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Study on the Application of Mind Mapping to English Vocabulary Teaching in Junior High School

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Through a survey-based approach including questionnaire surveys and teaching experiments, this paper studies the effects of mind mapping on students' vocabulary mastery, learning strategies and learning interest in junior high school English vocabulary teaching. The study conducted over three months with two parallel classes, one as the experimental group and the other as the control group. The results show that integrating mind maps can improve students' vocabulary and spelling accuracy, promote autonomous learning, and increase interest in vocabulary acquisition. Finally, this paper puts forward some suggestions on cultivating diversified thinking, student-centered teaching and applying interdisciplinary mind mapping to help teachers improve students' vocabulary ability in junior high school English teaching.

Keywords: mind mapping, junior high school, English vocabulary teaching

Introduction

Vocabulary, as a fundamental component of English learning, holds an indispensable position. Budd (2004) argued that language is never an isolated entity, and students should pay attention to uncovering its essence when learning English vocabulary, enabling more effective memorization and utilization. The junior high school phase serves as a juncture bridging elementary foundational knowledge and the complexities of high school grammar. As the learning content becomes more intricate, the difficulty of knowledge increases significantly, and teaching methods undergo abrupt transitions, many junior high school students perceive English learning as challenging. One of the most prominent challenges lies in vocabulary.

According to *Compulsory Education English Curriculum Standards 2022 Edition*, students at the Level Three or higher are expected to communicate and express themselves using around 1800 words on relevant topics. Therefore, the process of learning English vocabulary should not rely solely on traditional rote memorization but rather on students' active engagements. However, in practical teaching scenarios, many students lack interest in memorizing English vocabulary. They passively engage in mechanical memorization according to teacher's requirements. Similarly, most English teachers, driven by academic performance, merely resort to a "spoon-feeding" approach in imparting language knowledge to students, so that it is very common to for students to make spelling mistakes and forget words. Some students, lacking even the most basic vocabulary foundation,

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become increasingly pessimistic due to unsatisfactory performance in tests, leading to a vicious cycle of vocabulary deficiency and aversion to learning.

Tan (2011) pointed out that the greatest challenge Chinese students face in learning English currently lies in effectively understanding, memorizing, and utilizing English vocabulary. In light of the aforementioned circumstances, the application of mind maps can offer new insights and approaches to English vocabulary teaching.

Theoretical Background

Definition of Mind Mapping

The concept of mind maps was introduced by Buzan, T. in the early 1960s, considering them as effective learning tools for memory and cognition. Mind maps, as visual thinking tools, can be utilized to address difficulties in memory and to express divergent thinking processes more comprehensively within the human mind. The construction basis of mind maps lies in hierarchical structures and categorized information (Buzan, T. & Buzan, B., 1993). Murley (2007) suggested that mind maps are one of the intuitive visual expressions capable of presenting complex information clearly. Liu (2009) described the entire map as an endless branching chain radiating from the center. Hence, mind maps possess the following characteristics: Firstly, they represent content in graphical form, aligning more closely with human cognitive tendencies. Secondly, they maintain a concise structure where each associated point conveys key meanings clearly. Thirdly, within mind maps, different colored curves and lines link core words, aiding individuals in distinguishing and memorizing knowledge.

Empirical Studies on Mind Mapping to English Vocabulary Teaching

Mind mapping is an intuitive way of thinking that has been widely utilized and researched in English language teaching. In the constructivist theory, learners are not mere recipients of information but rather active constructors of knowledge. Many scholars have applied mind maps across various educational stages from primary to high school.

Cong and Xu (2010) applied mind maps in primary school English teaching. The results indicate that teachers can effectively attract primary school students' attention and facilitate their vocabulary learning and memorization by fully leveraging the fun, intuitiveness, and flexibility of mind maps.

Wang (2015) attempted to apply mind maps to high school vocabulary teaching through guiding students in integrating, memorizing, storing, and retrieving vocabulary from the perspective of synonyms and antonyms. Ultimately, the study concluded that the use of mind maps can alter students' attitudes toward learning English vocabulary, thereby enhancing their autonomy in English learning.

Zhang (2016) explored the application strategies of mind maps in junior high school English teaching. The results show that mind maps can be used to teach new words, review old words, as well as teach word roots and affixes. This greatly enriches vocabulary teaching methods, enhances the quality of education and teaching, and stimulates students' interest in learning English.

Li (2024) studied the effect of mind mapping in junior high school English vocabulary teaching and the moderating effect of gender and vocabulary level, including its influence on learning achievement, learning strategy and learning attitude. The results show that mind mapping has a positive effect on vocabulary learning, and the effect is more obvious for students with low vocabulary level before, and there is no significant difference

between genders. Besides, mind mapping can improve learning strategies and attitudes, which is of great significance for vocabulary learning research and practice.

As analyzed above, combined with mind mapping and the theory of constructivism, the vocabulary abilities of junior high school students before and after teaching experiments will be analyzed and some feasible suggestions will be given to improve their vocabulary learning ability.

Research Design

Research Questions

There are three research questions in this paper. They are:

(1) Does the use of mind maps improve students' vocabulary and spelling accuracy?

(2) Can mind maps foster autonomous learning and the use of learning strategies?

(3) Do mind maps enhance students' interest in learning English vocabulary?

Data Collection and Analysis

After comprehensively reviewing relevant literature and materials, a post-instructional experiment questionnaire along with pre- and post-test instruments were developed and administered to Experimental Class 1 (N = 54) and Control Class 2 (N = 52). A total of 106 valid questionnaires and test results were collected, with all responses deemed complete and usable for analysis.

Participants

The research participants are two eighth-grade classes from a junior high school in Jilin Province, China, with comparable average academic performance and gender distributions. Class 1 was randomly selected as the experimental group. Class 2 served as the control group. Class 1 utilized mind maps for vocabulary instruction in new lessons, reading classes, and review sessions, while Class 2 continued with the method of explaining words and repeating memory as before.

Instrument

The data were collected through questionnaires and tests, with the study primarily comprising two components: examining the impact of introducing mind mapping on vocabulary instruction in junior high school English classrooms, and investigating its effects on the vocabulary learning abilities of junior high school students.

Results and Discussion

The post-experiment questionnaires employed a Likert five-point scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Student assessments were conducted across four dimensions: learning cognition, learning effectiveness, learning strategies, and mind map cognition. The vocabulary test (full score: 100) comprised four question types: English-Chinese translation, multiple-choice items, passage completion, and cloze exercises.

Results of the Post-experiment Questionnaires

Q4 and Q5 are designed to investigate whether students like the brainstorming method of memorizing words and to remember words through minds maps, as shown in Table 1.

Table 1
Post-experiment Cognitive Statistics of Vocabulary Learning

Dimension1 Vocabulary Learning Cognition	Questions		Average Value	Standard Deviation
	Q4	I like the brainstorming method of memorizing words.	4.11	0.57
	Q5	I consciously use mind maps to remember words.	4.02	0.60

Table 1 shows that the average score for Question 4 is 4.11, with a standard deviation of 0.57. The data indicates that students in the experimental class have a relatively high level of cognition with minimal differences among them. This suggests that after using mind maps for vocabulary learning in junior high school English teaching, most students prefer brainstorming as a learning method when memorizing words. Question 5 has an average score of 4.02 and a standard deviation of 0.60, indicating that students generally agree with this viewpoint, demonstrating that students are consciously able to use mind maps to memorize words.

Questions 12-14 are designed to investigate students' words forgetting rate, words review efficiency, and interest in vocabulary learning after using mind maps for vocabulary learning, as shown in Table 2.

Table 2
Post-experiment Statistics of Vocabulary Learning Effect

Dimension2 Vocabulary Learning Effect	Questions		Average Value	Standard Deviation
	Q12	I forget the learned words easily.	1.83	0.67
	Q13	I think mind mapping can improve my vocabulary review efficiency.	4.13	0.52
	Q14	After using mind mapping, I become more interested in learning words.	4.31	0.47

Table 2 shows that the average score for Question 12 is 1.83, with a standard deviation of 0.67, indicating a relatively low level of cognition among students. This suggests that after using mind maps for vocabulary learning, students' word forgetting rate decreased. The average scores for Question 13 are 4.13 with a standard deviation of 0.52, and for Question 14 are 4.31 with a standard deviation of 0.47, indicating a high level of agreement among students regarding the positive impact of using mind maps. This demonstrates that after using mind maps for vocabulary learning, students have a higher level of enthusiasm for vocabulary learning.

Questions 6-11 are designed to investigate vocabulary learning strategies used by students after application of mind mapping into English vocabulary teaching, as shown in Table 3.

Table 3
Post-experimental Statistics of Vocabulary Learning Strategy

Dimension3 Vocabulary Learning Strategy	Questions		Average Value	Standard Deviation
	Q6	I first look at the structure of the word (prefix and suffix).	4.15	0.71
	Q7	I put old words and new words together.	4.04	0.82
	Q8	I put together words that sound similar.	4.02	0.88
	Q9	I can remember new words by associating them with words I have learned.	3.98	0.69
	Q10	After vocabulary learning, I can often sort out and summarize the vocabulary I have learned.	4.15	0.60
	Q11	I can learn words by working in groups.	4.00	0.91

Table 3 shows that the average scores for the 6 questions range from 3.5 to 5.0, indicating that after the experiment, students have a relatively high level of vocabulary learning strategy and there have been changes in their vocabulary learning strategies. Before memorizing words, students focus on word structures, utilize associations to reinforce connections between words, and engage in group cooperation and communication. After memorizing words, they summarize and review the words promptly and test the effectiveness of vocabulary review. Additionally, it's noted from the table that except for question 11 with a standard deviation of 0.91, the standard deviations for other questions are 0.71, 0.82, 0.88, 0.69, and 0.60 respectively, indicating significant individual differences among students after the experiment.

Question 1-3 and question 15 are designed to investigate students' attitudes towards application of mind mapping into English vocabulary teaching, as shown in Table 4.

Table 4
Post-experimental Statistics of Students' Attitudes towards Application of Mind Mapping

	Questions		Average Value	Standard Deviation
Dimension4 Mind Map Cognition	Q1	I am interested in the mind mapping vocabulary teaching method.	4.43	0.57
	Q2	I prefer mind mapping to the way I used to learn.	4.54	0.57
	Q3	I can draw English word maps very quickly.	3.85	0.60
	Q15	I hope teachers also use mind maps to teach words.	4.20	0.68

Table 4 shows that the average scores for both questions are 4.43 and 4.54, respectively, with standard deviations around 0.50, indicating high levels of cognitive awareness among students and minimal individual differences. Question 3 has an average score of 3.85, indicating a moderate level of cognitive awareness among students, suggesting that students are able to quickly create English word maps after the experiment. Question 15 has an average score of 4.20, indicating that students hope teachers to continue utilizing cognitive mapping as a teaching method. However, the standard deviation for this question is 0.68, indicating significant individual differences among students, suggesting that some students has encountered difficulties in drawing cognitive maps. Therefore, in future teaching endeavors, teachers need to provide additional guidance to these students.

Therefore, the implementation of mind maps in English vocabulary teaching positively influences students' attitudes and learning strategies. The study reveals a transition from traditional to brainstorming learning methods, indicating a shift in students' approaches to vocabulary acquisition. Moreover, students displayed heightened interest in mind maps and improved vocabulary retention following the experiment, indicating the efficacy of this learning approach. Additionally, students progressed from mechanical memorization to utilizing association and summarization techniques, reflecting an improvement in their learning strategies.

Results of the Tests

To ensure there were no significant differences in English vocabulary proficiency levels between the control and experimental groups prior to the experiment, this study conducted vocabulary tests on 106 students in both groups and SPSS 27.0 was employed to analyze collected data, as shown in Table 5.

Table 5
Statistical Analysis of Pre-Experimental Vocabulary Test Scores

	Control Group (N=52)		Experimental Group (N=54)		MD
Pre-test Scores	M	SD	M	SD	1.59
	73.37	10.22	74.96	12.84	

Table 5 shows that the experimental group's mean score was slightly higher than that of the control group (MD = 1.59). Therefore, Class One and Class Two of Grade Eight can be considered as two parallel classes for conducting an experimental study on English vocabulary teaching using mind mapping. After three months of experimental teaching, in order to clarify whether traditional vocabulary teaching methods and the use of mind mapping as a teaching method for vocabulary would affect students' vocabulary scores, vocabulary tests were conducted on students in both classes.

The vocabulary scores of the control and experimental groups at the end of the experiment were analyzed, with results shown in Table 6.

Table 6
Statistical Analysis of Post-Experimental Vocabulary Test Scores

	Control Group (N=52)		Experimental Group (N=54)		MD
Post-test Scores	M	SD	M	SD	6.33
	74.06	9.96	80.39	10.62	

Table 6 shows that the mean English vocabulary score of the control group is significantly lower than that of the experimental group (MD = 6.33). Therefore, compared to traditional English vocabulary teaching methods, the use of mind mapping in the process of English vocabulary teaching can enhance students' English vocabulary scores.

The Summary and Existing Problems Found in the Experiment

As analyzed above, the application of mind maps in junior high school English vocabulary teaching resulted in improved vocabulary size and spelling accuracy. Students perceived mind maps as beneficial for word memorization efficiency. The experimental group demonstrated a significant improvement in English vocabulary acquisition compared to the control group, suggesting that mind mapping played a crucial role in enhancing vocabulary performance relative to traditional teaching methods. Secondly, mind maps were found to enhance students' self-directed learning abilities and encourage the development and use of learning strategies. Students demonstrated improved word memorization efficiency and expressed a desire for continued use of mind maps, suggesting increased self-directed learning abilities and awareness of vocabulary strategy application. Thirdly, the use of mind maps increased students' interest in learning English vocabulary, as evidenced by improved word memorization efficiency and heightened interest. This indicates an enhancement in self-directed learning abilities and awareness of vocabulary strategy application.

However, some problems were also found in the experiment. For example, some students rely too much on the mind map template given by the teacher, and try to use "note-filling thinking" to treat the mind map as a fill-in-the-blank assignment, which does not reflect the subjectivity and critical thinking in learning. At the same time, if teachers interfere too much in the teaching process, students will be worried a lot about grades and limit their imagination. Interdisciplinary knowledge is also an important dimension. If teachers can transfer the

knowledge and learning methods of other disciplines into English vocabulary, the breadth of students' knowledge will be greatly enlarged. Therefore, the following strategies are proposed to enhance the opportunities of junior high school students.

Strategies to Enhance Junior High School Students' Vocabulary Ability

Cultivating Divergent Thinking

In junior high school English vocabulary instruction, teachers can employ mind mapping to guide students in expanding associative lexical clusters multidimensionally from core vocabulary. For instance, using "environment" as a central term, students are encouraged to generate subtopics such as "pollution," "recycling," and "climate" through semantic associations, further specifying derivatives like "plastic waste" and "solar energy." By employing color-coded symbols to differentiate grammatical categories (e.g., verb phrases, adjectival descriptors), learners visually construct lexical networks, transcending the limitations of linear memorization. Instructors may design brainstorming sessions with open-ended prompts (e.g., "What actions protect the environment?") to stimulate active retrieval of prior knowledge, thereby enhancing logical classification and creative thinking during mind map creation.

Implementing Student-Centered Pedagogical Approaches

Student-led mind mapping activities enhance classroom engagement. Teachers may allow learners to select thematic interests (e.g., "sports" or "festivals") for collaborative group mapping, incorporating multimedia tools (e.g., digital mind mapping platforms) to integrate images, sample sentences, or video clips. During this process, educators transition into facilitative roles, posing scaffolded questions (e.g., "How might verbs summarize festival customs in your map?") to guide autonomous discovery of morphological patterns or cultural distinctions. Post-class assignments could include personalized tasks such as annotating error-prone vocabulary in unit-specific maps or designing mind map relay games where groups sequentially expand incomplete lexical branches. Such strategies reinforce collaborative skills while addressing individualized learning needs.

Facilitating Cross-Disciplinary Applications of Mind Mapping

Integrating English lexical mapping with disciplines like history and science fosters knowledge transferability. For example, when teaching "exploration," instructors might link it to the "Age of Discovery" in history curricula, synthesizing navigational tools (compass, ship), explorers (Columbus, Magellan), and action verbs (navigate, discover) within mind maps. Scientific terminology such as "ecosystem" can extend to concepts like food chains and energy cycles, prompting bilingual labeling and interdisciplinary flowchart development. Furthermore, project-based "theme week" initiatives—such as a "Space" unit integrating physics (gravity), geography (planet), and technology (rocket) vocabulary—enable students to establish cross-disciplinary connections through mapping while composing interdisciplinary reports in English. This dual approach advances both linguistic proficiency and holistic academic competencies.

Conclusion

This study employed a teaching experiment methodology to investigate the impact of mind mapping application in vocabulary instruction on eighth-grade students' lexical competence, learning strategies, and learning motivation. Two parallel classes with comparable academic profiles were selected for comparative

analysis. The experimental findings demonstrate that the integration of mind mapping techniques effectively enhances students' comprehensive vocabulary learning capabilities.

Based on these results, pedagogical recommendations are proposed. It is suggested for teachers to adopt student-centered instructional approaches, incorporate interdisciplinary knowledge integration, and systematically cultivate students' divergent thinking patterns to optimize vocabulary mastery. This pedagogical framework suggests that visual cognitive tools like mind maps can serve as effective mediators in facilitating multidimensional vocabulary learning processes.

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