

# The Impact of Mind Mapping on High School Students' English Reading Interest and Comprehension Ability

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**Abstract:** This study investigates the impact of mind mapping on high school students' English reading interest and comprehension ability through a quasi-experimental design involving 100 first-year students divided into experimental and control groups. Adopting mixed methods—pre- and post-tests, Likert-scale surveys, and stratified interviews—the research analyzed data via SPSS to assess changes in five reading interest dimensions (practicality, functional cognition, pleasure, engagement, expansion) and three comprehension competencies (information extraction, strategy application, pluralistic thinking). Results indicated significant post-intervention improvements in the experimental group across all interest dimensions ( $p < 0.05$ ) and comprehension metrics compared to the control group. Interviews revealed enhanced student engagement and perceived utility of mind mapping. The findings suggest that integrating mind mapping into English reading instruction effectively fosters intrinsic motivation, cognitive structuring, and metacognitive strategies, thereby advancing pedagogical practices aligned with competency-based curricula.

**Keywords:** Mind Mapping; Reading Interest; Reading Comprehension; High School Education

## 1. Problem Posing

With China's rapid economic development and deepening global engagement, English has emerged as a vital communication tool, amplifying the significance of English language education. Within secondary education, English reading instruction occupies a central position in both examination-oriented and contemporary competency-based pedagogical frameworks.

This dual status as both a pedagogical priority and challenge necessitates innovative teaching approaches that transcend traditional exam-driven models characterized by rote translation and sentence-by-sentence textual analysis.

The General High School English Curriculum Standards [1] establish tiered objectives for reading proficiency aligned with students' communicative needs and cognitive development. These evolving standards demand that educators continuously update their teaching methodologies to better cultivate students' reading comprehension abilities and intrinsic motivation.

As a tool for visualizing knowledge, mind maps can be helpful in stimulating students' interest in learning and improving their autonomy in learning. Based on the above background, this study attempts to understand and learn about the use of mind maps as a tool in English classrooms both domestically and internationally. The aim is to investigate the role of mind maps as a new and effective English reading teaching tool in improving high school students' English reading ability and cultivating their interest in English reading. It also provides teachers with a more interactive and positive classroom teaching environment.

This study uses mind maps to assist reading instruction in English reading classrooms, discusses the effectiveness of mind maps in reading instruction, and enriches and enriches the theory of English reading teaching methods. Secondly, by truly applying mind maps in high school English reading classrooms, it helps teachers establish a highly interactive teaching environment between teachers and students, providing an effective model for teaching reform and adaptation, while also helping students better master effective reading methods.

This study mainly explores the effects of mind

maps on the English reading interest and reading ability of high school students in terms of their English reading skills, and verifies two questions:

1. To what extent does mind mapping-enhanced reading instruction influence students' reading interest?
2. How does mind mapping integration affect the development of reading comprehension competencies?

## **2. Literature Review**

### **2.1 Mind Map**

First conceptualized by Tony Buzan [2] through neuroscience applications, mind mapping employs multimodal representation (colors, images, hierarchical branching) to externalize cognitive processes. Contemporary scholarship defines it as:

"A visual learning strategy converting complex information into keyword-based diagrams" [3]

"A coherent multi-level structure demonstrating conceptual relationships" [4]

"A graphic organizer for knowledge concretization" [5]

Common features include hierarchical information organization, radial knowledge structures, and dual coding through verbal/visual channels. In EFL contexts, this technique aids textual analysis through key information extraction, textual schema construction, and inter-concept linking.

### **2.2 Reading Interest & Comprehension**

English Reading Interest: Wang [6] believes that interest is a personality psychological tendency of people to recognize things and engage in related activities. It is the directional attitude, enthusiastic emotional experience, and pleasant state that people have towards certain things and activities. English learning interest refers to the desire of learners to acquire knowledge while learning English, and to transform this desire into learning practice. [7] Referring to the research of domestic researchers on the dimensions of students' learning interest, this study will select five dimensions of practicality, functional cognition, pleasure, engagement, and extension to conduct an interest scale for English reading in the studied class, in order to explore in depth the process of cultivating students' interest in English reading. English

immersion refers to whether students can fully and wholeheartedly devote themselves to the entire process of reading and learning. Pleasure refers to whether students can experience pleasant emotions during the process of English reading. Expansion refers to whether students can independently learn various knowledge of extracurricular reading. Functional cognition refers to students' understanding of the functions of reading and learning. Practicality refers to whether students can actively apply the knowledge in the text to their own life situations.

English reading comprehension ability: Reading comprehension ability is one of the important components of reading ability. Wang Qiang [8] believes that reading comprehension is the ability of learners to use their eyes as receivers to perceive stimuli from the text they are reading and decode signals containing information, connecting them with existing knowledge in the brain and constructing new meanings. The core element of reading ability is reading comprehension. Reading comprehension refers to a student's level of understanding of a text and their ability to use the information provided in the text to deal with difficulties encountered. English reading ability can be divided into four parts: decoding ability, language knowledge, reading comprehension, and cultural awareness.

By studying the five dimensions of English reading interest and four aspects of English reading comprehension ability, a high school students' English reading interest scale and English reading comprehension ability scale were developed, and corresponding survey questionnaires were created based on them to facilitate subsequent experiments.[9]

### **2.3 Current Status of English Reading Teaching Based on Mind Maps at Home and Abroad**

The research on the application of mind maps in English reading teaching by foreign researchers is relatively diversified. At first, mind maps were used to facilitate the learning of students with learning difficulties, but later gradually expanded to other areas of education. Foreign scholars' research on the application of mind maps in English reading teaching mainly focuses on the following aspects: mind maps promote the processing of discourse information in reading; Promote the

improvement of students' reading comprehension scores; As an effective tool for teachers to teach and students to learn. Due to the early start of foreign scholars' research on the application of mind maps in English reading teaching, with a wide range of research scope and significant effects, a wide range of research results have been achieved. The research on mind maps in China was later than abroad. The definition and application of mind maps first appeared in 1997 and were not truly introduced to China until 2004, sparking a research trend. The research on mind maps in China mainly focuses on two aspects: the application of mind maps in the design of English reading teaching at different stages, and the impact of mind maps on English reading teaching at different stages. In the context of the new curriculum reform, domestic researchers mainly study the effects and impacts of applying mind maps to English reading classes at different stages of learning on English reading teaching.[10,11]

### **3. Research Design**

#### **3.1 Research Question**

This article will explore the impact of using mind maps in high school English reading teaching on students' English reading interest and comprehension ability. The following research questions will be verified:

1. Can conducting English reading teaching based on mind maps improve students' interest in reading?
2. Can conducting English teaching based on mind maps improve students' reading comprehension ability in their reading literacy?

#### **3.2 Research Object**

This study will select two classes in the first year of high school in a certain location as the research objects, and set the two classes as the experimental group and the control group, respectively. When choosing a class, it is advisable to select classes with the same number of students, similar gender ratios, and similar teaching backgrounds. The scores of the English reading comprehension section in the final quality inspection of two classes in the previous semester were used as the pre-test scores for this experiment, and an independent sample t-test was conducted using SPSS

software to test the pre-test scores. The sig (two tailed) value was greater than 0.05, indicating that the English proficiency of the students in the two classes was similar and the difference in learning situation was not significant. During the research process, it is important to ensure consistency in the pace of teaching by teachers, and that the selected textbooks and teaching aids are also the same. In the experimental group, a mind map based reading teaching method was used, while in the control group, traditional reading teaching methods were used. In order to minimize errors as much as possible, the students in both classes were not informed in advance that they were the subjects of testing and observation. Compare and analyze the two classes after the experiment is completed.[12]

#### **3.3 Research Tools**

##### **3.3.1 Survey Questionnaire**

As this study focuses on two aspects of students' English reading interest and reading comprehension ability, the survey questionnaire is divided into two types: the English Reading Comprehension Ability Survey Questionnaire and the English Reading Interest Scale.

##### **3.3.1.1 English Reading Comprehension Ability Survey Questionnaire**

This study uses an English reading comprehension questionnaire as a research tool to further understand whether mind mapping as a teaching method can improve the English reading comprehension ability of high school students and in what ways it can promote the improvement of students' reading comprehension ability. This will supplement the results of the experimental research and provide suggestions for improving students' English reading literacy.

The survey questionnaire referred to the development goals of English reading literacy in primary and secondary schools formulated in Wang Qiang and Chen Zehang's (2016) "Chinese Primary and Secondary School English Graded Reading Standards" and relevant information from other teachers. Based on the specific situation of students, the questionnaire questions were designed from three dimensions: information extraction, strategy application, and multidimensional thinking. The reliability of the questionnaire was tested using SPSS software. The results

indicate that after various testing methods such as chi square test and sphericity test, the overall validity of this questionnaire is convincing, with significant differences between variables. When conducting a survey using a questionnaire, a survey should be conducted before and after the experiment, with 50 students from each of the control group and the experimental group. The time limit is within 30 minutes, and the answer can only be a single choice. The five point scoring system used has levels of "completely disagree", "usually disagree", "sometimes agree", "usually agree", and "completely agree", with corresponding scores of one point, two points, three points, four points, and five points.

#### 3.3.1.2 English Reading Interest Scale

This study uses the English Reading Interest Scale to investigate the impact of using mind maps in high school English reading teaching on students' reading interest. The interest scale used in this study adopts the Likert five point scale. After referring to the English curriculum standards in China and survey questionnaires from other researchers, the questionnaire is set to 25 questions and divided into five dimensions for practicality, functional cognition, pleasure, engagement, and expansion. In order to check the effectiveness and reliability of the interest scale, it is necessary to test its reliability and validity before the experiment begins. By using the Cronbach's alpha coefficient in SPSS software to check the reliability of the scale, after testing, it was found that the alpha coefficient values for each dimension exceeded 0.7, which meets the criteria for coefficient testing. Therefore, the scale is relatively reliable and has good reliability; By using sphericity test, it was found that the KMO value of the scale is higher than 0.5 and the sig value is lower than 0.05, indicating that the scale can be used for validity analysis and there are significant differences between the dimensions tested. Finally, it was concluded that the reliability and validity of the scale are relatively good, and the scale can be used in experiments. Before and after the experiment, use this interest scale to survey 50 students from each of the experimental group and the control group. The time limit is 30 minutes, and the answer can only be selected as a single choice. Adopting a five point scoring system, the

levels are "completely disagree", "usually disagree", "sometimes agree", "usually agree", and "completely agree", with corresponding scores of one point, two points, three points, four points, and five points.

#### 3.3.2 Interview method

Further understand the impact of mind maps on students' reading interest through interviews, in order to supplement the results of the Reading Interest Scale. After the experiment, students were selected through stratified sampling for individual interviews and the content of the interviews was recorded. Divide the students in the experimental class into three layers, randomly select two students from each layer, and select a total of six students.

#### 3.3.3 Quasi Teaching Experiment

This study explores the changes in high school students' English reading comprehension ability and reading scores after using mind maps through teaching experiments, and further understands the auxiliary role of mind maps in reading teaching by comparing the scores of reading comprehension tests before and after the experiment.

Before starting the experiment, the reading comprehension scores of the students in the experimental group and the control group from the final English proficiency test of the previous semester will be used as the pre-test scores for this study. After conducting a semester long mind map assisted English reading teaching experiment, this experiment selected the reading comprehension section of a certain year's college entrance examination exam in a place with relatively authoritative educational achievements as the post test paper. This test paper consists of four reading comprehension questions, with a single choice question type. Each question is worth two points, and the total score is 20 points. The reliability and validity of the real college entrance examination questions are relatively high, so they can be used as the test paper for this reading comprehension test. When conducting the post test experiment, it is necessary to simulate a real exam environment, supervised by the teacher, and ranked according to the scores to ensure that students take the test seriously and further ensure the authenticity and reliability of the post test score data.

#### 3.3.4 Data Analysis



This study mainly collected data through four methods: survey questionnaires, interest scales, interviews, and quasi teaching experiments.

Before starting the quasi teaching experiment, it is necessary to first statistically analyze the pre-test scores of two groups of students; After the experiment is completed, the post test scores of the two groups of students need to be calculated, and then the performance data of the two classes before and after the experiment can be obtained through statistical ranking. The performance data of the two classes can be analyzed using SPSS software.

Before the experiment begins, distribute a reading comprehension ability survey questionnaire and a reading interest scale to the two groups of students in the experimental group and the control group; After the experiment, the two groups of students were surveyed again using the same reading comprehension ability questionnaire and the same reading interest scale. The response rate and validity rate of the questionnaire are both 100%.

After the experiment, six students with different grades in the experimental group were interviewed using stratified sampling to supplement the reading interest scale.

Using SPSS software to analyze and process the collected scores of pre - and post test papers, reading comprehension questionnaire, and reading interest scale data, in order to further explore whether using mind maps as an aid in high school English reading teaching can promote the improvement of high school students' English reading, interest reading comprehension ability, and reading scores.

## **4. Research Results and Discussion**

### **4.1 Research Results:**

Under the intervention of the experiment, the experimental group showed a significant difference in the subjects' English reading ability compared to before the experiment. Compared with the control group, the experimental group showed improvement in three dimensions of English reading ability: information extraction, strategy application, and pluralistic thinking;

The data collected from the reading interest scale distributed to the experimental group and the control group before and after the experiment are as follows: there are significant

differences between the experimental group and the experimental group in terms of practicality, functional cognition, pleasure, engagement, and expansion. Among them, in the functional cognition dimension, before the start of the experiment, the experimental group and the control group had basically the same cognition of reading function. However, after the intervention of the experiment, the experimental group's mastery of the knowledge system in the cognitive dimension was significantly improved, and the degree of improvement was also higher than that of the control group;

After conducting stratified sampling and interviews with students in the experimental class, the following results were obtained: all six selected students expressed a liking for using mind maps in classroom teaching and believed that mind maps could help them understand articles, improve their enthusiasm in English classes, and cultivate their interest in learning English. However, at the same time, some students also mentioned that they cannot effectively use mind maps as a tool in the process of English reading;

According to the pre-test of the experimental group and the control group before the experiment, it can be concluded that the standard deviation of the two groups' scores is not significantly different, and analysis using SPSS software shows that there is no significant difference in their scores. Therefore, they can be used as samples for the experiment; After the experiment, in order to test whether mind maps can improve the reading ability of middle school students, a post test was conducted on two groups. The results are as follows: analyzed using SPSS software, the T-test results of the two groups of data are reliable, and after the experimental intervention, there were significant differences in the test scores between the two groups. The experimental group showed an improvement in scores compared to the control group, with more stable grades and a more stable distribution in the overall class.[13,14]

### **4.2 Discussion**

By integrating the data obtained from the English reading ability survey questionnaire, English reading interest scale, and interviews with subjects selected through stratified sampling in the experimental class, and

combining the pre - and post tests conducted on students before and after the experiment, it can be concluded that using mind maps as an auxiliary teaching tool in English reading classrooms has a positive impact on improving students' English reading ability.

By analyzing the scores obtained from the reading tests conducted on the experimental group and the control group before and after the experiment, it can be concluded that there is not much difference in the scores between the two classes before and after the experiment, indicating that their reading levels are basically the same. Therefore, these two classes were chosen as the experimental group and the control group; After conducting a semester long experiment on applying mind maps to English reading teaching, there was a significant difference in the post test scores between the two classes. The experimental class scored significantly higher in the post test than in the pre-test, and the average score of this class was significantly higher than that of the control class. In addition, the overall scores of the experimental class were relatively concentrated, and there were no significant differences in grades. Therefore, this study suggests that using mind maps as a teaching tool in middle school English reading classes can improve students' English reading scores and even further enhance their English literacy.

Under experimental intervention, the performance of the experimental group and the control group in different dimensions of the reading interest scale was not the same. Through comparison before and after, it was found that the data of the experimental group showed significant changes. After the experiment, it was found that the experimental group performed better than the control group in the five dimensions of practicality, functional cognition, pleasure, engagement, and expansion by analyzing the data obtained from the reading interest scale. Secondly, in the reading ability scale, there was no significant difference in the mastery of knowledge systems in different dimensions of reading ability between the experimental group and the control group before the start of the experiment. However, after one semester of intervention, the participants in the experimental class showed varying degrees of improvement in their English reading abilities,

including information extraction, strategy application, and pluralistic thinking. Therefore, this study suggests that the English classroom teaching model of mind mapping can help improve middle school students' interest and ability in English reading, enabling them to enhance their reading interest in different dimensions and English reading abilities.

Therefore, applying mind maps as a tool for English teaching in high school English reading classrooms can improve students' understanding and mastery of the five dimensions of English reading interest, thereby enhancing their interest in English reading; After experimental intervention, by analyzing the content of interviews and the questionnaire data collected from two previous English reading ability surveys, it can be found that most students hold a positive attitude towards the use of mind maps in English reading teaching. After the experiment, this tool can also be actively used in daily teaching.

## **5. Conclusion**

After conducting experiments, the author collected data from interest scales, survey questionnaires on reading ability, pre - and post experiment tests of experimental and control classes, and stratified sampling interviews. After analyzing the data, it was found that there is a correlation between using mind maps in middle school English classrooms and improving students' reading interest and ability. English classrooms based on mind maps have a positive effect on improving middle school students' reading interest and ability. The specific results are as follows:

In textbook based English classrooms, reading lessons are explained through mind maps and appropriate reading materials are supplemented to train students to use mind maps to complete reading tasks, enhance their enthusiasm for reading English articles, increase their English reading volume, and further improve their reading ability. Through interviews, it can also be learned that students are more receptive to the teaching mode based on mind maps, and some students with weaker foundations have also increased their interest in English reading through this teaching method, thereby improving their English reading ability.

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