable students with a more capable ESL student when activities were slightly above the less capable level of English competence.

The researcher also mediated social relationships between the diverse ESL participants by creating and fostering positive interdependence (*i.e.*, sharing their stories and ways of interpreting the new words) through meaningful collaboration.

The researcher as the facilitator in the ESL class used multiple, simultaneous, and diversified vocabulary instructional techniques focused on the participants' joint English vocabulary knowledge and productive skills (writing & speaking) in order to help them to obtain, retain and recall newly learn vocabulary in long-term. It is worth noting that during the vocabulary instruction, the researcher tried to build a culture of recognition by privileging student voice, thinking, and connections through the vocabulary instructional

techniques and making real-world connections between their vocabulary knowledge and their lives in and outside the classroom.

Through the vocabulary techniques, the researcher successfully made the interactive space between oneself and the ESL experimental group in order to help the participants have a better vocabulary learning experience. Vygotsky (1978) argued that (classroom) knowledge is cultural, learning is social, and teaching is assisting.

The community college ESL classes are unique as the students bring multiple linguistic repertoires and varied cultural perspectives to the class. Garcia and Wei (2015) argued that community college ESL students who are multilingual and multicultural have additional skills, including a metalinguistic awareness that enables them to use different variations of language or understandings of culture. Most of the ESL students at the community college are multilingual and this is beneficial for them to be more cognitively advanced for understanding and interpreting classroom material better than monolingual students (Nuñez et al., 2016).

The researcher of this study believes that through the proposed vocabulary techniques, the researcher was able to empower the ESL participants by viewing their multilingualism and biculturalism as an asset. For example, the techniques inspired the ESL participants to engage with the class and share their ideas and sentence examples in their conversation during the instructional sessions. In their research, Oropeza *et al*. (2010) showed that students feel inhibited from actively participating in class since they are not confident of engagement owing to their accents. The researcher occasionally expressed to the ESL participants that there is inherent pride of bilingual or multiannual

which was very helpful to the ESL students to develop a sense of historic identity and cultural connection.

The researcher of the current study found out that through the proposed vocabulary techniques and a well-structured ESL vocabulary instruction, the researcher could foster community college ESL vocabulary learning that would be beneficial for the students' personal and academic achievement as well as employment opportunities in the near future.

Emergence of Socio-Neurocognitive Method in Language Learning & Teaching

This study has been presented within three frameworks – (1) Mayer's cognitive theory of multimedia learning (2005, 2014); (2) metacognition in relation to language awareness (Haukås, 2018); and (3) sociocultural theory (Vygotsky, 1978). This dissertation helps illustrate how a combination of the neurocognitive, metacognitive and sociocultural techniques confirmed a statistically positive impact on the learning and recall of productive vocabulary by the experimental adult ESL learners. The researcher believes that the combination of these techniques may have significantly advanced educators' understanding in this foundational area of second language acquisition.

The contribution of combined neurocognitive, metacognitive and sociocultural frameworks for this study has led to the creation of what the researcher calls a "Socio-Neurocognitive" method. This study provided tangible evidence of the effectiveness of the Socio-Neurocognitive method on vocabulary learning and recalling for adult ESL learners with a range of different backgrounds and diversity.

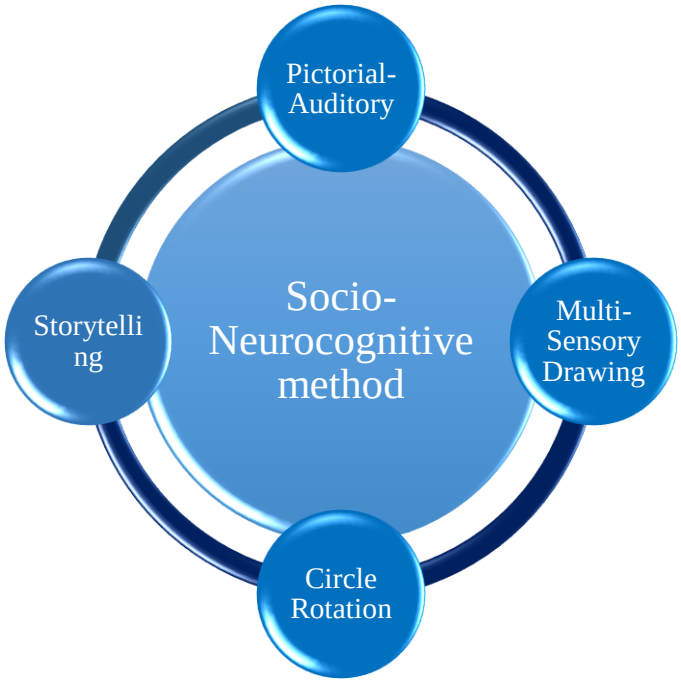
The author of this dissertation created the Socio-Neurocognitive method with four technique subdivisions: (1) the Pictorial Auditory technique; (2) the Multisensory

Drawing technique; (3) the Circle Rotation technique; and (4) the Storytelling technique. The researcher claims that the Socio-Neurocognitive method introduces a new way of language learning and teaching as it draws on the convergence and interrelatedness of these four frameworks that suits a range of diverse ESL learners.

Figure 7 shows the Socio-Neurocognitive method with its four technique subdivisions.

Figure 7

Socio-Neurocognitive method & four technique *subdivisions*



As illustrated by figure 7, the four techniques (the Pictorial-Auditory, Multisensory Drawing, Circle Rotation and Storytelling techniques) are intertwined surrounding the principal notion of the Socio-Neurocognitive method. Yet the researcher of this study argues that these vocabulary instruction techniques are as closely knitted with each other as with the main method (Socio-Neurocognitive method). These

techniques were designed by the researcher to facilitate second language vocabulary instruction of adult learners. The findings of the current study have showed that these techniques exhibited a beneficial purpose and productivity for adult ESL learners to obtain, retain and recall new vocabulary, successfully transferring more passive vocabulary into active vocabulary. Through these techniques the language learners not only were shown to be better at learning and understanding the target words of the English language, but also became more able at passing along this receptive vocabulary knowledge into the productive skills of writing and speaking.

The Socio-Neurocognitive method and its four technique subdivisions provide and allow the inductive approach to teach vocabulary meaning directly. For instance, in the first subdivision of this method, the Pictorial-Auditory technique, the language teacher can present word meaning by using visual/video or animation along with pronunciation of the word as well as its definition and a sentence example. The Pictorial-Auditory technique entails the process of receiving new words (input), and connecting the meaning to their output system through verbal (aural or written) and visual stimuli. This technique fosters communicative competence in the target language, which includes comprehension of the cultural and situational context of such communication.

The second subdivision of this method is the Multisensory Drawing technique. This technique enhances the information processing in various ways such as visually and kinesthetically. Through this research experiment, the researcher has noted that drawing the target words was a powerful way to boost the participants' memory, leading to long term vocabulary learning and retention. Drawing the target words with closed eyes, while pronouncing and visualizing images of the words simultaneously, affect a student's

ability to remember words more thoroughly. Indeed, the benefits of the Multisensory Drawing technique is that since it is not and should not be dependent on or exercised with any emphasis on ta student's level of drawing talent, the researcher suggests that this technique may work for all language learners, not just ones who are able to draw well. According to this study experiment, the researcher has confirmed that Multisensory Drawing provided a remarkable boost to language learners' ability to remember what they were learning. The researcher believes that drawing new words results in better recall therefore when a language learner draws a word, the word is encoded in the memory in a very systemic way – layering the visual memory of the word, the kinesthetic memory of their hand drawing the image of the target word, and the semantic memory which engages the language learner in meaning-making.

In addition, through the Multisensory Drawing technique the language learners help each other to internalize the new words by working together in groups. Through the social and cultural interaction, language learners establish connections between linguistic features of their mind image and private speech and share it with the partner through social performance. The Multisensory Drawing technique engages social interactions and connections which are rich, complex, and packed with meaning. Through this technique second language learners can elaborately weave their newly learned words into manifold layers of social fabric. Therefore, learning new vocabulary through the Multisensory Drawing technique may greatly increase the likelihood that the learner is able to later recall target words from long-term memory.

The third subdivision of the Socio-Neurocognitive method is the Circle Rotation technique, which aims to help language learners acquire new words better while engaging

in physical, social and cultural interactions. When language learners walk, stand and mingle in a group while verbally interacting with each other and using the newly learned words, they foster greater cognitive ability more efficiently. This enhances the deep learning process which is assisted by physical movement when the main region of the brain responsible for motor skills is activated. For example, the cerebellum is activated during physical movement and its function is visual processing, spatial perception, and cognitive abilities. This means that when a language learner uses the social brain areas to engage in physical movements and uses the newly learned words in communication with peers, the learner is also making the learning process more retainable in long-term memory through such cultural and social interactions and exchanges.

Collaborative scaffolding is also incorporated into the Circle Rotation technique. Collaborative dialogues that emerge from students' communication can lead to the co-construction of vocabulary retention. This technique requires students to work in groups and to incorporate and communicate the newly learned vocabulary in their conversations. Thus, vocabulary development occurs through this interaction with others in their groups. This helps the students to develop ZPD and learn from each other while exchanging observations about their cultures while using the newly learned vocabulary in their conversation.

The fourth subdivision of the Socio-Neurocognitive method is Storytelling. The Storytelling technique provides the opportunity for a language learner to both create and listen to stories that incorporate the newly learned words. Language learners work collaboratively to create a story while involving the newly words and ultimately share that with the entire class. Based on the findings of this study, the researcher reached the

conclusion that the Storytelling technique is an effective tool to learn second language words and recall them in long-term. According to Martinez-Conde et al. (2019), the "language network" in the brain becomes consistently activated when people listen to narratives. Based on JGR Communications (2016), through storytelling the language-processing parts in the brain are activated. Moreover, stories activate multiple senses in the brain: motor; auditory; olfactory; somatosensory; and visual. The researcher of this study argues that since the Storytelling technique stimulates the language learners to incorporate newly learned words in their stories, it becomes easier for the brain to imagine, elaborate and recall those words later.

Devising a story is a typical interactive technique through which the language learners have to construct a story in a grouped setting by connecting and using the target words in their stories. Each member of the group has an opportunity to add new dialogue and characters to the story. For the vocabulary learning process in particular, while language learners are deciding on how to incorporate the new words in the story, the learners are spontaneously rehearsing the words over and over in their mind. While the purpose of this technique is guided to thinking in the target language and using the vocabulary both in writing and speaking, using the newly words in the created stories encourages the language learners to talk and discuss with each other based on their own culture and background knowledge. The Storytelling technique requires the language learners to rewrite and complete stories and rehearse each before sharing that story with their peers in class, and therefore they have to use the words in their writing and speaking. Moreover, through collaboration and social interaction, creativity and interpersonal skills become stronger by creating stories in groups.

The results of this research led the researcher to create and introduce the Socio-Neurocognitive method and its four subdivisions techniques as an alternative method in teaching second language vocabulary. The Socio-Neurocognitive method centers *teaching* and *learning* a second language on the relationships that all participants in the language class create with each other. These relationships form the core of memorable learning. The Socio-Neurocognitive method is a form of alternative language learning with an emphasis on different aspects of the learning experience from that which is typically used in second language teaching and learning.

True to its title, the Socio-Neurocognitive method – as a new framework emanating from the neurocognitive, metacognitive and social cultural concepts – places an emphasis on the holistic aspects of language learning instead of emphasizing only one modality of teaching a second language.

Based on the findings and evidence of this research, the researcher claims that the Socio-Neurocognitive method is an effective method to employ in second language classes since the method engages language learners in the learning process and requires learners to be active learners and interact with each other while thinking about what they are doing and learning as individuals (metacognition); pairs or structured groups. The core elements of the Socio-Neurocognitive method is both strengthening the language learners input and, more importantly, building up output layers of the student's learning by engaging in social interaction and communication with their peers in the class. The researcher argues that the benefits of Socio-Neurocognitive method include: focus on a language learner's active learning; improving second language vocabulary retention; development of personal and interpersonal communication and higher hierarchy of

thinking skills; and learning and rehearsing in small groups toward a common goal. The core element of the Socio-Neurocognitive method is focus on language learners' interactions rather than on learning as a solitary activity.

Based on the best knowledge of the researcher, the role of holistic learning that integrates the neurocognitive and social interactions in language learning has been widely overlooked thus far. The researcher proposes that continued studies on adult second language learning should further explore the powerful impact of this new Socio-Neurocognitive method. The researcher believes that this method is beneficial for vocabulary learning. First, the target language use intended as communication is an interactive phenomenon, relying on the ability of the language learners to infer others' mental states and to coordinate with each other in successful language production. Second, in adult learners, this method provides multisensory learning that can help to disambiguate the meaning of a new word; analogously, collaborative learning represents one of the easiest ways for adult learners to learn new words and can enable long-term retention by social interaction. The Socio-Neurocognitive method promotes interactive language learning to foster long-term vocabulary recall.

Conclusion

The research sought to respond to the research questions relating to the efficacy of the neurocognitive, metacognitive and sociocultural instructional techniques. The objectives of the study were accomplished through five phases.

At Phase One, the researcher observed two community college ESL classes and determined one as a control group and the other one as the experimental group. In this phase, the target words to teach were selected through their class materials. A pre-test

then was administered during Phase Two. In Phase Three, the researcher proposed and designed the vocabulary instructional techniques and taught them explicitly to the experimental group. In the Phase Four, the researcher administered the post-test and finally, in the final Phase Five, the researcher conducted a post intervention questionnaire and a focus group interview. By analyzing the quantitative and qualitative data, the researcher examined whether the inclusion of the proposed vocabulary techniques had positive effects on the Community College ESL students' vocabulary learning and retention. The effectiveness of these techniques was investigated through test comparisons. Participants' scores on vocabulary tests were considered from pre-tests to delayed post-tests for long-term retention for both groups. Also, the experimental group participants' attitudes and perceptions were evaluated via a questionnaire and a focus group interview. The findings of the study aid to fill the gap in the current literature about the inclusion and domain of the neurocognitive, metacognitive and sociocultural vocabulary instruction and vocabulary acquisition as well as word retention for learners of English as a second language.

This study is significant as it has provided insight crucial to vocabulary learning and retention. The research filled the gap in the current literature, despite the limitations, in the following ways:

(a) The study tried to address the inconclusive and insufficient evidence regarding the inclusion of cognitive, metacognitive and sociocultural techniques in facilitating vocabulary learning and enhancing long-term word recollection. The general findings showed that cognitive, metacognitive and sociocultural techniques are more effective than the traditional method alone for promoting learners' vocabulary acquisition and

enhancing their long-term word retention. However, the role of the traditional vocabulary teaching method (text definition) should not be overlooked as it also helped the control group participants to learn new vocabulary partially and be receptive although somewhat less productive.

(b) The study showed that, among the experimental group, the combination of cognitive, metacognitive and sociocultural techniques was more efficient than text definition for the control group. The reason lay in the fact that with the given activity combinations engaged in with the experimental group, the learners were exposed to multisensory forms of the target words and had more opportunity for social interactions and using the target words with their peers through speaking and writing. These factors may have affected the performance of the participants and finally,

(c) Finally, the design of the study as well as its methodological approaches was another addition to the field in that it used mixed methods research to examine the efficacy of cognitive, metacognitive and sociocultural techniques through examining learners' scores on pre- and post-tests as well as their perceptions and attitudes towards the proposed techniques.

Recommendations

Pedagogical implications

The present study has some pedagogical implications for the ESL students, instructors, syllabus designers, and curriculum developers. As shown, the findings revealed that the neurocognitive, metacognitive and sociocultural instructional techniques were useful for the Community College ESL students' word learning and retention. Besides, in general, the neurocognitive, metacognitive and sociocultural instructional

techniques were more effective for vocabulary learning and recall than traditional vocabulary teaching method alone which was conducted through word definition only. There are some points that should be considered by the ESL instructors using the neurocognitive, metacognitive and sociocultural instructional techniques in language classrooms.

First, while using the Pictorial Auditory technique, the simultaneous presentation of word definitions and sentence examples should be accompanied by relevant picture or video/animations as well as pronunciation. This simultaneous presentation facilitates vocabulary learning and reduces any extraneous cognitive load on the ESL learners working memory; ultimately, it "enhances cognitive processing of multimedia information" (Türk & Erçetin, 2014, p. 16) for long-term word retrieval and recall. It is suggested that curriculum developers and syllabus designers as well as ESL teachers should consider the temporal contiguity principle of multimedia learning and present verbal and visual multimedia information of new words simultaneously in order to minimize the language learners' cognitive load and enhance the vocabulary learning and recall.

Secondly, this study's purpose was to help ESL learners to expand their vocabulary reservoir and transfer the new words into their active vocabulary. However, depending on the learning objectives of ESL students in terms of vocabulary learning, appropriate teaching techniques should be considered based on the learners' needs. If the ultimate objective of the course is to both learn new words as well as recall them in long-term, then explicit vocabulary learning and intentional vocabulary learning is welcomed followed by enough word-focused activities and exercises (Laufer & Rozovski-Roitblat,

2015; Schmitt, 2008). Thus, the neurocognitive, metacognitive and sociocultural instructional techniques can be considered as a mediator to provide ESL learners with more exposures to the target words and maximum amount of engagement.

Third, while material and curriculum developers plan to prepare and design ESL vocabulary lesson plans, they should consider the ESL linguistic and cultural backgrounds including annotations that has cultural appropriateness. In the present study, attempts were made to choose the pictures, video/animation clips based on community college ESL students' diversity and cultural appropriateness.

Fourth, preparing lesson plans through social media and educational technology tools such as Adobe Spark page or PowerPoint slides have been making the processes of learning and teaching vocabulary smoother and warrant the ESL learners' attention. It is also economically friendly and easy with copyright free access to the pictures, video and animation clips when for educational purposes.

The ESL teachers should only consider usefulness, relevance, and practicality of the technique in their own class. Moreover, teaching vocabulary based on neurocognitive, metacognitive and sociocultural techniques seems fascinating to engage the ESL learners; however, including all subdivision of the techniques (Pictorial Auditory technique, Multisensory Draying technique, Circle Rotation technique and Storytelling technique) may take a large portion of the class time. Thus, the researcher suggests the ESL teachers to present the new words first through Pictorial Auditory technique then use one of the other subdivisions in every vocabulary instructional session. It is worth mentioning that each of the subdivision techniques are integrated and dynamic techniques that may help the ESL learners to both learn and recall new vocabulary.

Fifth, while designing vocabulary lesson plans, ESL material developers and language teachers should take the ESL individuals' learning style into consideration (*i.e.,* visualizer-verbalizer dichotomy) and create ESL vocabulary materials in a way that all ESL learners can benefit. According to Plass and colleagues (1998), "visualizer-verbalizer dimension describes individual differences among students when they acquire and process visual versus verbal information" (p. 27).

Research Implications

The attempt of this study was to empirically investigate the effectiveness of the neurocognitive, metacognitive and sociocultural instructional techniques on vocabulary learning in terms of long-term word learning and recall. The following suggests some directions for future research:

First, this research created the Socio-Neurocognitive method and explored the effectiveness of inclusion of the four subdivision of that in a community college ESL higher intermediate class. However, replicating the study with different participants and language levels could yield different results.

Second, since the present study yields interesting findings upon proposing and applying the Socio-Neurocognitive method and its four subdivision techniques for ESL learners. The author of this dissertation suggests replicating the same study vocabulary learning for EFL learners and even languages other than English, and with English learners from other countries.

Third, this study was conducted in an ESL multilingual context where the learners came from different cultures and background experiences and knowledge. However, it is suggested that the study be replicated in an ESL or EFL monolingual context where

participants, coming from similar cultural and linguistic backgrounds, and incorporate the proposed techniques for their vocabulary learning and retention.

Fourth, this study was conducted with adult participants ranging from 18 to 65 years old. Replicating the study with participants of varying ages can help to explore the efficacy of the Socio-Neurocognitive method on different groups such as K-12 vocabulary learning and retention. Based on Acha's (2009) findings, children with lower cognitive abilities and different learning characteristics may have different learning outcomes.

It is noteworthy, however, to acknowledge that more research is needed in the bilingual educational settings to help K-12, teenagers and adolescence group to enhance their vocabulary development based on the vocabulary instructional techniques proposed in this dissertation. More research addressing vocabulary instruction for the different age ranges from K-12 and through high school to adult school ages is needed because vocabulary is playing pivotal role to help them to learn and understand the textbook materials.

Moreover, most of the vocabulary teaching methods in the present review targeted receptive vocabulary guided by social constructivism, sociocultural, and schema theories. And no vocabulary instructional technique was suggested for the divergence of neurocognitive, metacognitive and sociocultural techniques in vocabulary teaching and learning. Future researchers could investigate how this study method may incorporate productive vocabulary practices in classrooms, particularly as it relates to using new words within writing and speaking. This dissertation study made a unique contribution to the field, and it would be interesting to conduct other research investigating the proposed

techniques and their inclusion for vocabulary instruction in bilingual K–12 and adolescence schools.

Fifth, through the finding of the present study, the researcher has theorized that knowledge of underlying theories of vocabulary instructional practices and particularly the Socio-Neurocognitive method and the inclusion of its four subdivision techniques helped the researcher to focus on the big picture within vocabulary lessons and to manipulate and modify the vocabulary instructional practices according to the diverse ESL students' needs. This dissertation's findings can be used by second language educators as a model to view the importance of theories and their dynamic effectiveness on vocabulary instruction.

Sixth, due to the growing number of ESL students who are enrolled in community colleges, it is imperative that further research be undertaken to more accurately identify the needs of these students. To the best knowledge of the researcher, there are substantial gaps in the current literature about ESL community college vocabulary instructional methods. Pedagogical approaches to ESL programming believe that a traditional remedial pedagogy for vocabulary teaching impedes students to use their new vocabulary actively and simultaneously when they need to use it in their communication. This study suggests that further research on community college ESL vocabulary teaching methods and ESL students in general is necessary. Research focused on community college ESL programs is necessary to better fill the existing empirical gaps on ESL programs in community colleges which is daunting but necessary to substantially improve the students' English skills of these growing proportions of ESL population.

Seventh, in this study, since the Socio-Neurocognitive method was new for the ESL learners, the experimental group's performance on the vocabulary test could be attributed to the method's novelty effect. Novelty effects occur when the results of a study are due to the novelty of a treatment or method. Essentially, in the case of novelty effects, anything new may make a difference.

It is possible that the results of this study were due to the "novelty effect" since the vocabulary instruction techniques were new for the experimental group. The researcher of this study suggests further replicating the study's process in another similar context so as to directly test whether either the novelty effect plays any role in the current study results or similar results would continue to be recorded when the Socio-Neurocognitive method was conducted over a longer period of time.

Concluding Remarks

A great deal of this study's findings seem to be logical in terms of relevant previous literature results and the actual teaching and learning practices. Based on three main theories, Mayer's (2005, 2014) cognitive theory of multimedia learning, metacognition in relation to language awareness (Haukås, 2018), and sociocultural theory (Vygotsky, 1978), the researcher created the Socio-Neurocognitive method which can be considered an effective vocabulary teaching method. The advantage of such technique allowed the ESL learners to consolidate and internalize new vocabulary through active processing.

The Socio-Neurocognitive method used in the experiment assisted the ESL learners to activate some brain functions that was aligned with their learning styles. The ESL learners' interest in The Socio-Neurocognitive method as this teaching method

helped them to optimize their learning and helped them to recall and use the target vocabulary in long-term. The inclusion and holistic nature of the Socio- Neurocognitive method helped the memory to work better in exploring and understanding the new words provided instead of memorizing mere words and definitions segregated from a context. It is taken for granted that neurolinguistics aspect of this study coupled with the other proposed techniques in the current study helped the experimental group not to learn and internalize the words, rather it helped them to retrieve and recall those words whenever they needed in their speaking and writing. The inclusion of the vocabulary techniques was based on the ESL learner-centered approach which maximized the students' authority through the minimization of the teachers' dominance. Therefore, teaching vocabulary through the Socio-Neurocognitive method did not focus on enhancing learning vocabulary for a short length of time, but it enhanced the possibilities of retrieving and recalling the target words learned for a long time. It is worth noting that vocabulary learning became stronger and the retrieval of words became easier since the vocabulary techniques in this study were multisensory; also the vocabulary linked the ESL participants vocabulary usage to background experiences (*i.e.*, Storytelling technique) and made it thus easier for them to remember the words in long-term and make the information permanent. A reason for the effectiveness of the Storytelling technique might be related to this fact that stories engage many areas in the brain, subsequently, they engage many different emotional triggers that are helpful in retrieving information (Sprenger, 2010).

With the aim of investigating the effectiveness of the Socio-Neurocognitive method on L2 learners' vocabulary learning and recall over long-term memory, the

present study was situated within the three theoretical frameworks of Mayer's (2005, 2014) cognitive theory of multimedia learning, metacognition in relation to language awareness (Haukås, 2018), and sociocultural theory (Vygotsky, 1978). In the present content trend analysis, the researcher examined how theories underlying techniques for vocabulary instruction varied across a diverse ESL class.

This dissertation suggests a unified systemic approach to ESL classroom pedagogy. The findings in this study suggest that each technique component is related to different aspects of the vocabulary learning processes. Their union results in the synergy of neurocognitive, metacognitive and sociocultural techniques leading to the improvement in ESL student vocabulary learning outcomes as measured by the amount of acquired words and the abilities to recall and use the new words.

Perhaps the most fascinating effect of the vocabulary instructional techniques in this study was revealed in a student's comment that "I still remember the words that you taught us. I was never seen or taught like this!" Indeed, the vocabulary instruction is more than simply teaching the meaning of the words –the vocabulary instruction should empower the learners to learn from each other in a collaborative environment, it should aim to promote both passive and active vocabulary and help them to be productive, and the necessary and appropriate vocabulary should come easily to them whenever needed in their speaking and writing.

Any teacher of English to Speakers of Other Languages can use a teaching method that may serve as a relevant springboard for empowering their ESL students' English skills. Community college students bring so much prior international life experience to the ESL classes. Their experiences can help to initiate rich classroom

discussion on a great number of topics relevant to their cultural backgrounds while they are learning English. Staying focused on improving only the receptive English knowledge, the ESL students may miss the rich content and authentic learning experiences that invite them to engage in the society both academically and socially. By focusing on effective instructional techniques aspiring citizens of the world, we educators may allow ESL students to express their life experiences, connect these to ongoing social issues, and serve as future community proactive leaders. As Gay (2018) suggested, the goal of culturally responsive education is to "connect in-school learning to out of school living (p.4)."

The ESL students are the new members of the community. They are out of their comfort zone to learn to be bicultural or multicultural, trying to get over all the obstacles encountered, and especially by simply being a "new-comer". Our job as educators is to help them to navigate new culture and opportunities by fostering their English language. The United States society will continue to become more diverse and this is a valuable prize for the entire country.

REFERENCES

Abraham, L. B. (2008). Computer-mediated glosses in second language reading comprehension and vocabulary learning: A meta-analysis. *Computer Assisted Language Learning*, *21*(3), 199-226.

Acha, J. (2009). The effectiveness of multimedia programmes in children's vocabulary learning. *British Journal of Educational Technology*, *40*(1), 23-31.

Ahmadian, M., Amerian, M., & Tajabadi, A. (2014). The effect of collaborative dialogue on EFL learner's vocabulary acquisition and retention. *International Journal of Applied Linguistics and English Literature*, *3*(4), 38-45.

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.

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.

Alghamdi, H. H. (2019). Exploring Second Language Vocabulary Learning in ESL Classes. *English Language Teaching*, *12*(1), 78-84.

Al-Khasawneh, F. M., & Huwari, I. F. (2014). The effect of metacognitive strategies instruction on vocabulary learning among Jordanian University students. *International Journal of English and Education*, *3*(3), 102-113.

Alkurtehe, K. A. M., & Dzakiria, H. (2018). An Overreview of the Sociocultural Theory and Vocabulary Development. *JEES (Journal of English Educators Society)*, *3*(1), 41-50.

Álvarez Ayure, C. P., Barón Peña, C., & Martínez Orjuela, M. L. (2018). Promoting the Use of metacognitive and vocabUlary learning strategies in eighth-graders. *Íkala, revista de lenguaje y cultura*, *23*(3), 407-430.

Alvermann, D. E., Unrau, N., & Ruddell, R. B. (2013). *Theoretical models and processes of reading* (Vol. 978, No. 0-87712). International Reading Assoc.

Amiryousefi, M., & Ketabi, S. (2011). Mnemonic instruction: A way to boost vocabulary learning and recall. *Journal of Language Teaching and Research*, *2*(1), 178. *Analysis and Applications* (9th Ed.). Toronto: Pearson Education.

Anderson, N. J. (2002). The role of metacognition in second language teaching and learning. Washington, DC: ERIC Clearinghouse on Languages and Linguistics. *Center for Applied Linguistics*.

Anderson, N. J. (2008). Metacognition and good language learners. *Lessons from good language learners*, 99-109.

Artigal, J. M. (1992). Some considerations on why a new language is acquired by being used. *International journal of applied linguistics*, *2*(2), 221-240.

Asgari, A., & Mustapha, G. B. (2011). The type of vocabulary learning strategies used by ESL students in University Putra Malaysia. *English language teaching*, *4*(2), 84.

Asher, J. J. (1969). The total physical response approach to second language learning. *The modern language journal*, *53*(1), 3-17.

Atkinson, R. C., & Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. In *Psychology of learning and motivation* (Vol. 2, pp. 89-195). Academic Press.

Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature reviews neuroscience*, *4*(10), 829.

Baddeley, A. D. (1999). Cognitive psychology: A modular course. Essentials of human memory.

Baddeley, A. D. (2002). Is working memory still working? *European psychologist*, *7*(2), 85.

Baddeley, A., & Wilson, B. A. (2002). Prose recall and amnesia: Implications for the structure of working memory. *Neuropsychologia*, *40*(10), 1737-1743.

Bailey, K. M., & Santos, M. G. (Eds.). (2009). *Research on ESL in US community colleges: People, programs, and potential*. Michigan Series on Teaching Ac.

Ballman, T. L., Liskin-Gasparro, J. E., & Mandell, P. B. (2001). *The communicative classroom*. Heinle & Heinle/Thomson Learning.

Banisaeid, M. (2013). Comparative Effect of Memory and Cognitive Strategies Training on EFL Intermediate Learners' Vocabulary Learning. *English Language Teaching*, *6*(8), 108-118.

Bannon, E., Fisher, P. J., Pozzi, L., & Wessel, D. (1990). Effective definitions for word learning. *Journal of reading*, *34*(4), 301-303.

Barcroft, J. (2015). Can retrieval opportunities increase vocabulary learning during reading?. *Foreign Language Annals*, *48*(2), 236-249.
Behavioral Research. Thousand Oaks: Sage.

Behroozizad, S., Nambiar, R. M., & Amir, Z. (2014). Sociocultural theory as an approach to aid EFL learners. *Reading*, *14*(2).

Berne, J. I., & Blachowicz, C. L. (2008). What reading teachers say about vocabulary instruction: Voices from the classroom. *The Reading Teacher*, *62*(4), 314-323.

Blachowicz, C. L. (1986). Making connections: Alternatives to the vocabulary notebook. *Journal of Reading*, *29*(7), 643-649.

Brain involved in memory by Levent Efe, *retrieved from* https://qbi.uq.edu.au/brain-basics/memory/where-are-memories-stored *(2019)*

Brand, N., & Jolles, J. (1985). Learning and retrieval rate of words presented auditorily and visually. *The Journal of general psychology*, *112*(2), 201-210.

Broner, M. A., & Tarone, E. E. (2001). Is it fun? Language play in a fifth-grade Spanish immersion classroom. *The Modern Language Journal*, *85*(3), 363-379.

Brown, D. (2001). Teaching by Principles: An Interactive Approach to Language Pedagogy. Addison Wesely Longman. *Inc. USA.*

Brundrett, M, & Rhodes, C. (2014). *Researching educational leadership and management: Methods and approaches*. Los Angeles; London; New Delhi; Singapore; Washington, DC: Sage.

Bruning, R. H., Schraw, G. J., & Ronning, R. R. (1999). *Cognitive psychology and instruction*. Prentice-Hall, Inc., One Lake Street, Upper Saddle River, NJ 07458.

Butcher, K. R. (2006). Learning from text with diagrams: Promoting mental model development and inference generation. *Journal of Educational Psychology*, *98*(1), 182.

Butcher, K. R. (2014). The multimedia principle In Mayer RE, editor. (Ed.), The Cambridge handbook of multimedia learning (pp. 174–206).

Cabeza, R., Grady, C. L., Nyberg, L., McIntosh, A. R., Tulving, E., Kapur, S. & Craik, F. I. (1997). Age-related differences in neural activity during memory encoding and retrieval: a positron emission tomography study. *Journal of neuroscience*, *17*(1), 391-400.

Carpenter, P. A. (1994). Working memory constraints in comprehension: Evidence from individual differences, aphasia, and aging. *Handbook of psycholinguistics*, 1075-1122.

Carrell, P. L. (1991). Second language reading: Reading ability or language proficiency?. *Applied linguistics*, *12*(2), 159-179.

Carter, R. (2012). *Vocabulary: Applied linguistic perspectives*. Routledge.

Chai, W. J., Abd Hamid, A. I., & Abdullah, J. M. (2018). Working memory from the psychological and neurosciences perspectives: A review. *Frontiers in psychology*, *9*, 401.

Chamot, A. U. (2004). Issues in language learning strategy research and teaching. *Electronic journal of foreign language teaching*, *1*(1), 14-26.

Chamot, A. U. (2005). Language learning strategy instruction: Current issues and research. *Annual review of applied linguistics*, *25*, 112-130.

Chamot, A. U., & O'malley, J. M. (1994). *The CALLA handbook: Implementing the cognitive academic language learning approach*. New York: Addison-Wesley Publishing Company.

Cohen, A. D. (2011). Second language learner strategies. *Handbook of research in second language teaching and learning*, *2*(Part V), 681-698.

Cohen, G., Kiss, G., & Le Voi, M. (1996). Memory: current issues. *Journal of Forensic Identification*, *46*(5), 597-629.

Cole, M., & Engeström, Y. (1993). A cultural-historical approach to distributed cognition. *Distributed cognitions: Psychological and educational considerations*, 1-46.
Computer Adaptiveness. *Language Learning*, *54*(3), 399-436.

Cook, L. K., & Mayer, R. E. (1983). Reading strategies training for meaningful learning from prose. In *Cognitive strategy research* (pp. 87-131). Springer, New York, NY.

Coskun, A. (2010). The effect of metacognitive strategy training on the listening performance of beginner students. *Novitas-royal*, *4*(1).

Craik, F. I., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of verbal learning and verbal behavior*, *11*(6), 671-684.

Craik, F. I., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of experimental Psychology: general*, *104*(3), 268.

Cubukcu, F. (2008). Enhancing vocabulary development and reading comprehension through metacognitive strategies. *Issues in Educational Research*, *18*(1), 1-11.

De Guerrero, M. C., & Villamil, O. S. (2000). Activating the ZPD: Mutual scaffolding in L2 peer revision. *The Modern Language Journal*, *84*(1), 51-68.

Demirezen, M. (1988). Behaviorist theory and language learning. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *3*(3).

Desmond, J. E., & Fiez, J. A. (1998). Neuroimaging studies of the cerebellum: language, learning and memory. *Trends in cognitive sciences*, *2*(9), 355-362.

Dhieb-Henia, N. (2003). Evaluating the effectiveness of metacognitive strategy training for reading research articles in an ESP context. *English for Specific Purposes*, *22*(4), 387-417.

Diaz, I. (2015). Training in metacognitive strategies for students' vocabulary improvement by using learning journals. *Profile Issues in TeachersProfessional Development*, *17*(1), 87-102.

Divide: Guidelines for Conducting Mixed Methods Research in Information

Donato, R., & MacCormick, D. (1994). A sociocultural perspective on language learning strategies: The role of mediation. *The modern language journal*, *78*(4), 453-464.

Dongyu, Z., Fanyu, B., & Wanyi, D. (2013). Sociocultural theory applied to second language learning: Collaborative learning with reference to the Chinese context. *International education studies*, *6*(9), 165-174.

Dougherty, K. J., & Townsend, B. K. (2006). Community college missions: A theoretical and historical perspective. *New Directions for Community Colleges*, *2006*(136), 5-13.

Downing, P. E. (2000). Interactions between visual working memory and selective attention. *Psychological science*, *11*(6), 467-473.EFL classroom, Language Learning, 50, 2, 385-412.

Dunning, D., Johnson, K., Ehrlinger, J., & Kruger, J. (2003). Why people fail to recognize their own incompetence. *Current directions in psychological science*, *12*(3), 83-87.

Echevarria, J., Vogt, M., & Short, D. (2008). Making content comprehensible for English learners: The SIOP model. *Educational Psychologist*, *32*(1), 1-19.

Ellis, N. (2001). Memory for language. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 33-68). Cambridge, UK: Cambridge University Press.

Ellis, N. C. (2001). *Memory for language* (pp. 33-68).

Ellis, R. (2003). *Task-based language learning and teaching*. Oxford University Press.

Ellis, R., & Ellis, R. R. (1994). *The study of second language acquisition*. Oxford University.

Ellis, R., & He, X. (1999). The roles of modified input and output in the incidental acquisition of word meanings. *Studies in second language acquisition, 21*(2), 285-301.

Erhard, P., Kato, T., Strupp, J. P., Andersen, P., Adriany, G., Strick, P. L., & Ugurbil, K. (1996). Functional mapping of motor in and near Broca's area. *Neuroimage*, *3*(3), S367.

Eun, B., & Lim, H. S. (2009). A sociocultural view of language learning: The importance of meaning-based instruction. *TESL Canada Journal*, 12-26.
Fakültesi Dergisi, XX (2), 399-426.

Fernandes, M. A., Wammes, J. D., & Meade, M. E. (2018). The surprisingly powerful influence of drawing on memory. *Current Directions in Psychological Science*, *27*(5), 302-308.

Flavell, J. H. (1979). Metacognition and cognitive monitoring [Metacognición y monitoreo cognitivo]. *American Psychologist*, *34*(10), 906-911.

Fletcher, J. D., & Tobias, S. (2005). The multimedia principle. *The Cambridge handbook of multimedia learning*, *117*, 133.

Foerde, K., & Shohamy, D. (2011). The role of the basal ganglia in learning and memory: insight from Parkinson's disease. *Neurobiology of learning and memory*, *96*(4), 624-636.

Folse, K. S. (2006). The effect of type of written exercise on L2 vocabulary retention. *TESOL quarterly*, *40*(2), 273-293.

Folse, K. S., & Briggs, S. J. (2004). *Vocabulary myths: Applying second language research to classroom teaching* (No. Sirsi) i9780472030293). Ann Arbor: University of Michigan Press.

Fontana, A., & Frey, J. H. (1994). Interviewing: The Art of Science. In N. K. Denzin & Y. S. Lincoln (eds.), *the Handbook of Qualitative Research* (pp. 361-76). Thousand Oaks: Sage Publications.

Fontana, A., & Frey, J. H. (2005). The interview: From neutral stance to political involvement. In N. K. Denzin & Y. S. Lincoln (eds.), *The Sage handbook of qualitative research* (3rd edition) (pp. 695-727). Thousand Oaks, CA: Sage Publications, Inc.

Fortkamp, M. B. M., & Verçosa, D. M. (2019). Working memory capacity and the retention of L2 vocabulary. *Leitura*, *1*(39), 55-74.

Frawley, W., & Lantolf, J. P. (1985). Second language discourse: A Vygotskyan perspective. *Applied Linguistics*, *6*(1), 19-44.

Gañán-Gómez, I., Wei, Y., Starczynowski, D. T., Colla, S., Yang, H., Cabrero-Calvo, M. &Garcia-Manero, G. (2015). Deregulation of innate immune and inflammatory signaling in myelodysplastic syndromes. *Leukemia*, *29*(7), 1458-1469.

Gardiner, S. S. F. (2015). Developing a Student-Centered Curriculum for High Intermediate and Advanced Writing Community College ESL Students to Promote Their Discovery of Campus Resources.

Gathercole, S. E. (1999). Cognitive approaches to the development of short-term memory. *Trends in cognitive sciences*, *3*(11), 410-419.

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice*. Teachers College Press.

Gay, L. R., Mills, G. E., & Airasian, P. W. (2009). *Educational research: Competencies for analysis and applications*. Merrill/Pearson.

Gerald, B. (2018). A Brief Review of Independent, Dependent and One Sample t-test. *International Journal of Applied Mathematics and Theoretical Physics*, *4*(2), 50-54.

Ghazal, L. (2007). Learning vocabulary in EFL contexts through vocabulary learning strategies. *Novitas-Royal*, *1*(2).

Goldman-Rakic, P. S. (1987). Circuitry of the frontal association cortex and its relevance to dementia. *Archives of gerontology and geriatrics*, *6*(3), 299-309.

Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. Ernst Klett Sprachen.

Gu, P. Y. (2003). Vocabulary learning in a second language: Person, task, context and strategies. *TESL-EJ*, *7*(2), 1-25.

Gu, Y. (2003b). Fine brush and freehand: The vocabulary learning art of two successful Chinese EFL learners.

Guan, Y. (2014). The effects of explicit listening strategy instruction on the listening comprehension of English as Second Language (ESL) community college students.

Hannula, D. E., & Ranganath, C. (2008). Medial temporal lobe activity predicts successful relational memory binding. *Journal of Neuroscience*, *28*(1), 116-124.

Harmer, J. (1991). *The Practice of English Language Teaching.* London: Longman Group Uk. Limited.

Harmon, J. M., Wood, K. D., & Keser, K. (2009) Promoting vocabulary learning with interactive word wall. *Middle School Journal*, 40(3), 58-63.

Hasselgård, H. (2018). Language Contrasts, Language Learners and Metacognition: Focus on Norwegian Advanced Learners of English. In *Metacognition in Language Learning and Teaching (Open Access)* (pp. 98-120). Routledge.

Hatch, E., & Brown, C. (1995). *Vocabulary, semantics, and language education*. Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211 (hardback: ISBN-0-521-47409-4; paperback: ISBN-0-521-47942-8).

Haukås, Å. (2018). 2 Metacognition in Language Learning and Teaching. *Metacognition in Language Learning and Teaching*, 11.

Haukås, Å. Bjørke, C., & Dypedahl, M. (Eds.). (2018). *Metacognition in Language Learning and Teaching (Open Access)*. Routledge.

Heimlich, J. E., & Pittelman, S. D. (1986). *Semantic Mapping: Classroom Applications. Reading Aids Series, IRA Service Bulletin*. International Reading Association, 800 Barksdale Rd., PO Box 8139, Newark, DE 19714-8139.

Herber, H. L. (1978). *Teaching reading in content areas*. Prentice Hall.

Hiver, P., & Whitehead, G. (2018). Teaching Metacognitively: Adaptive Inside-Out Thinking in the L2 Classroom. *Metacognition in Language Learning and Teaching*.

Hong, X. (2010). Review of Effects of Glosses on Incidental Vocabulary Learning and Reaing Comprehension. *Chinese Journal of Applied Linguistics (Foreign Language Teaching & Research Press)*, *33*(1).

Houston, J. P. (2001). *Fundamentals of learning and memory*. Academic Press. *Integrating Quantitative and Qualitative Approaches in the Social and Behavioral International Journal of Language Learning and Applied Linguistics World*, *4*(4), 13-29.

Ismawati, L. (2018). TEACHING VOCABULARY USING STORYTELLING TECHNIQUE AT THE EIGHTH GRADE OF SMP NEGERI 3 BUNGA MAYANG.

Iverson, J. M., & Thelen, E. (1999). Hand, mouth and brain. The dynamic emergence of speech and gesture. *Journal of Consciousness Studies*, *6*(11-12), 19-40.

Iverson, J. M., & Thelen, E. (1999). Hand, mouth and brain. The dynamic emergence of speech and gesture. *Journal of Consciousness Studies*, *6*(11-12), 19-40.

Jacobs, G. M., Power, M. A., & Inn, L. W. (2002). *The teacher's sourcebook for cooperative learning: Practical techniques, basic principles, and frequently asked questions*. Corwin Press.

Jiang, B., & Kuehn, P. (2001). Transfer in the academic language development of post-secondary ESL students. *Bilingual Research Journal*, *25*(4), 653-672.

Johnson, D. D., Toms-Bronowski, S., & Pittelman, S. D. (1997). An investigation of the effectiveness of semantic mapping and semantic feature analysis with intermediate grade level students (Program Rep. No. 83–3). *Madison, WI: Wisconsin Center for Education Research, University of Wisconsin*, *8*. Journal. TESL-EJ, 7, 2, 1-26.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research

Jones, L. (2004). Testing L2 vocabulary recognition and recall using pictorial and written test items. *Language Learning & Technology*, *8*(3), 122-143.

Kato, F. (1996). Results of an Australian study of strategy use in learning Japanese Kanji characters. *Unpublished manuscript, University of Sydney, Sydney, Australia*.

King, A. (1993). From sage on the stage to guide on the side. *College teaching*, *41*(1), 30-35.

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of school health*, *74*(7), 262-273.

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of school health*, *74*(7), 262-273.

Klimesch W. (1994). The Structure of Long-Term Memory: A Connectivity Model of Semantic Processing. *Hillsdale, NJ: Erlbaum*.

Kost, C. R., Foss, P., & Lenzini Jr, 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. D. (1981). *Second language acquisition and second language learning*. University of Southern California.

Krashen, S. (1982). Principles and practice in second language acquisition.

Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. Addison-Wesley Longman Ltd.

Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *The modern language journal*, *73*(4), 440-464.

Krashen, S. D. (1993). The case for free voluntary reading. *Canadian Modern Language Review*, *50*(1), 72-82.

Kumpulainen, K., & Mutanen, M. (2000). Mapping the dynamics of peer group interaction: A method of analysis of socially shared learning processes. In *Social interaction in learning and instruction: The meaning of discourse for the construction of knowledge* (pp. 144-160). Pergamon Press.

Lantolf, J. (1997). The function of language play in the acquisition of L2 Spanish. *Contemporary perspectives on the acquisition of Spanish*, *2*, 3-24.

Lantolf, J. P. (Ed.). (2000). *Sociocultural theory and second language learning* (Vol. 78, No. 4). Oxford university press.

Lantolf, J. P. (2005). Sociocultural and second language learning research: An exegesis. In *Handbook of research in second language teaching and learning* (pp. 359-378). Routledge.

Lantolf, J. P. (2006). Sociocultural theory and L2: State of the art. *Studies in second language acquisition*, *28*(1), 67-109.

Lantolf, J. P., & Thorne, S. L. (2006). *Sociocultural theory and the genesis of second language development* (Vol. 398). Oxford: Oxford University Press.

Lantolf, J. P., Thorne, S. L., & Poehner, M. E. (2015). Sociocultural theory and second language development. *Theories in second language acquisition: An introduction*, 207-226.

Larsen-Freeman, D. (2000). Grammar: Rules and Reasons Working Together. *ESL Magazine*, *3*(1), 10-12.

Larsen-Freeman, D., & Anderson, M. (2013). *Techniques and principles in language teaching 3rd edition-Oxford handbooks for language teachers*. Oxford university press.

Laufer, B., & Goldstein, Z. (2004). Testing vocabulary knowledge: Size, strength, and computer adaptiveness. *Language learning*, *54*(3), 399-436.

Laufer, B., & Nation, P. (1999). A vocabulary-size test of controlled productive ability. *Language testing*, *16*(1), 33-51.

Laufer, B., & Rozovski-Roitblat, B. (2011). Incidental vocabulary acquisition: The effects of task type, word occurrence and their combination. *Language Teaching Research*, *15*(4), 391-411.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Leikin, M., Share, D. L., & Schwartz, M. (2005). Difficulties in L2 Hebrew reading in Russian-speaking second graders. *Reading and Writing*, *18*(5), 455-472.

Leiner, H. C., Leiner, A. L., & Dow, R. S. (1989). Reappraising the cerebellum: What does the hindbrain contribute to the forebrain?. *Behavioral neuroscience*, *103*(5), 998.

Leiner, H. C., Leiner, A. L., & Dow, R. S. (1993). Cognitive and language functions of the human cerebellum. *Trends in neurosciences*, *16*(11), 444-447.

Lewis, M., Gough, C., Martínez, R., Powell, M., Marks, J., Woolard, G. C., & Ribisch, K. H. (1997). *Implementing the lexical approach: Putting theory into practice* (Vol. 3, No. 1, pp. 223-232). Hove: Language Teaching Publications.

Lightbown, P. M., & Spada, N. (2001). How Languages are Learned Oxford University Press.

Lin, Y. (2015). The acquisition of words' meaning based on constructivism. *Theory and Practice in Language Studies*, *5*(3), 639-645.

Linse, C. T. &Nunan, D. (Ed). (2005). *Practical english language teaching: Young learners.* New York: McGraw- Hill ESL/ELT.

Little, D. G. (1991). *Learner autonomy: Definitions, issues and problems*. Authentik Language Learning Resources.

Littlewood, W., & William, L. (1981). *Communicative language teaching: An introduction*. Cambridge university press.

Livingston, J. A. (1997). Metacognition: An Overview. (Online) http://www.gse.buffalo. edu/fas/shuell/CEP564. *Metacog. html*.

Macaro, E. (2006). Strategies for language learning and for language use: Revising the theoretical framework. *The Modern Language Journal*, *90*(3), 320-337.

Mamiseishvili, K. (2012). International student persistence in US postsecondary institutions. *Higher Education*, *64*(1), 1-17.

Marefat, H., & Ahmadishirazi, M. (2003). The impact of teaching direct learning strategies on the retention of vocabulary of EFL learners. *The reading matrix*, *3*(2).

Martinez-Conde, S., Alexander, R. G., Blum, D., Britton, N., Lipska, B. K., Quirk, G. J., & Macknik, S. L. (2019). The Storytelling Brain: How Neuroscience Stories Help Bridge the Gap between Research and Society. *Journal of Neuroscience*, *39*(42), 8285-8290.

Marzano, R. J., & Marzano, J. S. (1988). *A Cluster Approach to Elementary Vocabulary Instruction*. International Reading Association, 800 Barksdale Rd., PO Box 8139, Newark, DE 19714-8139 (Book No. 232.

Maximo, R. (2000). Effects if rote, context, keyword, and context/keyword method on retention of vocabulary in EFL classroom. *Language Learning*, *50*(2), 385-412.

Mayer, R. E. (1992). Cognition and instruction: Their historic meeting within educational psychology. *Journal of educational Psychology*, *84*(4), 405.

Mayer, R. E. (1997). Multimedia Learning: Are we asking the right questions?

Mayer, R. E. (2001). Multimedia learning. New York, NY.

Mayer, R. E. (2008). Applying the science of learning: Evidence-based principles for the design of multimedia instruction. *American psychologist*, *63*(8), 760.

Mayer, R. E. (2014). Multimedia instruction. In *Handbook of research on educational communications and technology* (pp. 385-399). Springer, New York, NY.

Mayer, R. E., & Anderson, R. B. (1991). Animations need narrations: An experimental test of a dual-coding hypothesis. *Journal of educational psychology*, *83*(4), 484.

Mayer, R. E., & Fiorella, L. (2014). 12 Principles for Reducing Extraneous Processing in Multimedia Learning: Coherence, Signaling, Redundancy, Spatial Contiguity, and Temporal Contiguity Principles. *The Cambridge handbook of multimedia learning*, 279.

Mayer, R., & Mayer, R. E. (Eds.). (2005). *The Cambridge handbook of multimedia learning*. Cambridge university press.

McCarthy, M. (1990). *Vocabulary*. Oxford University Press.

McClelland, J. L. (1985). Distributed models of cognitive processes: Applications to learning and memory. *Annals of the New York Academy of Sciences*.

McGaugh, J. L., Cahill, L., & Roozendaal, B. (1996). Involvement of the amygdala in memory storage: interaction with other brain systems. *Proceedings of the National Academy of Sciences*, *93*(24), 13508-13514.

McGaugh, James L. "Memory--a century of consolidation." *Science* 287, no. 5451 (2000): 248-251.

Mendoza, M. B. (2004). Collaborative construction of word knowledge in vocabulary-related group activities in the ESL classroom.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rdedition). Los Angeles; London; New Delhi; Singapore; Washington, DC: Sage.

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual review of neuroscience*, *24*(1), 167-202.

Milton, J. (2009). Measuring second language vocabulary acquisition, *Vol. 54*, *Bristol: Multilingual Matters.*

Mitchell, M. (2004). Mitchell, R., Myles, F. (2004). *Second language learning theories, 2nd edition. London: Hodder Arnold*.

Murchison, C. F., Zhang, X. Y., Zhang, W. P., Ouyang, M., Lee, A., & Thomas, S. A. (2004). A distinct role for norepinephrine in memory retrieval. *Cell*, *117*(1), 131-143.

Nakata, T. (2017). Does repeated practice make perfect? The effects of within-session repeated retrieval on second language vocabulary learning. *Studies in Second Language Acquisition*, *39*(4), 653-679.

Nation, I. S. (2001). *Learning vocabulary in another language*. Ernst Klett Sprachen.

Nation, I. S. (2008). *Teaching ESL/EFL reading and writing*. Routledge.

Nation, I. S. P. (2011). Research into practice: Vocabulary. *Language Teaching*, *44*(4), 529-539.

Nation, I. S. P. (2013). Learning Vocabulary in Another Language. Cambridge: Cambridge University Press

Nation, P. (1990). A System of Tasks for Language Learning.

Nation, P. (1990). Teaching and learning vocabulary. Boston: Heinle & Heinle Publishers.

Nation, P. (2008). Teaching Vocabulary: Strategies and Techniques (Boston, Mass.: Heinle Cengage).

Newton, J. (2013). Incidental vocabulary learning in classroom communication tasks. *Language Teaching Research*, *17*(2), 164-187.

Nunan, D. (1990). Action research in the language classroom. *Second language teacher education*, *6281*.

Núñez, A. M., Rios-Aguilar, C., Kanno, Y., & Flores, S. M. (2016). English learners and their transition to postsecondary education. In *Higher education: Handbook of theory and research* (pp. 41-90). Springer, Cham.

Nunn, B. (2001). Task-based methodology and sociocultural theory. *LANGUAGE TEACHER-KYOTO-JALT-*, *25*(8), 12-20.

Nyikos, M., & Hashimoto, R. (1997). Constructivist theory applied to collaborative learning in teacher education: In search of ZPD. *The modern language journal*, *81*(4), 506-517.

Ohta, A. S. (2001). *Second language acquisition processes in the classroom: Learning Japanese*. Routledge.

O'MALLEY, J. M., Chamot, A. U., Stewner-Manzanares, G. L. O. R. I. A., Russo, R. P., & Küpper, L. (1985). Learning strategy applications with students of English as a second language. *TESOL quarterly*, *19*(3), 557-584.

O'malley, J. M., O'Malley, M. J., Chamot, A. U., & O'Malley, J. M. (1990). *Learning strategies in second language acquisition*. Cambridge university press.

Oropeza, M. V., Varghese, M. M., & Kanno, Y. (2010). Linguistic minority students in higher education: Using, resisting, and negotiating multiple labels. *Equity & Excellence in Education*, *43*(2), 216-231.

Oxford, R. (1990). Language learning strategies. *New York*, *3*.

Oxford, R. (2001). Research on language learning strategies: Purpose. *Methods, Issues*.

Oxford, R. L. (1990). Language Learning Strategies: What Every Teacher Should Know. Newburg House/Harper & Row, New York. Now Boston: Heinle & Heinle.

Oxford, R. L., & Ehrman, M. E. (1995). Adults' language learning strategies in an intensive foreign language program in the United States. *System*, *23*(3), 359-386.

Öztürk, M. (2007). Multiple-Choice Test Items of Foreign Language Vocabulary. *Eğitim*

Paas, F., & Sweller, J. (2012). An evolutionary upgrade of cognitive load theory: Using the human motor system and collaboration to support the learning of complex cognitive tasks. *Educational Psychology Review*, *24*(1), 27-45.

Paivio, A. (1986). *Mental Representations: A Dual-Coding Approach*. New York: Oxford.

Pallant, J. (2005). SPSS survival manual Berkshire.

Paris, S. G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. *Dimensions of thinking and cognitive instruction*, *1*, 15-51.

Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods* (3rd edition).Thousand Oaks, CA: Sage.

Petersen, S. E., Fox, P. T., Posner, M. I., Mintun, M., & Raichle, M. E. (1989). Positron emission tomographic studies of the processing of singe words. *Journal of cognitive neuroscience*, *1*(2), 153-170.

Pinker, S. (2007). The language instinct (1994/2007).

Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory into practice*, *41*(4), 219-225.

Plass, J. L., Chun, D. M., Mayer, R. E., & Leutner, D. (1998). Supporting visual and verbal learning preferences in a second-language multimedia learning environment. *Journal of educational psychology*, *90*(1), 25.

Plonsky, L. (2011). The effectiveness of second language strategy instruction: A meta-analysis. *Language learning*, *61*(4), 993-1038.

Price, E. A., & Driscoll, M. P. (1997). An inquiry into the spontaneous transfer of problem-solving skill. *Contemporary Educational Psychology*, *22*(4), 472-494.

Punch, K. F., (2011). *Introduction to Research Methods in Education*. Sage Publication.

Rasekh, Z. E., & Ranjbary, R. (2003). Metacognitive strategy training for vocabulary learning. *Tesl-Ej*, *7*(2), 1-18.

Rassaei, E. (2018). Computer-mediated textual and audio glosses, perceptual style and L2 vocabulary learning. *Language Teaching Research*, *22*(6), 657-675.

Raufman, J., Brathwaite, J., & Kalamkarian, H. S. (2019). English Learners and ESL Programs in the Community College: A Review of the Literature.

Read, J. (2000). *Assessing vocabulary*. United Kingdom: Cambridge University Press.

Reynolds, B. L., & Teng, M. F. (Eds.). (2019). *English Literacy Instruction for Chinese Speakers*. Singapore: Palgrave Macmillan.

Roberts, E. (1999). Critical teacher thinking and imaginations: Uncovering two vocabulary strategies to increase comprehension. *Reading Horizons: A Journal of Literacy and Language Arts*, *40*(1), 4.

Robertson, L. T. (2002). Memory and the brain. *Journal of Dental Education*, *66*(1), 30-42.

Rodriguez, O., Bohn, S., Hill, L., & Brooks, B. (2019). English as a second language in California's community colleges. *San Francisco: Public Policy Institute of California*.

Rodriguez, O., Bohn, S., Hill, L., & Brooks, B. (2019). English as a Second Language in California's Community Colleges. *Public Policy Institute of California*.

Sadeghi, K., Khezrlou, S., & Modirkhameneh, S. (2017). Calling Iranian learners of L2 English: effect of gloss type on lexical retention and reading performance under different learning conditions. *Journal of Research in Reading*, *40*, S66-S86.

Sanchez, S., & Pulles, S. (2019). English as a Second Language in California's Community Colleges.

Schacter, D. L. (1969). *Searching for memory: The brain, the mind, and the past*. Basic Books.

Schmitt, N. (2000). Vocabulary in language teaching. Cambridge: Cambridge University Press.

Schmitt, N. (2008). Instructed second language vocabulary learning. *Language teaching research*, *12*(3), 329-363.

Schmitt, N. (2010). *Researching vocabulary: A vocabulary research manual*. Springer.

Schmitt, N., & McCarthy, M. (1997). *Vocabulary: Description, acquisition and pedagogy*. Cambridge university press.

Schneider, E., & Ming, K. (2019). Masters of Morphology: Explicit Multisensory Structured Metacognitive Language Strategies to Foster Adolescent Learners' Content Vocabulary. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*.

Schwartz, R. M., & Raphael, T. E. (1985). Concept of definition: A key to improving students' vocabulary. *Reading Teacher*.

Schwarzer, D. (2009). Best practices for teaching the "whole" adult ESL learner. *New Directions for Adult and Continuing Education*, *2009*(121), 25-33.

Schwarzer, D. (2009). Best practices for teaching the "whole" adult ESL learner. *New Directions for Adult and Continuing Education*, *2009*(121), 25-33.*Sciences*. Thousand Oaks, CA: Sage.

Shrum, J. L. (2015). *Teacher's handbook, contextualized language instruction*. Cengage Learning.

Skinner, B. F. (1953). Science and Human Behavior. New York: The Free Press (Macmillan)

Smidt, S. (2009). *Introducing Bruner: a guide for practitioners and students in early years education*. Routledge.Social Science Research. *BUP (Bangladesh University Professional) Journal*.

Spada, N., & Lightbown, P. M. (2008). Form-focused instruction: Isolated or integrated?. *TESOL quarterly*, *42*(2), 181-207.

Sprenger, M. (2010). *Brain-based teaching in the digital age*. ASCD.

Squire, L. R. (1992). Memory and the hippocampus: a synthesis from findings with rats, monkeys, and humans. *Psychological review*, *99*(2), 195.

Stahl, S. A., & Vancil, S. J. (1986). Discussion is what makes semantic maps work in vocabulary instruction. *The Reading Teacher*, *40*(1), 62-67.

Steiner, D. M. (2018). Effective Teaching Techniques and Study Strategies for English Language Learners in ESL Community College Classes.

Swain, M. (2000). The output hypothesis and beyond: Mediating acquisition through collaborative dialogue. *Sociocultural theory and second language learning*, *97*, 114.

Sweller, J. (2005). Implications of cognitive load theory for multimedia learning. *The Cambridge handbook of multimedia learning*, 19-30.

Sweller, J. (2005). Implications of cognitive load theory for multimedia learning. *The Cambridge handbook of multimedia learning*, *3*(2), 19-30.

Sweller, J. (2011). Cognitive load theory. In *Psychology of learning and motivation* (Vol. 55, pp. 37-76). Academic Press.

Sweller, J., & Chandler, P. (1994). Why some material is difficult to learn. *Cognition and instruction*, *12*(3), 185-233.System. *IS Quarterly*, *37*(1), 21-54.

Tabeei, S., Tabrizi, A. R. N., & Ahmadi, G. (2013). The effect of metacognitive strategies instruction on listening comprehension of Iranian EFL learners: Focusing on gender.

Tahmasebi, S. (2011). Linking Task-based Language Teaching and Sociocultural Theory: Private Speech and Scaffolding in Reading Comprehension. *Advances in Language and Literary Studies*, *2*(1), 41-55. TESOL Quarterly, 37, 73-104.

Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. *Handbook of mixed methods in social and behavioral research*, *1*, 13-50.

Tashakkori, A., & Teddlie, C. (2003b). The Past and the Future of Mixed Model Research: From "Methodological Triangulation" to "Mixed Model Designs". In A. Tashakkori & C. Teddlie (eds.), *Handbook of Mixed Methods in Social and Behavioral Research* (pp. 671-703).

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage.

Teemant, A., Leland, C., & Berghoff, B. (2014). Development and validation of a measure of Critical Stance for instructional coaching. *Teaching and Teacher Education*, *39*, 136-147.

Thornbury, S. (2006). *How to teach vocabulary*. Pearson Education India.Thousand Oaks, CA.

Thorburry, S. (2002). How to teach vocabulary. England.

Trujillo Becerra, C. L., Álvarez Ayure, C. P., Zamudio Ordoñez, M. N., & Morales Bohórquez, G. (2015). Facilitating vocabulary learning through metacognitive strategy training and learning journals. *Colombian Applied Linguistics Journal*, *17*(2), 246-259.

Türk, E., & Erçetin, G. (2014). Effects of interactive versus simultaneous display of multimedia glosses on L2 reading comprehension and incidental vocabulary learning. *Computer Assisted Language Learning*, *27*(1), 1-25.

Vallar, G., & Pagano, C. (2002). In Handbook of memory Disorders (eds: Baddeley AD, Kopelman MD, Wilson BA.

Vallar, G., & Shallice, 2 (2002), pp. 249-270. *Neuropsychological impairments of short-term memory*. Cambridge University Press.

Van Boxtel, C., Van der Linden, J., & Kanselaar, G. (2000). Collaborative learning tasks and the elaboration of conceptual knowledge. *Learning and instruction*, *10*(4), 311-330.

Van Lier, L. (2000). 11 From input to affordance: Social-interactive learning from an ecological perspective. *Sociocultural theory and second language learning*, *78*(4), 245.

Vandergrift, L. (2003). Orchestrating strategy use: Toward a model of the skilled second language listener. *Language learning*, *53*(3), 463-496.

Vandergrift, L., Goh, C. C., Mareschal, C. J., & Tafaghodtari, M. H. (2006). The metacognitive awareness listening questionnaire: Development and validation. *Language learning*, *56*(3), 431-462.

Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS quarterly*, 21-54.

Vold, E. T. (2018). Using Machine Translated Texts to Generate L3 Learners' Metalinguistic Talk. *Metacognition in Language Learning and Teaching*, 67.

Vygotskiĭ, L. S. (1997). *The collected works of LS Vygotsky: The history of the development of higher mental functions* (Vol. 4). Springer Science & Business Media.

Vygotsky, L. (1978). Interaction between learning and development. *Readings on the development of children*, *23*(3), 34-41.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1978). Internalization of higher psychological functions. *Mind in society: The development of higher psychological processes*, *37*(2), 52-57.

Vygotsky, L. S. (1978). Socio-cultural theory. *Mind in society*.

Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Harvard university press.

Vygotsky, L. S. (1981). The instrumental method in psychology. *The concept of activity in Soviet psychology*, *2*(3), 135-143.

Watkins, Cheryl I. "Strategies for ESL Students in Community Colleges to Develop Their Public Speaking Skills." (2014).

Webb, S. (2005). Receptive and productive vocabulary learning: The effects of reading and writing on word knowledge. *Studies in Second Language Acquisition*, *27*(1), 33-52.

Webb, S. (2005). Receptive and productive vocabulary learning: The effects of reading and writing on word knowledge. *Studies in second language acquisition*, *27*(1), 33-52.

Webb, S. (2007). The effects of repetition on vocabulary knowledge. *Applied linguistics*, *28*(1), 46-65.

Wenden, A. (1987). Metacognition: An expanded view on the cognitive abilities of L2 learners. *Language learning*, *37*(4), 573-597.

Wenden, A. (1987). Metacognition: An expanded view on the cognitive abilities of L2 learners. *Language learning*, *37*(4), 573-597.

Wenden, A. L. (1998). Metacognitive knowledge and language learning1. *Applied linguistics*, *19*(4), 515-537.

Wichadee, S. (2011). The effects of metacognitive strategy instruction on EFL Thai students' reading comprehension ability. *Journal of College Teaching and Learning*, *8*(5), 31.

Wilkins, D. A. (1972). *Linguistics in language teaching*. E. Arnold, 1973.

Wiltgen, B. J., Brown, R. A., Talton, L. E., & Silva, A. J. (2004). New circuits for old memories: the role of the neocortex in consolidation. *Neuron*, *44*(1), 101-108.

Winsler, A. (2006). Still talking to ourselves after all these years: Vygotsky, private speech, and self-regulation. In *Current research trends in private speech: proceedings of the first international symposium on self-regulatory functions of language* (pp. 17-72).

Woodrow, L. (2005). The challenge of measuring language learning strategies. *Foreign language Annals*, *38*(1), 90-98.

Xia, Y. (2014). Language Theories and Language Teaching—from Traditional Grammar to Functionalism. *Journal of Language Teaching & Research*, *5*(3).York: Cambridge University Press.

Yanguas, I. (2009). Multimedia glosses and their effect on L2 text comprehension and vocabulary learning. *Language Learning & Technology*, *13*(2), 48-67.

Yeasmin, S., & Rahman, K. F. (2012). Triangulation research method as the tool of social science research. *BUP journal*, *1*(1), 154-163.

Yoshii, M., & Flaitz, J. (2002). Second language incidental vocabulary retention: The effect of text and picture annotation types. *CALICO journal*, 33-58.

Yu, C. H., & Ohlund, B. (2010). Threats to validity of research design. *Retrieved January*, *12*, 2012.

Zaki, H., & Ellis, R. (1999). Learning vocabulary through interacting with a written text. *Learning a second language through interaction*, 153-169.

Zhang, L. J., & Qin, T. L. (2018). Validating a Questionnaire on EFL Writers' Metacognitive Awareness of Writing Strategies in Multimedia Environments. In *Metacognition in Language Learning and Teaching (Open Access)* (pp. 157-178). Routledge.

Zhao, N. (2009). Metacognitive Strategy Training and Vocabulary Learning of Chinese College Students. *English Language Teaching*, *2*(4), 123-129.

Zohar, A., & David, A. B. (2009). Paving a clear path in a thick forest: A conceptual analysis of a metacognitive component. *Metacognition and Learning*, *4*(3), 177-195.

Zuengler, J., & Miller, E. R. (2006). Cognitive and sociocultural perspectives: Two parallel SLA worlds?. *TESOL quarterly*, *40*(1), 35-58.

APPENDIX A

IRB APPROVAL LETTER

IRBPHS - Approval Notification

To: Malihe Eshghavi
From: Richard Greggory Johnson III, IRB Chair
Subject: Protocol #1323
Date: 12/13/2019

The Institutional Review Board for the Protection of Human Subjects (IRBPHS) at the University of San Francisco (USF) has reviewed your request for human subjects approval regarding your study.

Your research (IRB Protocol **#1323**) with the project title **A CONVERGENCE OF CONCEPTUAL FRAMEWORKS: NEUROCOGNITIVE, METACOGNITIVE AND SOCIAL CULTURAL TECHNIQUES IN VOCABULARY TEACHING AND LEARNING** has been approved by the IRB Chair under the rules for expedited review on **12/13/2019**.

Any modifications, adverse reactions or complications must be reported using a modification application to the IRBPHS within ten (10) working days.

If you have any questions, please contact the IRBPHS via email at IRBPHS@usfca.edu. Please include the Protocol number assigned to your application in your correspondence.

On behalf of the IRBPHS committee, I wish you much success in your research.

Sincerely,

Dr. Richard Greggory Johnson III

Professor & Chair, Institutional Review Board for the Protection of Human Subjects

University of San Francisco

irbphs@usfca.edu

APPENDIX B

INFORMED CONSENT FORM

CONSENT TO BE A RESEARCH SUBJECT

Consent Form for the Participants of "A CONVERGENCE OF CONCEPTUAL FRAMEWORKS: NEUROCOGNITIVE, METACOGNITIVE AND SOCIAL CULTURAL TECHNIQUES IN VOCABULARY TEACHING AND LEARNING" Research Study

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Below is a description of the research procedures and an explanation of your rights as a research participant. You should read this information carefully. If you agree to participate, you will sign in the space provided to indicate that you have read and understand the information on this consent form. You are entitled to and will receive a copy of this form.

You have been asked to participate in a research study conducted by Malihe Eshghavi, a doctoral student in the Department of International and Multicultural Education at University of San Francisco. This faculty supervisor for this study is Dean Shabnam Koirala-Azad, a professor in the Department of International and Multicultural Education at University of San Francisco

WHAT THE STUDY IS ABOUT:

The purpose of this research study is to investigate whether the inclusion of cognitive, metacognitive and sociocultural techniques in vocabulary instruction could enhance vocabulary acquisitions of community college adult ESL learners and if it can help the ESL students to recall and use new vocabulary effectively in their speaking and writing. The main purpose of this study is to help ESL community college language learners transform their passive vocabulary into active vocabulary by using methods informed by cognitive, metacognitive and sociocultural concepts. The researcher will explore the effectiveness of integrating cognitive, metacognitive and sociocultural consideration in vocabulary teaching and its impact on converting students' passive vocabulary to active vocabulary.

WHAT WE WILL ASK YOU TO DO:
if you accept to be a participant in this study then the following will happen during this study:

You will fill out the demographic information form including your age, gender, first language, and how many other languages you know; then you will be asked to take an English vocabulary pretest based on your course book.

In the next stage, if you are among the experimental group participants, you will learn new English vocabulary through new instruction techniques over three weeks and six consecutive sessions. Two weeks after the instruction, you will perform the post-test. Post-test is based on vocabulary that were thought and selected from your course book. The post-test will require 20-30 minutes for completion. Then on the same day as the post-test, a questionnaire will be distributed to experimental group and you will answer questions and share your opinion on the type(s) of vocabulary techniques you received that may have assisted you to learn and remember the target words.

You will also be asked to indicate your preference and availability for an interview for the following week. The researcher will conduct a focus group interview in order to seek your opinions and get a sense of your experience of vocabulary learning the focus group interview will be conducted in your community college, and the length will be approximately 30 minutes. The interviews will be recorded on a mobile phone for the purpose of transcription and data analysis later on.

DURATION AND LOCATION OF THE STUDY:

If you are among control group, your participation in this study will involve one session to fill out demographic form and take pre-test that last 30 minutes and another session to take post-test that last 20-30 minutes.

If you are among experimental group, your participation in this study will involve one session to fill out demographic form and take pre-test that last 30 minutes. Then instructional session will happen over three weeks and six consecutive sessions. Each instructional session will last 20 minutes, with the length of the instruction totaling 120 minutes. In another session you will take post-test and will answer a questionnaire questions. This session would last 30- 45 minutes. If you volunteer to participate in a focus group interview, you will participate in a 30 minutes interview. This study will take place in the community college.

POTENTIAL RISKS AND DISCOMFORTS:
We do not anticipate any risks or discomforts to you from participating in this research. If you wish, you may choose to withdraw your consent and discontinue your participation at any time during the study without penalty.

BENEFITS:
The possible benefit to you of participating in this study is learning new English vocabulary effectively and you will be able to recall and use these vocabulary in your communication and possible improvement using the vocabulary in your ESL speaking and writing, but this cannot be guaranteed.

PRIVACY/CONFIDENTIALITY:
Because you will not be providing any information that can uniquely identify you (such as your name or student ID number), the data you provide will be anonymous.

COMPENSATION/PAYMENT FOR PARTICIPATION:

There is no payment or other form of compensation for your participation in this study.

VOLUNTARY NATURE OF THE STUDY:

Your participation is voluntary and you may refuse to participate without penalty or loss of benefits. Furthermore, you may skip any questions or tasks that make you uncomfortable and may discontinue your participation at any time without penalty. In addition, the researcher has the right to withdraw you from participation in the study at any time. Not participating or withdrawal from the study will not affect your grade of the course you are taking.

OFFER TO ANSWER QUESTIONS:
Please ask any questions you have now. If you have questions later, you should contact the principal investigator: (Malihe Eshghavi) at ([redacted]) or (meshghavi@dons.usfca.ed). If you have questions or concerns about your rights as a participant in this study, you may contact the University of San Francisco Institutional Review Board at IRBPHS@usfca.edu.

I HAVE READ THE ABOVE INFORMATION. ANY QUESTIONS I HAVE ASKED HAVE BEEN ANSWERED. I AGREE TO PARTICIPATE IN THIS RESEARCH PROJECT AND I WILL RECEIVE A COPY OF THIS CONSENT FORM.

PARTICIPANT'S SIGNATURE *DATE*

APPENDIX C

PRODUCTIVE RECALL PRE-/POST-TEST

Instructions: Please read each definition, and write the word in the space provided.

Example: A person who teaches is called a

Teacher (n)

1. A person who is present at an event or incident but does not take part

   B_____ (n)

2. Consisting of many different and connected parts

   C _____ (adj)

3. A person who kills another human being

   M _____ (n)

4. A storm with a very violent wind and strong rain

   H _____ (n)

5. An organization set up to provide help and collect money for people in need

   C _____ (n)

6. When something happens suddenly by chance

   A _____ (adv)

7. Divide something to give out to different people or parties

   D _____ (v)

8. Join someone to go somewhere

   A _____ (v)

9. Get or acquire through a request or effort

O _____ (v)

10. To collect financial support for a charity

F _____ (v)

11. Having or showing a strong desire and determination to succeed

A _____ (adj)

12. Make (something) appear larger than it is

M _____ (v)

13. Give support, confidence, or hope to (someone)

E _____ (v)

14. Having very high reputation and level of respect

P_____ (adj)

15. Pay some or all of the costs involved in preparing a sports game, art show, etc.

S _____ (v)

16. Communication over a distance by telephone, internet, etc.

T _____ (n)

17. Feeling or showing respect for someone or something

I _____ (adj)

18. For a person to become well and healthy again

R _____ (v)

Match the words with the definitions in the box below.

_____ 19. Trend (n)	A. Form a mental picture of something not present
_____ 20. Glory (n)	B. A moral duty to do certain things
_____ 21. Entrepreneur (n)	C. Lack of concern for others
_____ 22. Rehabilitation (n)	D. Feeling or showing concern and sympathy for others
_____ 23. Imagine (v)	E. A person or something that vanishes and cannot be seen
_____ 24. Investment (n)	F. Feeling deep pleasure and satisfaction because of achievements
_____ 25. Exception (n)	G. Helping others, especially by giving money, food or clothes
_____ 26. Proud (adj)	H. Putting money in a business to make more income
_____ 27. Donation (n)	I. A person who creates and organizes a new business
_____ 28. Responsibility(n)	J. Make (something) certain to happen
_____ 29. Aggressively(adv)	K. A company or group of people formed to act as a single business
_____ 30. Corporation (n)	L. Bringing someone back to health through training and therapy
_____ 31. Selfish (adj)	M. Doing something in a forceful and angry way
_____ 32. Compassionate (adj)	N. Honor and happiness about an achievement and success
_____ 33. Assure(v)	O. A general way in which something is growing and developing
_____ 34. Disappear (v)	P. A person or thing that is different and does not follow the general rule
_____ 35. Logo (n)	Q. A symbol used by a company for its products or services
_____ 36. Generosity (n)	R. A doctor for animals
_____ 37. Glamorous (adj)	S. Happy to use time or money to help others
_____ 38. Veterinarian (n)	T. Excitingly attractive

APPENDIX D

RECOGNITION PRE-/POST-TEST

Instructions: Please read each sentence and choose a word that matches the sentence very well.

1. Can you _____ the world without guns and war?

   a) Think b) Talk c) Memorize d) Imagine

2. Human relationships are _____. They are not easy to explain.

   a) Complex b) Simple c) Predictable d) Beautiful

3. Police have not yet found any evidence about the _____Who killed Mr. Smith?

   a) Scene b) Victim c) Murderer d) Place

4. She listens to loud music late at night. She is very _____ not caring that her roommate is resting.

   a) Selfish b) Angry c) Polite d) Sad

5. The _____ to the school helped students financially to continue their education.

   a) Computer b) Teachers c) Donation d) Food

6. He has to buy a new cellphone because he dropped his phone _____while on the bus and broke it.

   a) Happily b) Accidentally c) Sadly d) Immediately

7. Whenever John's mother wants to travel abroad, John and his wife_____ her.

a) like b) Love c) Accompany d) Teach

8. The teacher was _____with the student's progress in speaking English.

a) Angry b) Shocked c) Impressed d) Challenged

9. Mary is very _____which helps her to think about achieving her dreams in the future.

a) Worry b) Concern c) Ambitious d) Disappointed

10. The old man cannot see the newspaper very well, so he has to_____ the letters to read the news.

a) Stand b) Magnify c) Look d) Minimize

11. My father always _____ me to travel around the world and learn about people.

a) Encouraged b) Missed c) Impacted d) Familiarized

12. Usually students like to buy a t-shirt with their university's_____ from the university's store

a) Chocolate b) Logo c) Class d) Coffee

13. You have to study hard in order to be accepted in _____ schools such as Harvard or Stanford University.

a) Big b) Private c) Public d) Prestigious

14. In order to _____ a large concert, a company must have lots of money.

a) Sit b) Sale c) Sponsor d) See

15. Athletes who play sports _____get hurt more frequently than athletes who don't.

a) Slowly b) Often c) Aggressively d) Rarely

16. It can take longer for an elderly person to_____ from a serious injury.

a) Suffer b) Recover c) Cure d) Be well

17. Winning the Oscar for his film was the great _____ of his career and reputation.

a) Glory b) Happiness c) Moment d) Salary

18. Putting kids in sports at a young age is a growing _____ in many countries today.

a) Trend b) Activity c) Exercise d) Game

Instructions: Fill in the blanks by using the vocabulary in the word box. Use each word only once.

Hurricane	**Proud**	**Telecommunication**	**Investments**
Distribute	**Rehabilitation**	**Assure**	**Veterinarian**
Charity	**Corporation**	**Responsibility**	**Glamorous**
Generosity	**Exception**	**Compassionate**	**Fundraised**
Entrepreneurs	**Obtain**	**Disappeared**	**Bystander**

19. The police knew it would be useful to talk to the _____ who saw the thief steal the woman's purse.

20. In some cultures, people greatly value kindness to others and feel it is their _____ to help their neighbors as much as they can.

21. Healthcare workers are usually_____ people. They are always ready to help others in need.

22. The _____destroyed many buildings in Florida. People went to the shelters to protect themselves.

23. Some people prefer to give their money to a _____ in order to provide financial help for others in need.

24. Robbers walked past her and stole her purse then they _____ quickly.

25. Their parent were_____ of their child as she graduated as a top student with great grades.

26. Every Christmas, this charity organization_____ clothes and food to homeless and poor people.

27. Most of the students did not find the mathematics class helpful since it was intensive and therefore they couldn't first _____ any basic math knowledge.

28. Their cat's _____was able to rescue the cat's life by diagnosing the illness quickly.

29. Many people lost their houses because of the fire. Some community members _____to help their own neighbors after the tragedy.

30. He made many_____ in a computer company to make more money

31. There are lots of _____in northern California who invest in tech companies in Silicon Valley.

32. Sara _____ her mother that everything is alright in school now, because she had trouble with her grades before.

33. These days, technology is fast paced and life without_____ seems very hard.

34. Some board members questioned the President's ability to run the _____.

35. After a serious injury, physical therapy _____ helped the professor return to normal life.

36. Most competitive athletes earn money for playing sports, but gymnasts are a/an _____. They do not receive any salary.

37. The bride is looking very _____in that dress.

38. The waiter was thankful for the _____of costumers.

APPENDIX E

QUESTIONNAIRE

This survey is asking your feedback and opinion about the new techniques that I (Malihe) used in your class to teach new words.

Thank you for answering these questions:

1. It was easy for me to learn new words with text definition, examples & picture/video.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

2. It was easy for me to learn new words with closed eyes drawing & pronouncing.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

3. It was easy for me to learn new words with storytelling & group practicing.

- o Strongly agree
- o Agree
- o Neither agree nor disagree
- o Disagree
- o Strongly disagree

4. It was easy for me to learn vocabulary through circle conversation rotation (the technique that you stood up in front of each other and practiced the vocabulary).

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

5. After learning vocabulary through these techniques, do you remember the vocabulary easily? If yes, do you use those vocabulary in your speaking and writing?

6. After learning vocabulary through these techniques, do you remember the vocabulary easily? If yes, do you use those vocabulary in your speaking and writing?

7. Which technique or activity did you like most about the vocabulary teaching techniques? Why?

8. Which technique or activity you like least about the vocabulary teaching techniques? Why?

9. Do you have any other comments that you would like to share with me about the new vocabulary teaching techniques?

APPENDIX F

FOCUS GROUP INTERVIEW QUESTIONS

1. Which vocabulary learning technique did you like, and why?

Picture & definition Circle Rotation
Closed eyes drawing and pronouncing Story telling

2. What did you like most about the vocabulary teaching techniques?

3. What did you like least about the vocabulary techniques?

4. What technique helped you remember the words better?

5. After learning new vocabulary through these techniques, do you remember the vocabulary easily? If so, do you use those vocabulary in your speaking and writing?

6. What other methods did you use in the past to learn vocabulary?

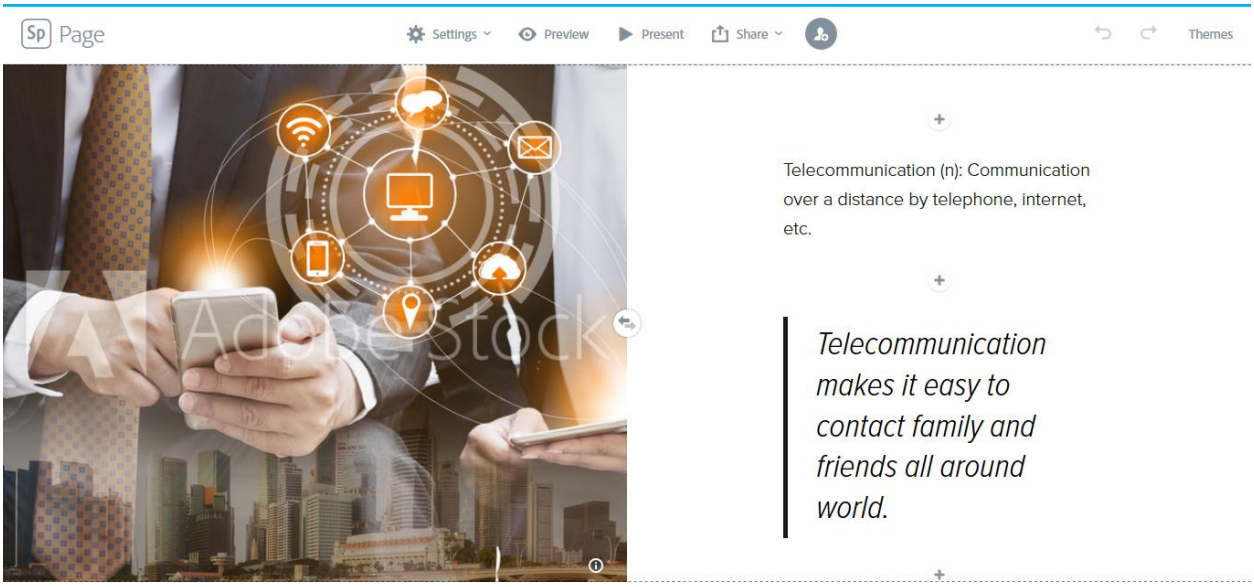
7. Do you have any other feedback that you would like to share with me about new vocabulary teaching techniques?

Note: The researcher may ask additional follow-up questions, as appropriate, with participants.

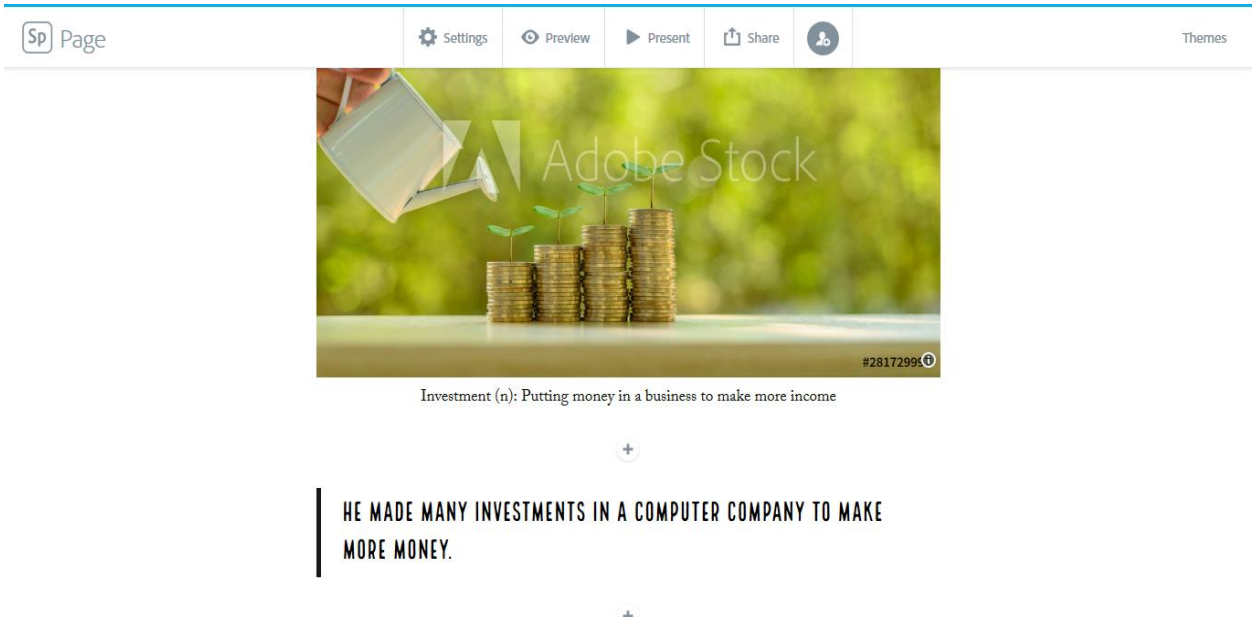
APPENDIX G

PICTORIAL AUDITORY TECHNIQUE SAMPLE

a. Telecommunication (n)



b) Investment (n)

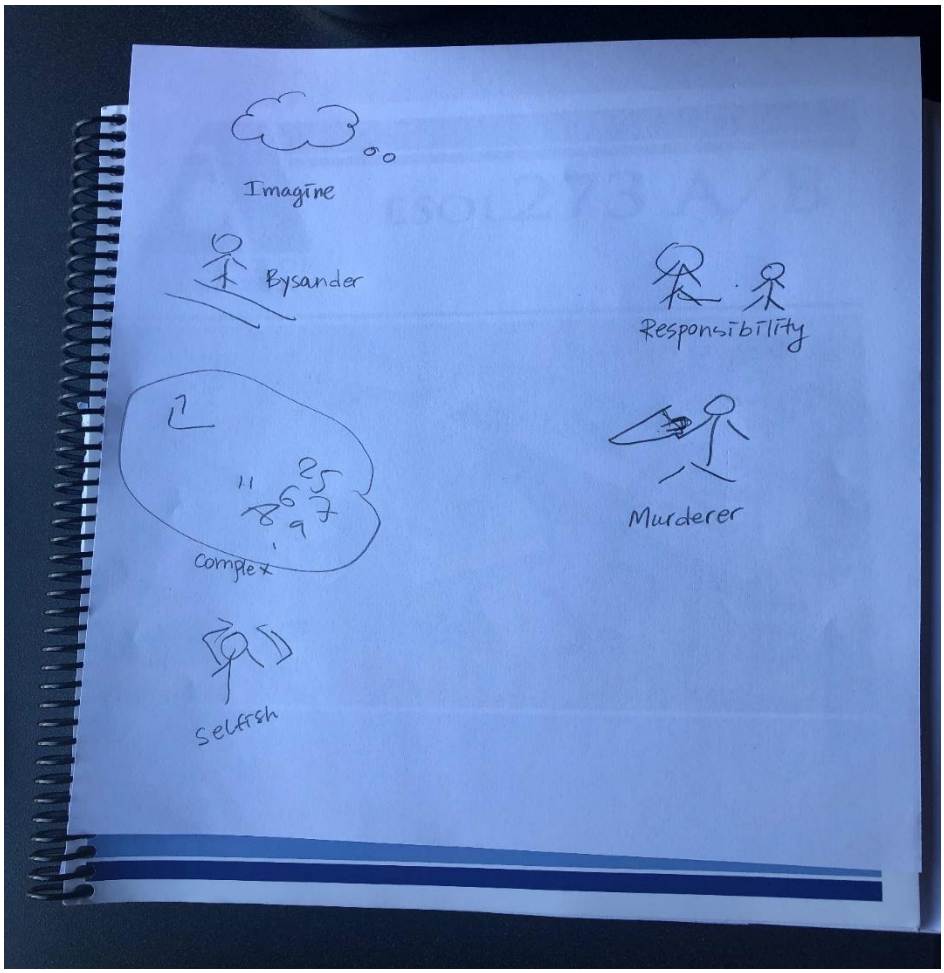


Note: The above pictures are screenshots, however, they are more clear in Adobe Spark page

APPENDIX H

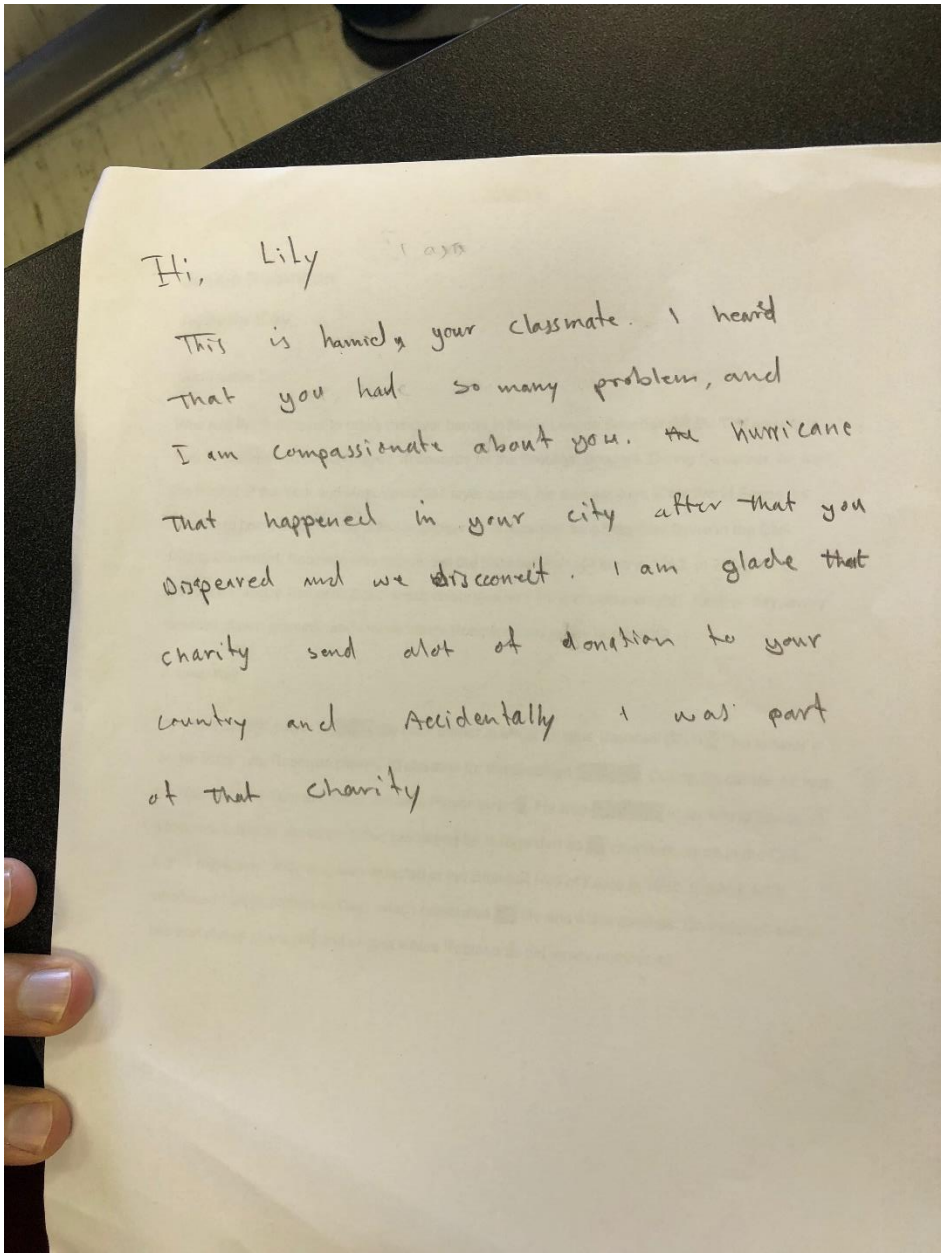
PARTICIPANTS' WORK SAMPLES

a) Multi-Sensory Drawing techniques (Student's drawing sample):



Note: the drawings in the above picture were performed by the student with eyes closed, after which the student then opened her/his eyes and wrote the words near the related drawing.

b) Storytelling Technique:



Hi, Lily

This is hamid, your classmate. I heard that you had so many problem, and I am compassionate about you. the hurricane that happened in your city after that you Disperved and we disconect. I am glade that charity send alot of donation to your country and Accidentally I was part of that charity

Note: Each group prepared a story using new vocabulary in that story