THE APPLICATION OF MIND MAPPING FOR ENGLISH VOCABULARY LEARNING OF GRADE 8 STUDENTS, IN SICHUAN PROVINCE, CHINA

Rouyi Pu[1*] and Nipaporn Sakulwongs[2]

[1]Graduate student in Master of Curriculum and Instruction, Suryadhep Teachers College, Rangsit University Phahonyothin Rd., Lak-hok, Pathum Thani, Thailand

[2]Lecturer in Master of Curriculum and Instruction, Suryadhep Teachers College, Rangsit University Phahonyothin Rd., Lak-hok, Pathum Thani, Thailand

*E-mail: rouyi.p63@rsu.ac.th

ABSTRACT

This mixed methods research compared Grade 8 students' learning achievement before and after the use of Mind Mapping and examined their attitude towards the use of Mind Mapping in English vocabulary course in Sichuan Province, China. The sample group consisted of 30 students who enrolled in a English vocabulary course in 2023 Academic Year. Quantitative data and qualitative data were collected applying six lesson plans, pretest, posttest, and semi-structured interview. The quantitative data were analyzed using mean, standard deviation as well as Paired Sample T-Test. The qualitative data were analyzed using thematic analysis.

The results showed that after the use of Mind Mapping, the students' posttest score ($\overline{X}$ = 20.30, SD = 4.19) was higher than that of the pretest score ($\overline{X}$ = 13.33, SD = 4.50), resulting in the significant mean difference of 6.97 points. The students' responses from the semi-structured interview suggested that the students had a positive attitude towards the use of Mind Mapping in a English vocabulary course. Therefore, the use of Mind Mapping provides another effective method for the teaching of Chinese middle school English vocabulary courses.

Keywords: Mind Mapping, English Vocabulary Courses, Students' Learning Achievement, Students' Satisfaction

Introduction

1. Background and Rationale of the Study

English is the universal language in the world, and vocabulary is one of the three elements of English language, and it is also the most basic element of language. The famous British linguist Wilkins (1987) also pointed out: "Without grammar, people can express very few things; and without words, people can't express anything." It can be seen that vocabulary is the cornerstone of language and the key element that people must master before communicating and expressing. Therefore, vocabulary learning is also an important part of English.

Ministry of Education of the People's Republic of China (2011) made clear requirements for middle school students' vocabulary: when students graduate from middle school, they can use 1500-1600 words, and idiomatic expressions or fixed colplaces should reach 200-300. The Curriculum Standards put forward higher requirements for students' vocabulary, because vocabulary plays a decisive role in the improvement of learners' English level. Although both teachers and students are aware of the importance of vocabulary, the effect of vocabulary teaching and learning is not optimistic, and it is generally time-consuming and inefficient. Liu (2018) found through investigation that most students thought words were very difficult to remember and boring to learn. They said they remembered words by repetition after class, and hoped teachers could teach them how to learn words. However, most teachers still use the traditional teaching methods, and the results are not satisfactory. Therefore, teachers should guide students to use some effective vocabulary memory strategies in vocabulary teaching.

Mind Mapping is an effective thinking tool and a visual tool for knowledge representation, which can be used to assist English vocabulary teaching. It uses lines, codes, images, colors and other graphics to visualize the thinking process in the form of image visualization. A mind map is a concept or topic at the center of development, and from this center diverges into many different branches, each branch is a sub-center, which can further diverge outward, thereby building a memory network to help people understand knowledge, and remember it. Therefore, according to the thinking characteristics of middle school students, teachers can guide them to use Mind

Mapping to build a memory network from the aspects of word meaning, usage, classification, roots and affixes, etc., so as to effectively memorize words (Wang, 2020). Mind Mapping aids vocabulary memory, which helps to solve the practical problems of difficult word memory and high forgetting rate, and stimulates students' interest in English learning. By drawing mind maps, students can develop good learning habits to connect new and old knowledge, and improve students' association and divergent thinking ability.

Research Objectives

1. To compare Grade 8 Chinese students' English vocabulary learning achievement before and after applying Mind Mapping.

2. To investigate Grade 8 Chinese students' learning satisfaction after applying Mind Mapping in learning English vocabulary.

Research Questions

1. Would grade 8 Chinese students' English vocabulary learning achievement be improved after applying Mind Mapping?

2. Would grade 8 Chinese students exhibit learning satisfaction after applying Mind Mapping in English vocabulary learning?

Literature Review

1. Definition of Mind Mapping

Mind Mapping is the collision of thinking and soul. In Chinese, it is composed of four simple Chinese characters, "si" stands for thinking; "wei" stands for angle and dimension; "daostands" for guidance; "tu" is a way of expression. Through the interpretation of these four words, the concept of Mind Mapping can be explained in one sentence: Mind Mapping can help students approach problems from different perspectives, and show the ideas in the mind by various means. Now this method is widely used in various fields. In the 1960s, it was proposed by Tony Buzan, a famous British psychologist. Since then, many scholars have been interested in it and put forward their own views. Farrand (2002) points out that Mind Mapping is handy for solving problems, because people can deal with their problems on a piece of thesis. Budd (2004) comes up with the concept of Mind Mapping as "the hierarchies and associations flow out from a central image in a free-flowing, yet organized and coherent, manner." The important part and the central image are connected by thick lines, and the thin lines are scattered outward, leading to the secondary part.

Wang (2000) thinks that its function is mainly reflected in notes and can be applied to teaching practice. Li (2007) holds that Mind Mapping is a whole process of thought, and it also makes the mind more vivid.

Based on the above definition of Mind Mapping, the author believes that Mind Mapping is not only a thinking tool, but also a learning method. It can mobilize abstract thinking and use the central image to radiate some relevant contents. Learners will benefit a lot from mind maps, such as enhancing thinking ability, improving attention and memory, inspiring imagination and creativity.

2. Classifications of Mind Mapping This section mainly introduces some commonly used mind maps in English vocabulary teaching.

Situational Mind Mapping

Shu (1936) divides situation into three categories: real situation, imaginary situation and implied situation. Li (2007), a famous language expert in China, divides situation into entity situation, simulation situation, imagination situation and reasoning situation. Based on the above definition and classification of situation, the "context-based Mind Mapping" in this study refers to a mind map based on a certain central

word, such as location, occupation, status, category, etc., and associated with other related words.

Synonym/Antonym Mind Mapping Synonyms refer to words with the same or similar meaning. According to Zhang (2011), similarity can be reflected in the following four aspects: 1) The degree of meaning. 2) The focus of meaning. 3) The scope of meaning. 4) The objects of meaning. Antonyms include absolute antonyms and relative antonyms. The meanings of these antonyms are mutually exclusive. 1) Pairs of words with opposite meanings. For example: true versus false, dynamic versus static, support versus opposition. The conceptual meanings expressed by such antonyms are mutually exclusive. 2) Pairs of words that are often in the same or opposite position. Such as: spring to autumn, black to white, mountains to flat.

This kind of antonym has no contradictory relationship, but the contrast is distinct. The "synonym/antonym Mind Mapping" in this study refers to a word with multiple meanings, each of which corresponds to a synonym and an antonym.

Root-based Mind Mapping The core of English word formation lies in the root. The meaning

of a word is mainly reflected by the root, it can be formed into a word by itself or by combining with other words. The part of speech and meaning of a word can be changed by prefixes and suffixes. In other words, a word is generally composed of three parts: root, prefix and suffix. According to Bo (2007), the root determines the meaning of the word, the prefix changes the meaning of the word, and the suffix determines the part of speech. The "root-based Mind Mapping" in this study refers to the sum of words with the same root or the same prefix and suffix.

3. The Application of Mind Mapping in English Vocabulary Teaching.

Since the application of Mind Mapping in English teaching, scholars have done a lot of research on reading, writing, vocabulary and other aspects, which are mostly empirical studies. These involves a wide range of research objects, including students in various schools of all levels.

Xu (2020) selects Grade Three students from senior high school as the research group and introduces Mind Mapping into English vocabulary teaching. His research shows that Mind Mapping can not only enable students to memorize words efficiently in a short time, but also actively memorize words through the internal association between words. Tan (2011) combines Mind Mapping with vocabulary teaching, and she finds that this combination can help students enlarge their vocabulary and improve their English capacity. Therefore she states the combining with Mind Mapping and vocabulary teaching is a break-through of the traditional teaching. Zhang (2013) conducts a study on the students with learning difficulties in senior high school, and finds that Mind Mapping can effectively improve the word accuracy and shorten memory time of the students with learning difficulties. Chen (2013) conducts an experiment for two years on the influence of Mind Mapping on college students' English vocabulary. She confirms that this method can promote the formation of meta-cognitive strategies and cognitive strategies of English vocabulary for art college students, and the scores of vocabulary tests are improved. Jia (2014) points out that this method can improve the speed of students' memory and extraction of words, and cultivate students' sense of cooperation. Zhao (2015) also makes a study on the use of Mind Mapping to memorize English vocabulary, and confirms that Mind Mapping can help students build cognitive structure map and stimulate students' deep motivation for learning. The above researches show

that Mind Mapping can not only change the traditional memory method, but also make vocabulary stored in memory for a long time and improve their interest in the process of vocabulary learning.

4. The Theoretical Basis of Mind Mapping Brain Science

The brain is divided into the left brain and the right brain. Shen (2001) points out that the right hemisphere processes the incoming information automatically, and then generates other information from the processed information. The learning mode of Mind Mapping is to present knowledge in various ways such as graphics, lines and pictures, so as to promote meaningful learning. It can not only use the logic and digital ability of the left brain, but also use the space, color and imagination ability of the right brain. Mind Mapping is a proper combination of the neural network structure of the brain.

Knowledge Visualization

Edwards & Cooper (2010) think that the purpose of knowledge visualization is not only to transfer the facts of knowledge, but also to transfer the insight, experience, attitude, values, expectations and views of knowledge, so as to help people reconstruct and apply knowledge correctly. Knowledge visualization refers to teaching new knowledge in a visible way, such as using images and graphics. Wang (2014) believes that in a mind map, all the information is organized in a figure, and this figure is full of colors, the concepts related to the central words are written in each branch, these make the thinking process hidden in the mind explicit and visual.

5. Level of Processing

This theory indicates that "incoming stimuli are subjected to a series of analyses starting with shallow sensory analysis and proceeding to deeper, more complex, abstract and semantic analyses" (Craik & Lockhart, 1972). In the process of long-term memory of information, the processing level of knowledge is of great help. According to Zhang (2002), in the process of drawing a mind map, students must find out the relationship between the words first, which leads to divergent thinking. This process is the deep processing of vocabulary. After drawing a vocabulary map which is easier to be accepted and memorized by the brain, it can impress the students deeply. It is easy to extract and hard to forget when using the vocabulary next time.

6. Conceptual Framework of the Study

This study was composed of independent variable and dependent variables. The independent variable included three types of Mind Mapping. Students' English vocabulary achievement and students learning satisfaction were the dependent variables.

Research Methodology

1. Research Instruments

In this thesis, the study was conducted by collecting quantitative and qualitative data. Quantitative data include pretest and posttest. Qualitative data included semi-structured interviews. The data were analyzed in three different methods, all of which are in line with the two study objectives.

Independent Variable　　　　**Dependent Variables**
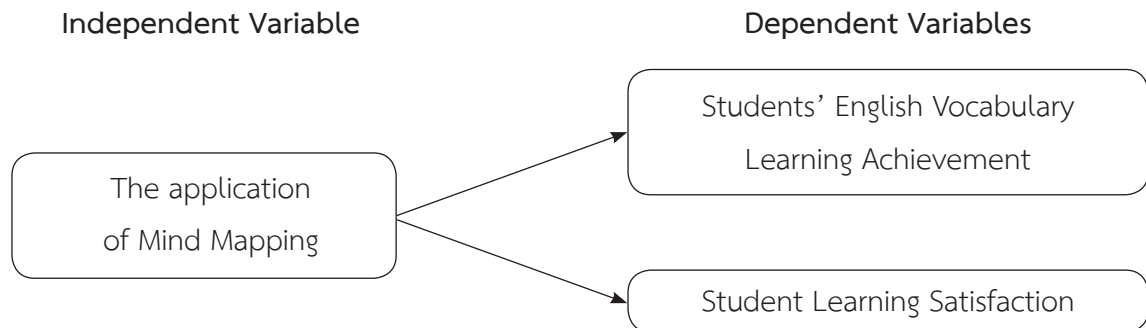
Figure 1 Independent Variable and Dependent Variable
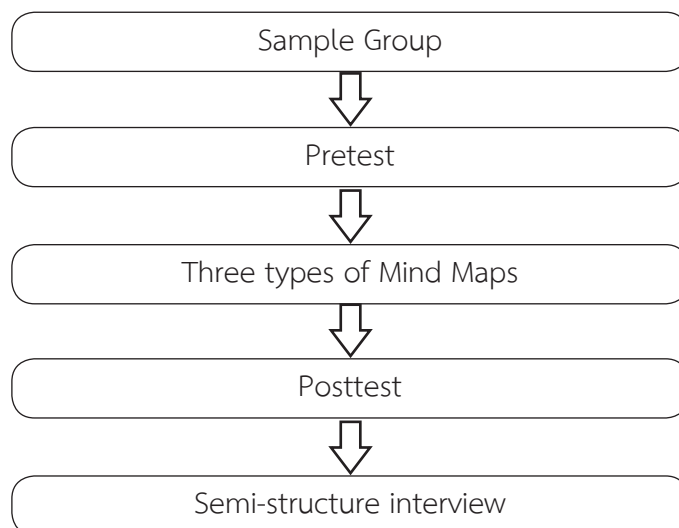
Figure 2 Illustration of Research Design

1.1 Lesson Plans

The researchers developed six 40-minute lesson plans for one month. A sample group of 30 students was instructed twice per week. Lesson themes were determined by the educational level of the sample group and the course materials. Before delivering the lectures to the sample group, the researcher received approval from the professors of the relevant disciplines.

1.2 Achievement Test

Learning achievement tests were developed according to the curriculum framework of the English Textbook for Compulsory Education. The researcher followed the standard guidelines of the China Council for School Examinations and Assessment while developing the test items. The vocabulary learning test mainly tests the students' vocabulary learning achievement. There are 30 questions on vocabulary test and one point is awarded for each question. The researcher conducted learning achievement tests before and after the intervention to analyze the learning outcomes of the study participants. It consisted of pretest and posttest. For the posttest, the same test questions were used, but in a different order of selection; the same group of students was treated after the intervention. Therefore, the same test items for pretest and posttest were applied in order to ensure consistency with the evaluation.

1.3 Semi-structured interview

Keleş (2012) assert that semi-structured interviews provide researchers the freedom to conduct interviews in a more casual conversation, allowing for unanticipated information to emerge. Therefore, semi-structured interviews are extremely effective for obtaining a solid understanding of a subject of interest. Hence, in order to find out the students' satisfaction with using PBE approaches in the teaching of Social Studies, each student from the experiment had a face-to-face interview with the researcher after the intervention of the approach. The interview consisted of six questions that the researcher framed. Each student took approximately 7-10 minutes to respond and wasgiven the freedom to speak in the language of their choice (English or Chinese). The responses of each student were audio recorded during the interview. Later the researcher translated and transcribed it in English. The data were analysed using the thematic analysis technique.

2. Validity and Reliability

The validity of the research tool was verified by three experts, they are experienced Chinese English teachers. The index of item objective congruence (IOC) was calculated by using a statistical formula. All instruments in this study were validated and rated by the experts as higher than 0.67, which indicates that the items were effective for the study. The IOC lesson plans were rated as +1. The learning achievement test questions were rated as 0.9. The semi-structured interview was rated as 0.83. The semi-structured interviews were rated as +1.

To check the reliability of the achievement test, the researchers had 30 students take a pilot test with the same questions as the achievement test in the study. The Kuder-Richardson formula (KR-20) was used to check the reliability coefficient of the learning outcome test. The KR-20 coefficient obtained was 0.745, which is greater than 0.70. Therefore, the test item was reliable.

3. Participants

The target population of this study consisted of 30 Grade 8 students in the middle school in Sichuan Province, China. They ranged in age from 13 to 15 years old with mixed genders and English vocabulary achievement. The researcher used a clustered random sampling method to select one class (N= 30 students) from a population of three mixed-ability classrooms of Grade 8 middle school students. The sample included the students with mixed genders and abilities in English vocabulary achievement.

4. Data Collection Procedures

4.1 Experiments and methods of data collection

The pretest and posttest will be conducted offline and all students will take the exams in the classroom. The exam papers will be personally marked by the teacher after they have been collected.

4.2 Approval and Ethics Consideration

Based on ethical considerations, the researcher submitted the letter of approval to the Ministry of Education (MoE) for authorization to conduct the study in the academic year 2023. After receiving an official letter of approval, the researcher was assigned to the District Education Officer (DEO). The researcher obtained the letter from the district education officer and requested approval from Yuechi No.1 Middle School, Sichuan Province.

Participants were also informed of study objectives prior to implementing the strategy. Additionally, study participants must sign consent documents to protect their legal and moral rights. As study participants were under 18, their parents countersigned the consent forms.

Results

The following discussion intends to present the findings in detail according to research objectives.

1. Learning Achievement

The results of the study showed that using a Mind Mapping to teach a English vocabulary course improved students' learning performance. The maximum score on the pretest was 21 (out of a total of 30) and the minimum score was 3. The posttest scores increased significantly, all 30 students showed significant or slight improvement on the posttest, with score gaps ranging from 5 to 10 points. The mean score on the posttest ($\overline{X}$ = 20.30) was 6.97 points higher than the pretest ($\overline{X}$ = 13.33). In addition, a significant score difference was achieved by student number 24. This student scored 13 points in the pretest and 23 points in the posttest, an improvement of 10 points. Thus, the improvement in student performance indicated that the use of the Mind Mapping had a positive impact on student performance in the English vocabulary course. Thus, all of the above findings were reliable answers to the first research question.
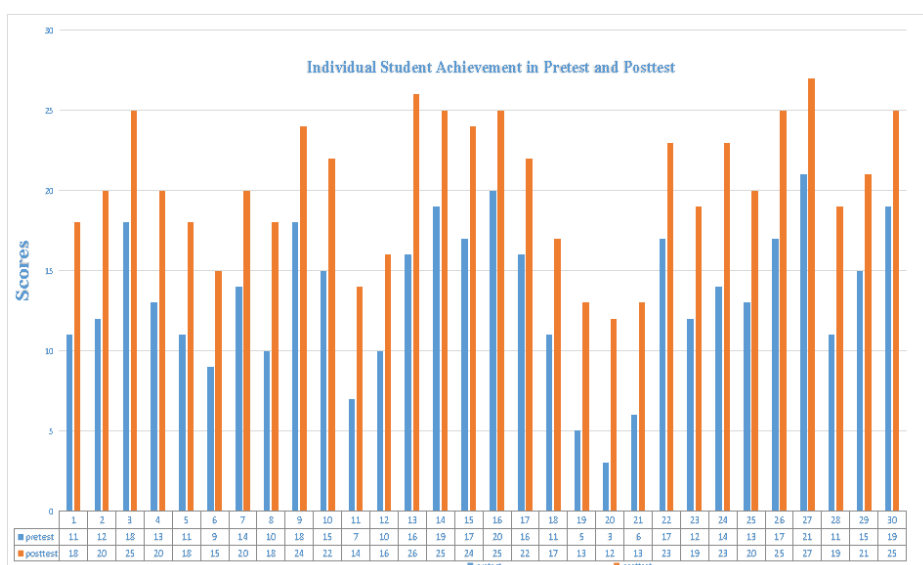

Individual Student Achievement in Pretest and Posttest

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
pretest	11	12	18	13	11	9	14	10	18	15	7	10	16	19	17	20	16	11	5	3	6	17	12	14	13	17	21	11	15	19
posttest	18	20	25	20	18	15	20	18	24	22	14	16	26	25	24	25	22	17	13	12	13	23	19	23	20	25	27	19	21	25

Figure 1 Individual Student Achievement in Pretest and Posttest

2. Semi-structured interview

In order to respond to the second research objective, the qualitative data was collected through semi-structured interviews. The objective of the study was to examine the learning satisfaction in English vocabulary of grade 8 Chinese students using Mind Mapping. The researcher conducted interviews with the research participants at the end of the intervention with the students of the target group. Due to the time constraint and the convenience of the research participant, the researcher interview sessions were conducted in groups of 3 with 5 members respectively. To protect the anonymity and privacy of the research participants, the researcher used the same student code which was used during the pretest and posttest. A total of six questions were framed for the interview after being validated and accepted by the three experts (three experts from China). The research participants were given the freedom to speak in the language they are comfortable to share their views and opinions. The interview was audio recorded for the purpose of data analysis. The data gathered were transcribed and then analyzed through the identification of themes. The data were read, analyzed, and interpreted into themes based on the research objectives and questions of the study. The data from the students' interviews were analysed under six themes: 1) Enjoyment in Learning, 2) Learning Satisfaction 3). Active Engagement, 4) Motivation in Learning 5) Effective communication, and 6) Revolution in Learning. All most all the students gave a positive response to the application of Mind Mapping in learning English vocabulary.

Enjoyment in Learning

Most of the study participants were excited to learn about the English vocabulary combined with Mind Mapping. It was interesting to determine the application of Mind Mapping in English vocabulary teaching through data collected from student group interviews. Cumulative analysis of focus group interviews showed that students' views on the application of Mind Mapping teaching methods in English vocabulary courses were positive. Students find this lesson interesting because they have the opportunity to explore how to make associations between English words and work with their group members to learn new concepts. Most students seemed to enjoy learning English vocabulary with Mind Mapping. They paid good attention to study in groups with their friends.

"Using Mind Mapping to learn English vocabulary makes lessons interesting.

I am free to make associations between English words." (Student 3, Group 1).

"I am happy and excited about learning English vocabulary because I have a chance to discuss how to design mind maps with my friends. It's fun to study with friends." (Student 1, Group 2).

Learning Satisfaction

Based on comments and learning experiences shared by study participants during interviews, the conference showed that learning English vocabulary using Mind Mapping produced positive learning satisfaction. Most of the study participants agreed using Mind Mapping helps them remember vocabulary better, and they hope to learn other topics by applying Mind Mapping.

"Using Mind Mapping in the classroom makes us learn English vocabulary better. Mind Mapping makes English vocabulary learning no longer boring and make us more interested in learning English." (Student 1, Group 2)

"When I usually read English novels, Mind Mapping has given me a great help in memorizing words." (Student 4, Group 3)

Active Engagement

Most participants were active in the learning activities. The students found Mind Mapping stimulating because most of the learning activities required them to do themselves. In addition, the learning activities kept them engaged because they were designing mind maps and memorizing words.

"During study activities, when I have the opportunity to interact with friends, which makes my study more meaningful." (Student 2, Group 1).

"Mind Mapping is learning by doing, engaging us in activities that help us enhance our memory. I learn better when I interact with my friends," (Student 1, Group 3)

Most participants showed significant improvement in the posttest compared to the pretest, indicating their confidence level.

Motivation in Learning

In interview, most participants emphasized that they were highly motivated and curious about learning English vocabulary when the learning activity was based on Mind Mapping. Mind Mapping encouraged and motivated the participants to learn English vocabulary better.

"I really like the English vocabulary class because I can interact with the people around me. I really like the course of designing different mind maps because it gives me a good chance

to memorize English vocabulary." (Student 2, Group 1).

Effective Communication

Mind Mapping was adopted to provide participants with the better opportunities to learn and remember English vocabulary. Mind Mapping learning activities involved a great deal of interaction between learners and provide them with opportunities to communicate with group members, thereby improving their speaking skills.

"In group activities, I have many opportunities to share my views and opinions. It's improved my communication skills." (Student 4, Group 2)

Revolution in Learning

More than 90 percent of respondents responded that using Mind Mapping was a new way to learn English vocabulary.

"I really like learning English vocabulary using Mind Mapping. It was much more interesting than the traditional method of memorizing vocabulary." (Student 4, Group 1)

Consequently, the analysis above showed that students found Mind Mapping beneficial to study the English vocabulary Course. Most students who shared their overall impressions indicated that Mind Mapping greatly improved their learning efficiency and made them more interested in learning. All of the data presented here remarkably addressed research objective 2.

Conclusion

The results of a study on the use of Mind Mapping in a English class for Chinese students in grade 8 showed that it had a beneficial impact on the students' learning English vocabulary. Students were likely to participate in an engaging learning environment because they were eager to learn English vocabulary through Mind Mapping. Mind Mapping makes learning English vocabulary fun and enjoyable, which makes it much simpler to learn, remember and recall. If schools adopt Mind Mapping, students will do better on English vocabulary tests because Mind Mapping encourages active learning engagement and learning from each other. In general, Mind Mapping is a highly effective teaching strategy that is crucial in the classroom of today, especially when teaching and studying English vocabulary, which will ultimately increase English vocabulary achievement.

The Result of Pretest and Posttest Data Analysis

The first objective of the study was to improve learning achievement

in a English vocabulary course after the use of Mind Mapping by Grade 8 middle school students in Sichuan Province, China. Next, the result of the pretest and posttest were analyzed using paired sample t-test to compare the difference between the sample group's learning achievements. The teaching research has effectively verified that the root-based, synonym/antonym and context-based mind maps can show their own strengths, such as assisting students in English vocabulary learning, providing students with more specific learning methods, and making the process of vocabulary learning more interesting. In English vocabulary learning, three different types of mind maps are applied to help learners classify different vocabulary, to enhance their understanding of vocabulary from multiple perspectives, to help learners create a clear cognitive structure, so as to consolidate word-memorizing. Mind Mapping helps students frame their memorizes. Because of the short learning time, the influence of three types of mind maps on students' short-term memory is not significant enough. As time goes by, the effect of mind map on long-term memory can gradually appear and become more significant. Compared with the general glossary, Mind Mapping can make the process of word-memorizing

more interesting and personalized, because it has colors, pictures and notes. Below is additional detail of the conclusion regarding the findings of the study.

The Paired Sample T-test statistics analysis of achievement scores revealed a higher mean score in the posttest ($\overline{X}$ = 20.30, S.D. = 4.19) than that of the pretest ($\overline{X}$ = 13.33, S.D. = 4.50) with the mean difference of 6.97. The higher mean of the posttest indicated a positive impact of Mind Mapping in improving students' learning achievement in a English vocabulary.

1) The highest and the lowest scores out of 30 in the pretest were 20 points and 3 points, respectively. While the highest and the lowest scores in the posttest were 27 points and 12 points, respectively. Through these difference in scores of the pretest and of the posttest, it suggested that the highest score of the posttest was higher than the pretest score by 7 points. The lowest score of the posttest was also higher than the lowest score of the pretest by 9 points.

2) The majority of participants, 26 out of 30 participants from the sample group scored more than 15 out of 30 points in the posttest. Whereas in the pretest only 13 students scored 15 and above out of 30 points.

3) All the 30 students scored higher on the posttest than on the pretest. The improvement scores ranged from 5 to 10 points.

4) Based on the above quantitative data analyses, it was evident that the students' test scores improved on the posttest. In addition, the results clearly demonstrated that the use of a Mind Mapping significantly improved the performance of Grade 8 middle school students in English vocabulary course in Sichuan Province, China.

The Result of Semi-structured interview Analysis

The second objective of the study was to examine Grade 8 middle school students' attitudes towards the use of Mind Mapping in a English vocabulary class in Sichuan Province, China. Semi-structured interview sessions were conducted with three groups of students, each consisting of five students, to collect the required qualitative data.

The sample group consisted of only 15 students, who voluntarily participated in interviews. A thematic analysis was performed on the interview data after recording, transcription, interpretation, and analysis. Students' attitude towards using Mind Mapping to improve their performance in Career Guidance courses were positive according to the study.

1) All students claimed that they enjoyed using the Mind Mapping for their English vocabulary courses. This was evident from their responses collected through Semi-structured interviews.

2) According to the Semi-structured interviews, after the experiment, the students' attitude towards vocabulary learning changed from negative to positive. Most of them can finish the task of memorizing words actively. Through the classroom observations, most students can learn and memorize new words by drawing mind maps.

3) According to the comparative experiment results of three word groups, middle school students are more likely to use context-based Mind Mapping. The reason may be that middle school students are in the stage of transforming from image memory to abstract memory, and Situational Mind Mapping is more in line with the middle school students' way of thinking.

There is a very reason to believe that as long as students insist on using Mind Mapping, their English vocabulary scores will be greatly improved.

Discussion

Research Objective 1- To compare grade 8 Chinese students' English vocabulary learning achievement before and after applying Mind Mapping. Shuang (2020), who discovered that Mind Mapping in English vocabulary teaching significantly improved students' memory ability and the accuracy of dictation.

This study also supported the fact that the use of Mind Mapping in the English vocabularyclass had a constructive impact on the English vocabulary achievement of the students.

The findings were parallel to the studies conducted by Ma (2017). The researcher conducted an experiment on 90 students, and her research results were as follows: The application of Mind Mapping can enrich students' vocabulary memory strategies; The application of Mind Mapping has a positive effect on students' vocabulary level.

Research Objective 2- To investigate Grade 8 Chinese students' learning satisfaction after applying Mind Mapping in learning English vocabulary. Cai (2022) selected 81 students for experimental teaching. He summed up four ways to draw a mind map of English words: subject words, spelling and pronunciation, affixes and free association. In the final data results, he concluded that four kinds of Mind Mapping in English vocabulary class improved students' interest in learning English.

When teaching English vocabulary, using a variety of Mind Maps would help students to have a positive attitude toward the use of Mind Mapping in English vocabulary class. The students' intense curiosity while participating in the exercises was noted, which was a certain indication of their motivation.

Suggestions and Recommendations.

The following are recommendations for practices;

1) The learning outcomes of the students were improved through Mind Mapping in the English vocabulary class. The study's findings demonstrated that the posttest measure of learning achievement was higher than the pretests. As a result, it is strongly advised to incorporate Mind Mapping into regular English vocabulary teaching.

2) No matter the grade level, or size of the class, English teachers should use Mind Mapping to raise students' academic progress and engagement.

3) Learners showed a positive attitude towards Mind Mapping in learning English vocabulary. Thus, Mind Mapping in daily teaching in the English vocabulary class is highly recommended.

4) Additionally, Chinese researchers could use this study as a guide while conducting research in a relevant area of study.

Here are some recommendations for Further Research.

1) To strengthen the findings, similar research might be carried out at various grade levels with larger sample size and a longer time frame.

2) To make the results more trustworthy and meaningful, longer-term study can be conducted

REFERENCES

Bo, B. (2007). **Bo Bing English Grammar**. Beijing: Kaiming Press.

Budd, J. W. (2004). Mind Maps as Classroom Exercises. **The Journal of Economic Education, 35**(1), 35-46.

Cai, S. L. (2022). The application of Mind Mapping in junior high school English vocabulary Teaching. **Vocational and Technical Education**, (23), 182-184. doi:cnki:sun:yjjs.0. 2022-23-040.

Chen, Y. (2013). The application of Mind Mapping in English vocabulary learning strategy training. **Journal of Inner Mongolia Normal University**, (26), 117-119.

Craik, F., & Lockhart, R. S. (1972). Levels of processing: a framework for memory research. **Verbal Learning and Verbal Behavior, 11**, 671-684.

Edwards, S. L., & Cooper, N. (2010). **Problems and countermeasures of college students' employment guidance course.** Education Teaching Forum.

Farrand, P. (2002). The efficacy of the Mind Mapping' study technique. **Medical Education, 36**, 426-431.

Jia, Y. Y. (2014). **Based on the mind map of junior middle school English vocabulary learning activity design** (Master's thesis, Hebei University). Retrieved from https://kns. cnki.net/KCMS/detail/detail. aspxdbname =CMFD201402&filename=1014040306.nh

Keleş, O. (2012). Elementary Teachers Views on Mind Mapping. **International Journal of Education, 4**(1), 93-100. doi:10.5296/ije.v4i1.1327

Li, J. H. (2007). The application of Mind Mapping in high school English teaching. **Basic English Education,** (4), 46-50.

Liu, Y. (2018). **Based on the empirical research on junior middle school English vocabulary teaching mind maps** (Master's thesis, Hebei Normal University). Retrieved from https://kns.cnki.net/KCMS/ detail/ detail.aspxdbname=CMFD2018 02&filename=1018022006.nh

Ministry of Education of the People's Republic of China. (2011). **A Compulsory Education English Curriculum Standards**. Beijing: Beijing Normal University Press.

Shen, D. L. (2001). **Theory and Practice of Brain Function Development**. Beijing: Educational Science Press.

Shu, X. C. (1936). **Word-ocean Dictionary**. Shanghai: Chinese Dictionary Press.

Shuang, J. Y. (2020). **An Experimental Research on the Mind Map in English Vocabulary Review Teaching for Students of Junior High School** (Master's thesis, Yan'an University). Retrieved from https://kns.cnki.net/KCMS/detail/detail. aspx?dbname =CMFD202002&filename=1020301424.nh

Tan, J. C. (2011). Application of Mind Mapping in vocabulary memorizing. **Education and Teaching Research, 25**(1), 137-140. doi:10.13627/j.cnki.cdjy.2011.01.020

Tian, Z. Z. (2016). **A mind map application study in junior high school English vocabulary teaching** (Master's thesis, Henan Normal University). Retrieved from https://kns.cnki.net/ KCMS/detail/detail.aspxdbname=CMFD201701&filena me=1016234659.nh

Wang, L. (2000). A brief analysis of Mind Mapping teaching method. **Heilongjiang Science and Technology Information**, (4), 12-15.

Wang, S. F. (2014). Reconstruction of the classroom teaching model by knowledge visualization with internet technology. **Curriculum, Teaching Material and Method, 34**(7), 43-47. doi:10.19877/ j.cnki.kcjcjf.2014.07.008

Wang, H. M. (2020). **The Application of Mind Mapping in Primary School English Vocabulary Teaching** (Master's thesis, Hunan Normal University). doi:10.27137/d. cnki.ghusu.2020.000735

Wei, H. (2010). **Applied Research on Mind Mapping in Teaching of English Words** (Master's thesis, Henan Normal University). Retrieved from https://kns.cnki.net/ KCMS/detail/detail.aspx?dbname=CMFD2010&filename=2010154496.nh

Wilkins, D. A. (1987). Exploring computer network teaching models. **Exploring Computer Network Teaching Models, 9**(4), 70–73.

Xu, J. (2020). **Mind Mapping In The Primary School English Vocabulary Teaching Application Research** (Master's thesis, Yangzhou University). Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspxdbname=CMFD202101&filename=1021015551.nh

Zhang, H. S. (2011). The Overview Of Applied Research On Mind Map Education At Home And Abroad From 2001 to 2010. **China Educational Technology**, (8), 120-124.

Zhang, L. (2013). **The Application of Mind Mapping in the Teaching of English Words in Senior High School** (Master's thesis, Shanghai Normal University). Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201401&filename=1013298697.nh

Zhang, Q. Z. (2002). Depths of Processing and L2 vocabulary learning. **Modern Foreign Languages, 25**(2), 177.

Zhao, J. N. (2015). An enpirical study on the use of Mind Mapping in the teaching of basic college English vocabulary. **Journal of Qiqihar University**, (11), 179-181. doi:10.13971/ j.cnki.cn23-1435/c.2015.11.057

....