

Empirical Perspectives on Mind Mapping in English Reading-Writing Teaching in Junior Middle School

Xiaohu Huang^{1*}, Jiayao Shi¹¹School of Foreign Languages, Yancheng Teachers University, ChinaDOI: <https://doi.org/10.36348/sijll.2025.v08i03.002>

| Received: 01.02.2025 | Accepted: 06.03.2025 | Published: 08.03.2025

*Corresponding author: Xiaohu Huang

School of Foreign Languages, Yancheng Teachers University, China

Abstract

In recent years, multi-dimensional English reading-writing teaching activities have received increasing attention from scholars and teachers at home and abroad. As a kind of visual thinking and cognitive tool, mind mapping is also a training method for divergent thinking. However, mind mapping in traditional junior middle school English teaching is mainly applied to a certain lesson and is taught separately, which is not conducive to students to grasp a distinct text structure and form a comprehensive knowledge hierarchy. Based on the input and output theory of second language acquisition, schema theory and knowledge visualization theory, this article tries to incorporate mind mapping with English reading and writing teaching. This research takes Reading and Integrated Skills from the reading materials of Yilin Press for grade-eights as examples, and was carried out for 6 weeks. The subjects of the investigation were 66 students from two regular classes in the eighth grade, of which the control class adopted the traditional teaching method while the experimental class employed the mode of combining reading and writing based on mind mapping. After the test, questionnaires and random interviews were conducted accordingly and the data were analyzed by SPSSAU software. Through the practice of integrating mind mapping with English reading and writing teaching, the multi-dimensional linkage between mind mapping and English reading-writing teaching can advance the shift from extensive reading to intensive writing, enhances integrated linguistic skills for students and provides some insights and suggestions for junior middle school English teaching.

Keywords: Mind mapping; Junior middle school English; Reading and writing teaching.

Copyright © 2025 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

1. INTRODUCTION

In traditional English linguistic teaching, reading and writing are usually separated, with reading only emphasizing the content of the text and writing merely giving priority to composition. However, according to the new curriculum standard, English teachers should cultivate students' ability of self-study, truly reflect the students' dominant position in the class, which reveals that reading and writing are expected to be integrated. Therefore, how to combine reading and writing reasonably and flexibly in English teaching is a subject that English teachers ought to attach importance to.

In recent years, multi-dimensional English reading-writing teaching activities have received increasing attention from scholars and English teachers at home and abroad. As a kind of visual thinking and cognition tool, mind mapping is also a training method for divergent thinking. By incorporating mind mapping with English reading and writing teaching, this mode stimulates English visualization teaching, instruct junior

middle school teachers' teaching practice, and fosters the development of English teaching. However, mind mapping in traditional junior high school English teaching is mainly applied to a certain class and is taught separately, such as vocabulary class, reading class or writing class, which is not conducive to students to grasp a distinct structure of context and form a comprehensive knowledge hierarchy.

2. LITERATURE REVIEW

This section comprises the concept, theoretical basis, pedagogical investigations of mind mapping at home and abroad, as well as the previous usage of mind maps in English reading-writing teaching.

2.1 Concept of Mind Mapping

The use of graphical maps via branching and radial diagrams can be traced to the 3rd century when the renowned thinker Tyros graphically visualized the notion of Aristotle's categories. The term mind mapping was originally popularized by the British psychology writer Tony Buzan (1993), who was inspired by Alfred

Kozibski's general semantics (1938). Conventional contours impel the reader to scan from normal order, whereas readers tend to thumb through the entire passage in a habit out of sequence. Thus, the collaboration of the perception and visual tools can significantly increase the efficiency and productivity of a certain work. Dr. Sun Yixin (1997) introduced mind mapping to China in 1997 and is actively engrossed in related academic methodology, intending to advocate the latest research findings to the corporate and educational sectors.

2.1.1 Definition of Mind Mapping

The mind map is a diagram deployed to organize information that is layered and linked. It is frequently forged around a sole conception, with an image manifested on an unfilled page centrally to which associated reproductions of notions are computed. The principal parts are vividly united with the central notion, while other sectors are separated from these main sections. Balim, A. G. (2013) employed technology-assisted techniques to explain the concept the mapping that was a conducive tool to educational studies. Anna Buran & Andrey Filyukov (2015) conducted a behavioral study to imply that mind mapping was useful in language learning. Veli Batdi (2015) carried out a meta-analysis study to mirror that mind maps were traditional learning methods for anthropologist. In brief, mind mapping is a method of visual thinking where each of the data, feelings or memories that enter the brain becomes the core of thought, and from this chief point, correlated nodes are dispersed outwards, and each link can become another dominate subject, which in turn can be scattered externally to numerous knots, similar to a individual database.

2.1.2 Characteristics of Mind Mapping

Mind maps are valuable for reinforcing both the quality of education and the effectiveness of learning, and they have proved to be an increasingly crucial approaches to learning. Hence, understanding the characteristics of mind mapping is conducive to researchers and learners to improve their philosophical thinking and discernment skills.

As stated by Buzan (1993:4), the main characteristics of mind mapping can be summed up as six aspects. The primary feature is that mind maps are widely distributed and stereoscopic. The next mark is that is that the brain's left-right coordination biases it toward the use of multiple forms of graphics and multiple colors of symbols. The integration of texts, images and colors is the third trait. The fourth facet is the derivation of new ideas on new pivots. Finally, individualization is the last element, since everyone inclines to interpret the same matter uniquely.

Apart from Buzan's viewpoint, mind mapping is diffuse and hierarchical in nature, allowing for the meticulous organization and induction of human opinions. For example, when the core is the plant, we

naturally think of branches as seed plants, mosses and ferns etc., of which seed plants composes gymnosperms and angiosperms, establishing a colossal thinking structure map.

2.2 Theoretical Basis of Mind Mapping

Three chief basic theories that visualize thinking and support the following research will be deployed in this section, input and output theory of second language acquisition, schema theory and knowledge visualization theory included.

2.2.1 Second Language Acquisition Theory

The input hypothesis refined by the American linguist Professor Krashen (1988) in the early 1980s has associated the language-producing dogma and been widely influential in the field of foreign language. This theory suggests that language is obtained by absorbing intelligible resources. Nonetheless, the input hypothesis attributes language acquisition to language input besides one-sided ignoring and excluding output. In the late 1980s, Swain put forward the output hypothesis that is a clear indication that contributes to the appropriate and flexible application of language.

According to Krashen (1988), learners should grasp a second language in the same way that children attain mother tongue. Namely, children are never trained to master systematic language though they can express themselves aptly. Krashen (1988) stressed that with a sufficient amount of input material, students' ability to utilize the language will be enhanced, not taught directly accordingly. While from the perspective of Swain, the course of acquiring a foreign language is making assumptions and revising hypotheses about the target information, which also serves as a trial run. By noting the mismatch between output and input, the output can not only mediate acquisition and apprehension, but also it arouses linguistic reflection.

In contrast to the traditional English teaching in which only the expressions of information and assisted teaching content matter, mind mapping aids students to shape an article system in the process of English reading and input. Meanwhile, in the case of English writing output, mind mapping guides students activate visionary thinking.

2.2.2 Schema Theory

Schema theory previously is applied by cognitive psychologists to interpret the mental course of comprehension and was initially put by the German psychologist Kant (1781). In accordance to schematic reading rules, learners' reading skill count on three schemata that are linguistic schema, text schema and formal schema that synchronize and blend with the text and expression of the discourse. The linguistic schema in reading comprehension alludes to the vocabulary, idioms, syntax and grammar of a text. Only if the reader has acquired basic linguistic knowledge can he or she

grasps the textual information according to the words, phrases and sentences in order to launch the formal schema and content schema in the brain. The reading material consists of various abstract linguistic symbols, all of which are dependent on sufficient language schemata. However, deficits in this case can be a barrier to apprehension. Text schema alludes to the commonplace with the material or previous experience and setting information in relation to the theme. Content schema can, to some extent, compensate for the deficiency of linguistic schema by predicting, verifying, and intensifying the reader's understanding. Formal schema denotes the differences in the genre and organizational structure. Dhindsa H, Makarimi-Kasim, Anderson O. (2011) once noted that mind-map teaching approach was conducive to the quality of students' cognitive structures. Readers who have cultivated various formal schema in their minds and mastered structural features will increase their reading speed productively and nourish their apprehension.

2.2.3 Knowledge Visualization Theory

The knowledge visualization is a form of visual presentation that facilitates the dissemination of knowledge both in terms of design and application. Besides, information visualization is anchored in graphic blueprint and cognitive principle and is a crucial factor in the composition of information visualization. For instance, concept maps are graphical representations formed on enormous learning strategies and the relationship between notions to shape a hierarchical structure while causal maps are graphical techniques on the basis of individual construction law.

The function of knowledge visualization can be categorized into four major points. Above all, knowledge visualization facilitates the transfer of knowledge. Secondly, it offers a vast potential for credit knowledge innovation in linguistic management. Thirdly, the application of knowledge visualization is able to address information overload. Fourthly, the method of knowledge visualization can avoid the misinterpretation and misuse of information to make a rational determination.

Knowledge visualization is on the one hand due to the fact that vision is the important channel where humans receive plentiful information. On the other hand, because the way that knowledge demonstrates has an impact on the perception, understanding, application and dissemination of intrinsic information.

Mind mapping is a visual tool proposed by Tony Buzan (1971), a famous English educator, in 1971. Using a combination of images and words, mind maps represent the relationship between subjects at all levels by means of a hierarchical diagram of mutual affiliation and correlation. Making full use of the functions of the left and right brain and the laws of being conducive to maintaining a balanced between philosophy and art,

rationality and creativity to explore and evaluate people's boundless might and vigor.

2.3 Pedagogical Studies on Mind Mapping Abroad and at Home

Mind mapping manifests thoughts and ideas in their entirety, expresses the structure of content in an intuitive way, and presents the course of the connection of information efficiently. It is commonly used in western primary and secondary school teaching and is a learning strategy prevalent in Europe and America countries. In addition, not only is a tool for cognition and learning, reflection and innovation, but also it is a natural expression of creative thinking. With the popularization of e-learning, the contemporary nature of mind mapping is more apparent and its promotion has become one of the educational reform strategies in many countries.

2.3.1 Pedagogical Studies on Mind Mapping Abroad

As one of the strategies of educational reform, several countries in the world have achieved significant results in improving teaching effect through the medium of mind mapping, such as Britain, America, Australia and Singapore. Among them, Singapore has performed mind mapping as one of the compulsory courses taught from kindergarten to university. The majority of lesson plans made in American schools have applied the approach to presenting mind mapping as well. Besides, the usage of mind mapping can be ascertained in the account of the specialists and scholars who come to China to attend international academic conferences in Britain and America. In American classrooms, teachers employ mind maps extensively to foster learners' creative and logical thinking, and unlock their infinite potential. Hallen, D. and Sangeetha, N. (2015) tried to discover the effectiveness of mind mapping in English teaching among VIII standard students. Formulated on the brainstorming approach, mind mapping establish an appropriate or related conceptual organizational tasks, exerting the possibilities of the physiological functions of the left and right human brains to symbolize the relationship between each level of subject matter with a hierarchical graph of mutual subordination and correlation.

Mind maps aid teachers and students to master the relatively precise learning manner, institute a systematic framework system, allow the whole flow design more scientific, boost cooperation between teachers and students, and constitute a united teaching mechanism via enormous studies conducted by specialists in different countries, which has attained favorable outcomes.

2.3.2 Pedagogical Studies on Mind Mapping at Home

Mind mapping was put in place to China in the 1880s, initially with the aim of assisting people with learning disabilities. Since then, the popularity of mind mapping has deepened with its integration into the industrial and commercial circles. China designated

2017 as the year of Mind Mapping Popularization, and in April of that year, the press conference was successfully held in Beijing with the participation of several educational platforms. On August 19, 2017, the World Mind Mapping Championship was organized in China, which heralded the further development of mind mapping in the country. In the course teaching of elementary education, mind mapping has progressively entered the regular instruction and cities just as Beijing, Guangzhou, Shanghai and Nanjing are the first to bear the brunt. And in experiments, students who adopted mind maps to their studies improve their academic achievement and innovation ability by 20%. Chinese Mind Maps Agency is also working intensely with East China Normal University Education Press to mobilize more and more teachers to join the Mind Maps teaching research and will release a series of books to satisfy the demand for more students.

Employing such excellent techniques and methods as mind mapping to the fullest extent in order to activate learners' brains and develop potential while increasing the proficiency, and to apply it to various fields to maximize the role of mind mapping will contribute to the prosperity and flourishing of every country.

2.4 Mind Mapping in English Reading-Writing Teaching

The implementation of the reading-writing teaching model is tremendously feasible and has to be in conformity with the inherent rules of teaching English proficiently. The teaching of reading without writing can only optimize students' reading skills, but also students' understanding of texts is not profound or lacks comprehensiveness and they do not know how to transfer their reading competence to other applications. A combination of reading and writing possess the distinct value that students digest their information of English better. In the meanwhile, during the stages, students learn how to lay out a text, reflect the central idea, comprehend the inherent rules and grasp the focus of the reading, on that account, increasing the efficiency of reading teaching.

2.4.1 Concept of English Reading-Writing Teaching

Reading integrated with writing is a significant portion of language learning, and an important aspect of language use. Reading combined with writing is critical way for students to master the language. Through reading and writing, students can grasp plentiful linguistic input, expand their language output, further consolidate their knowledge of phonetics, vocabulary and grammar, and boost the development of comprehensive language utilization.

English reading-writing teaching is a brand-new way to train students to learn English step by step to express their thoughts reasonably in writing, the purpose of which is to read articles, imitate writing in order to

further students' competence to choose words and sentences, plan and layout, so as to meet the requirement of being able to applying English to write in various styles more flexibly and grab the theme of the material. English reading-writing teaching is a training form of thinking and expression, which is not only through the theoretical guidance to impart knowledge, more importantly, it will be by virtue of practicing and cultivating the students with English-speaking countries' approaches to organizing content and written communication skills.

2.4.1 Previous Application of Mind Mapping in English Reading-Writing Teaching

Due to the complexity and diversity of problems encountered by human beings, in the case of reading or writing relying solely on a certain element is impossible to crack out all the problems in reading and break through all the problems encountered in writing. In order to align with the need of solving practical problems, the human brain must integrate different sorts of thinking to further the dynamism and creativity. Similarly, the external action of a person drawing a mind map is an important auxiliary means of reading and writing teaching, and the mind map is a tool for implementing thinking activities. As Omar, A., & Albakri proposed (2016:2), teachers were able to engage students to think critically through the use of the thinking maps during their literature lessons. The teachers also employed the Reader-Response strategies to complement the thinking maps in promoting critical thinking in the teaching of literature.

In China, according to Ye Qionghong (2017:76), reading and writing were two crucial elements of English language teaching in junior high school, and they were also the two main components of language proficiency, which could effectively stimulate students' writing abilities by integrating reading and writing teaching. Chen Xiuying (2017:39) stated that the process of teaching mind mapping also made the content of texts figurative, concrete, pictorial and diagrammatic, so that the dull content became an outline image to remember, which was an important enhancement process for knowledge acquisition. Chen Cuixia (2018:36) proposed that teachers applied mind maps to highlight key words, presented knowledge points radially and summarized key information in high school English teaching. Ni Lei (2019:40) believed that mind maps could improve students' reading habits and make reading content more logical.

Moreover, foreign scholars (Harry Stokhof; Bregje de Vries; Theo Bastiaens; Rob Martens, 2017:360) argue that mind mapping can support teachers in guiding student questions to contribute to curricular goals. Wan Jusoh, W. N. H. & Ahamd, S (2016) conducted an exploratory investigation to discover that mind mapping is a novel instrument in teaching and learning practice. Meanwhile, Lee, J. & D. L. Schallert

(2016) implemented a yearlong experimental study to scour the affiliation between the reading and writing. Besides, Merchie, E & Van Keer, H (2016:3) pointed out that the relationship between informative mind mapping and learners' personalities are stimulating graphical summary in late elementary education.

In the course of English reading, a more in-depth understanding of the internal logical structure of a discourse is acquired by using several mind maps and a more realistic situation is formed by performing exercises orally in a group. Group-to-group speech in the appearance of retelling, or in the arrangement of an interview for meaningful output, the person can be a flexible shift. Mind mapping plays a role of transformation and connection. Constructing mind maps is a process moving from concrete to abstract while retelling material is a route running from abstract to concrete.

In the writing class, students can be given a list of outlines with the assistance of mind maps, usually in tabular or floral form. As Rosemary Wette demonstrated (Rosemary Wette, 2017:2), students tended to take a bottom-up approach to their writing, focusing on analytic decoding and comprehension of meaning at word- and sentence-level. Students gradually master the model of text analysis mode after defining the theme, recording a frame outline and adding specific details to reach the destination of the combined reading with writing in which the mind map functions as a link.

The visual image of mind mapping plays a role of support and bridge in the teaching of reading and writing, but in the process of application, teachers should take some issues as the text of teaching materials, students' cognitive level and whether there is an actual effect into account.

3. METHODOLOGY

This part is designed to discover whether mind mapping is beneficial and applicable to English reading-writing teaching by conducting an experiment in junior middle school, covering research questions, participants, equipment, steps and data interpretation.

3.1 Research Questions

Adopting a comparative experimental approach, this study sought to answer the following three questions by analyzing questionnaire results, interview feedback and test scores before and after the investigation:

1. Can junior middle students' reading competence be improved by applying the mind mapping to English reading combined with writing teaching?
2. Can junior high students' writing achievements be enhanced by exerting the mind maps to English reading integrated with writing teaching?
3. What is students' feedback on the mind

mapping before and after the test?

3.2 Research Subjects

Based on the input and output theory of second language acquisition, schema theory and knowledge visualization theory, this study tries to incorporate mind mapping with English reading and writing teaching with reference to previous research. The participants of this study were 66 students from two regular classes in grade eight of a general middle school in Suzhou, with one class serving as the controlled class and the other class as the experimental class. Both the controlled class and the experimental class adopted the translation version of grade eight English materials Reading and Integrated Skills, and the whole time for each phase of the research was six weeks with four teaching weeks in total. In the controlled class, the teacher utilized the traditional model of teaching reading and writing separately while the experimental class employed a combination of both the reading and writing instruction using mind maps. The results of the questionnaires, interviews and test scores of the controlled and experimental classes were analyzed before and after the investigation to find out what the junior secondary students' thoughts on the application of mind maps in reading and writing classes, whether the teaching manner and the knowledge visualization aid are conducive to cultivating the junior secondary students' reading and writing competence and if students' interest in reading and writing in English be boosted.

3.3 Research Instruments

The major device for this study embraced two questionnaires, an interview outline and two English test papers. The questionnaires sought to spot students' attitudes toward and interests in the adoption of mind mapping in English reading combined with writing teaching before and after the experiment, and to explore what desires added improvement. The purpose of random interviews was to supplement students' feedback on the application of mind mapping in reading and writing lessons. The two test papers were directed to figure out whether students' reading and writing skills had changed as a result of the introduction of mind mapping in reading integrated with writing teaching.

3.3.1 Pre-test and Post-test

Since there was a formal class division test before students were admitted to the eighth grade, the two classes with the smallest differentiation in the score of the entrance examination were selected for this study and were divided into a controlled class and an experimental class. To confirm the homogeneity of the controlled and experimental classes, a reading and writing test was performed to the two classes and the results of the reading and writing sections at the end of the first semester of grade eight were evaluated to determine the parity of the two classes. The intention of this research was to analyze the effectiveness of adopting mind maps to teach English reading and writing altogether.

In this study, the traditional teaching method of English reading and writing is adopted in the controlled class, and the teaching manner of English reading and writing based on the mind maps is applied in the experimental class. The reading and writing tests before and after the experiment covers four reading comprehensions passages with 20 questions and a total of 40 marks, and the writing section consisted of an outline and an imitation of an essay on the ground of the above given examples and requirements. Both tests were reviewed by the school's English subject group after they were produced, and were of similar overall difficulty, with the consistent question types and the same number of questions and scores, so as to ensure the reliability and validity of every test and to be severed as reliable experimental data for following research and analysis.

3.3.2 Questionnaires

There are two questionnaires adopted in this study to investigate the perspectives and feedback of the students in the exploratory class in the former and latter experiment, with the aim of understanding the impact of mind mapping on the English reading-writing. The questionnaires are adapted from previous researches rest on the questions to be explored in this study.

The questionnaire before the investigation contains ten items, in which items one to three are about students' attitudes and habits towards reading classes, four to six include students' attitudes and habits towards writing classes, seven to eight cover students' views on teaching methods in reading and writing classes, item nine involve how much students know about mind mapping and other reading combined with writing teaching models are discussed in item ten.

The post-experimental questionnaire consists of ten questions as well, with questions one to three on students' attitudes and habits towards the application of mind mapping for changes in reading classes, four to six on students' attitudes and habits towards the adoption of mind mapping for shifts in writing classes, seven to eight on students' perceptions of teaching methods that have been implemented in reading integrated with writing classes, question nine on students' opinions towards mind maps and students giving their expectations and suggestions for the English reading and writing teaching comprised in question ten.

3.3.3 Interviews

With a focus on gaining a more detailed comprehension of students' attitudes and opinions in the experimental class regarding the implementation of mind maps for teaching reading and writing together and the reasons for the shifts, interviews were performed in the exploratory class before and after the experiment. According to the academic achievement bands of the students in the class, two students were randomly selected for each section, and ten students were selected in total to express specific outlooks.

3.3.4 Teaching Materials for Junior Middle Students

The investigation material concentrates on two parts, Reading and Integrated Skills, in the second book of translation version of English for grade eight in which Unit 6 is taken as an example to demonstrate the teaching process of reading and writing found on mind mapping so as to explore the effectiveness of mind maps and offer inspiration for future teaching.

3.3.5 SPSSAU Software

The full name of SPSSAU is Static Product and Service Software Automatically, entailing six categories of algorithms modules that are general research algorithms, data processing functions, questionnaire research algorithms, advanced algorithms, visualization research algorithms and medical experimental research. The data of tests and questionnaires before and after the study are compared and analyzed by SPSSAU where some specific information is reflected such as mean, t-value and standard deviation to discover if there is a significant difference by means of mind mapping.

3.4 Research Procedures

The study consists of four phases, starting in late April and ending in June in 2020, with the following phase-by-phase implementation steps.

The first phase which lasted approximately two days from April 27th to April 28th in 2020 was the preparation stage before the experiment. Previous to the research, the two classes with the smallest difference in performance in score were selected and identified as the subjects of the study as stated by the entrance examination results. Firstly, an experimental questionnaire was handed out to the students in the exploratory class to basically know their habits towards reading and writing before conducting the experiment. Subsequently, the students in the exploratory class were introduced to the implementation steps of utilizing mind maps to English reading-writing teaching.

The second phase continued for about six weeks from April 29th to June 19th in 2020 that was the implementation stage of the teaching experiment in which 18th May to 29th May was the mid-term review and inspection week. In the experimental class, the method of reading combined with writing is applied while in the controlled class, the model of reading and writing is taught separately. At the end of the teaching experiment, a post-experiment questionnaire was requested to the students in the exploratory class and ten students were selected randomly to express their views.

The third phase that endured for about two days June 20th to June 21th in 2020 was the post-test and data collection and analysis stage of the experiment. The experimental paper of the second semester of 8th grade of the experimental class and the controlled class was performed at the post-test information to analyze

whether there were significant differences in the reading and writing scores after the experiment.

The fourth stage remained for about four days from June 23th to June 26th in 2020 which was the reflective stage of the study. By analyzing scores of the experimental and controlled classes, combined with the results of the questionnaires and the data of the post-experimental interviews, this investigation summarizes the productivity of integrating the reading-writing mind mapping, and reflects the deficiencies and problems that need further assessment in the implementation process.

3.4.1 Teaching Procedures in the Controlled Class

Considering the teaching of English reading and writing in the controlled class, this study resorted to the traditional teaching method that is teaching reading and writing separately without the application of mind maps. The main teaching procedure was that the teacher explained the words, phrases and sentences, next translated the text, then guided the students to read and complete the corresponding exercises in the textbook, and finally asked them to read the passage aloud and try to recite it. In the writing class, the teacher explained the example text, underlined the important words and sentences, and arranged writing assignments for students to imitate.

3.4.2 Teaching Procedures in the Experimental Class

In the exploratory class, the implementation of mind mapping on teaching reading and writing referring to the previous researches was divided into six main steps.

The first step was before reading with the intention of cultivating junior middle school students' prediction and graph-comprehending skills. The teacher guided students to fix attention on the titles and pictures of the reading chapter to make presumptions about the content and to stimulate them to present their prior knowledge of the relevant topic, which facilitates the integration of old and new knowledge.

The second step was while-reading alluding to employ mind maps to sort out the clues of the reading context. The teacher demonstrated on the blackboard, instructed the students to comb the chapter vein and to write the complete thought map. In this process, the teacher requested the students to identify the theme of the reading chapter, discover the central idea of the mind map and fill the keywords of the secondary and tertiary branches by asking questions step by step. If time permitting, students were demanded to draw their own mind map, but students' practice for the mind map application was not enough and different mistakes might occur, so the teacher should be representative of the students to give timely feedback on the mind mapping review and to show students' excellent works.

The third step was post-reading, mainly with the aid of hand-drawn mind maps to repeat, recite, and accomplish the related activities, the teacher allowed students three minutes to read the text again in combination with the mind map familiar with the context. Initially to the degree of retelling the material with the assistance of mind mapping, and then students carded the context and key information to complete the after-class elementary exercises.

The fourth step was before writing that concentrated on in-depth analysis, refinement and enrichment of the framework and sentence patterns of the extended reading chapters. Teachers should guide students to activate the relevant vocabulary, phrases and sentence structures in their knowledge network, guide them to analyze the reading text in depth, refine the reading chapter's sentence frames and patterns, and expand and improve them to meet the requirements of the writing task.

The fifth step was while-writing with regard to organizing the composition by deploying the mind map drawn while reading to frame students' compositions on which to add, delete and modify. It is expected that after the experiment students will be more proficient in mastering vocabulary and sentence patterns related to the topic after numerous writing practice and finally the language knowledge can be consolidated in the application.

The sixth step was post-writing which involved revising and re-transcribing the essays, and students assessing each other's composition. The teacher and students acted as a team to point out and revise errors in capitalization, punctuation, sentence patterns or other aspects to improve the accuracy of the expressions in writing. The teacher shared the innovative content or outstanding grammar and sentence patterns in the students' essays, so that the rest of the class can learn from them.

The integration of reading and writing can cultivate a conscious and purposeful approach to reading, because only with a better understanding of the content and framework of the chapter they are reading, can students write compositions with high similarity to the reading material and accurate expression.

3.5 Data Collection and Analysis

As for the data of the tests before and after the study, the mean value of the test scores, the standard deviation, the standard error mean, and t-value are analyzed by the SPSSAU software.

In view of the data of the questionnaires, the reliability and validity are assessed.

In respect of the results of the interview, the recordings are transcribed and inspected according to the

dimensions of questions, and the mind maps drawn are collected.

4. RESULTS AND DISCUSSION

In this section, the results and discussion of the above research based on mind mapping operated in the English reading integrated with writing teaching will be discussed.

4.1 Results and Discussion of the Tests

The experimental class in this study is Grade 8 Class 1 with 33 students and the controlled class is Grade 8 Class 3 with 33 students. Both the papers before and after the research are two papers of similar difficulty, each consisting of 20 reading questions and one composition, and score out of 60 with 40 for the reading part and 20 for the writing section (Appendix I and Appendix II for the content of the two tests).

Table 4.1.1: Statistics before the Experiment

Class	Controlled Class	Experimental Class
Number of Students	33	33
Average Total Score	45.24	44.73
Average Reading Score	30.36	30.00
Average Writing Score	14.88	14.73

Table 4.1.2: Paired T-test of Reading Scores before the Experiment

Items	Paired (M±SD)		Mean Difference (Paired CC-Paired EC)	T Value	P Value
	Paired CC	Paired EC			
Paired T-test	30.36±5.56	30.00±5.43	0.36	0.457	0.651

* p<0.05 ** p<0.01 M=Mean SD=Standard Deviation (From SSPSSAU Software)

According to the Table 4.1.1 and Table 4.1.2, the mean of the controlled class is 0.36 points higher than that of the exploratory class, and the P value of the paired T-test is 0.651, which is greater than 0.05, indicating that there is no significant difference between the reading

scores of the students in the controlled class and the experimental class before the experiment, so the research on mind mapping can be continued to carry out if there will be further differences in reading scores between the two classes.

Table 4.1.3: Statistics after the Experiment

Class	Controlled Class	Experimental Class
Number of Students	33	33
Average Total Score	45.21	45.76
Average Reading Score	30.30	30.85
Average Writing Score	14.91	14.91

Table 4.1.4: Paired T-test of Reading Scored after the Experiment

Items	Paired (M±SD)		Mean Difference(Paired CC-Paired EC)	T Value	P Value
	Paired CC	Paired EC			
Paired T-test	30.30±6.06	30.85±5.94	-0.55	-0.722	0.475

* p<0.05 ** p<0.01 M=Mean SD=Standard Deviation (From SSPSSAU Software)

As can be seen in Table 4.1.3 and Table 4.1.4, the average score of the controlled class after the experiment is 0.55 points lower than that of the exploratory class. The P value of the paired T-test is 0.475, which is still larger than 0.05, but compared to the

period before the research, the P value decreased by 0.176, which mirrors that although there is no distinct variation in the students' reading scores, differences begin to appear and the reading ability of the students in the experimental class has been relatively improved.

Table 4.1.5: Paired T-test of Writing Scores before the Experiment

Items	Paired (M±SD)		Mean Difference(Paired CC-Paired EC)	T Value	P Value
	Paired CC	Paired EC			
Paired T-test	14.88±2.20	14.73±2.24	0.15	0.487	0.630

* p<0.05 ** p<0.01 M=Mean SD=Standard Deviation (From SSPSSAU Software)

It can be concluded from Tables 4.1.1 and Table 4.1.5 that the average writing score of the exploratory class is 0.15 points lower than that of the controlled class,

and the P value of the paired T-test is 0.630, which is greater than 0.05, revealing that there is no apparent distinction in the writing levels of the students.

Table 4.1.6: Paired T-test of Writing Scores after the Experiment

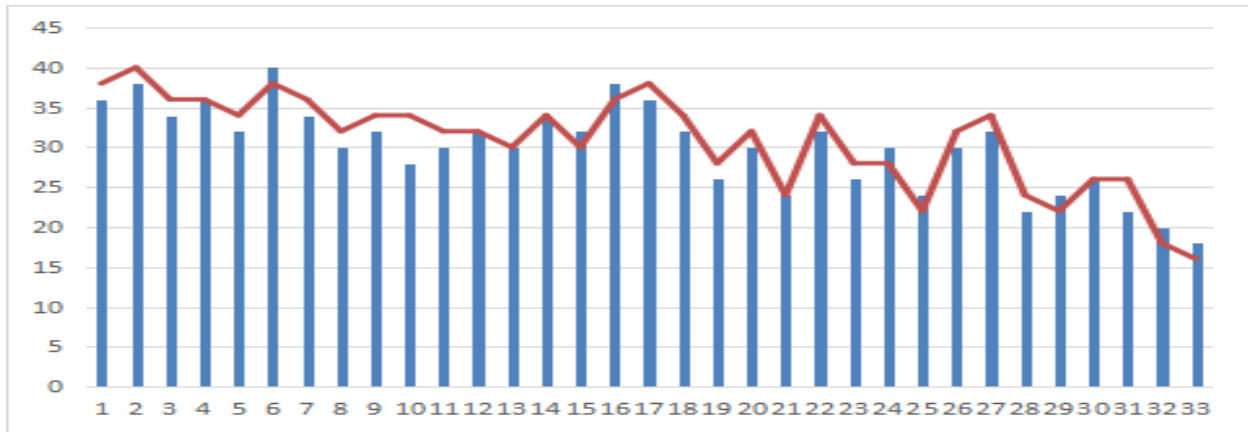
Items	Paired (M±SD)		Mean Difference (Paired CC-Paired EC)	T Value	P Value
	Paired CC	Paired EC			
Paired T-test	30.30±6.06	30.85±5.94	-0.55	-0.722	0.475

* p<0.05 ** p<0.01 M=Mean SD=Standard Deviation (From SSPSSAU Software)

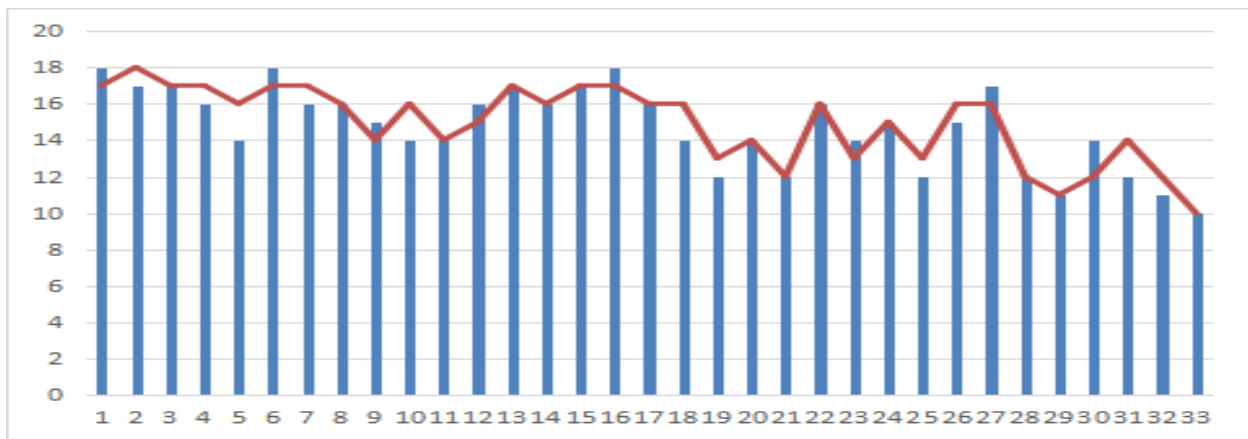
As shown in Tables 4.1.3 and 4.1.6, the average writing score of the exploratory class is 0.55 points higher than that of the controlled class after the experiment, and the P value of the paired T-test is 0.475,

demonstrating that the experimental period is shorter and that there is a small difference but not a particularly clear distinction between them.

4.1.7 Comparison of Reading Scores in Experimental Class before and after the Treatment



4.1.8 Comparison of Writing Scores in Experimental Class before and after the Treatment



The red lines show the result of reading and writing in the experimental class after integrating reading and writing by using the mind maps, while the blue column indicates the result of utilizing the traditional reading and writing separate teaching mode before the experiment. The average writing score of the experimental class has been added to 0.85 in accordance with Table 4.1.7 and Table 4.1.8. Hence, the teaching of reading and writing integrating with reading and writing by using mind-mapping has a certain effect on students' reading ability. However, due to that short experimental period, further experiment will be needed in the future.

In addition, the experimental class improved their average writing score performance by 0.18 points after utilizing mind maps for composition instruction. Thus, it can be summed up that teaching reading and writing employing mind mapping has an improvement on students' writing skills as well.

4.2 Results and Discussion of the Questionnaires

In order to boost the reading and writing teaching progressively, and to solve the problems of students in reading and writing in a more targeted way, the questionnaires are conducted accordingly.

Table 4.2.1: Question One to Question Three on Reading Teaching of Experimental Class

Question one: In reading class, what is your reaction to the teacher's questions in class? (%)		
Single Choice	Before the Experiment	After the Experiment
A. Think positively and answer actively.	18.18	30.30
B. Think positively, but don't answer actively.	33.33	39.39
C. When the teacher asks me, I start to think and answer.	30.30	24.24
D. Be negative and wait for an answer.	18.18	6.06
Question two: In reading class, what do you often do when you don't understand the content or something else? (%)		
Single Choice	Before the Experiment	After the Experiment
A. Think independently.	30.30	21.21
B. Consult others immediately.	27.27	39.39
C. Consult others occasionally.	33.33	30.30
D. Never ask for help.	12.12	9.09
Question three: At the end of each reading lesson, do you have a systematic review of what you have learned? (%)		
Single Choice	Before the Experiment	After the Experiment
A. Always	6.06	21.21
B. Often	24.24	36.36
C. Seldom	63.64	39.39
D. Never	6.06	3.03

It can be seen from Table 4.2.1 that only 18.18% of the students were able to think positively and answer seriously when the teacher asked a question in the reading class before the experiment, and after the experiment 30.30% of the students have been able to do so. Secondly, just 27.27% of students were able to ask others promptly when they encountered some points they did not understand in reading class before the

experiment, and 39.39% have been able to conduct that after the experiment. In addition, before the experiment, merely 6.06% of students were always able to constitute a clear framework of the reading text while after the experiment, 21.21% have been able to perform so. In general, the use of mind maps for English reading-writing teaching can cultivate students' competence to clarify lines of text and good reading habits.

Table 4.2.2: Question Four to Question Six on Writing Teaching of Experimental Class

Question four: What is the main difficulty you encounter in writing? (%)		
Single Choice	Before the Experiment	After the Experiment
A. Do not know what to write.	9.09	6.06
B. Know what to write but do not know which aspects to write from.	39.39	33.33
C. Know what to write but can't express it.	42.42	48.48
D. Not be willing to write.	9.09	12.12
Question five: Do you accumulate composition material or good words and sentences in your daily life? (%)		
Single Choice	Before the Experiment	After the Experiment
A. Always	6.06	9.09
B. Often	12.12	33.33
C. Seldom	51.52	39.39
D. Never	30.30	18.18
Question six: When you write, do you use the structure or other elements from previous reading texts? (%)		
Single Choice	Before the Experiment	After the Experiment
A. Always use them in my articles.	9.09	21.21
B. Use them occasionally in my compositions.	39.39	51.52
C. Be able to recall the texts, but do not know how to apply	42.42	21.21
D. Do not find the connection between the them.	9.09	6.06

From Table 4.2.2, it could be concluded that 39.39% of the students did not know the which approach to writing their compositions before the experiment, which has dropped to 33.33% after the experiment. Besides, only 12.12% of the students could collect essay materials and good phrases regularly before the experiment, and 33.33% after the experiment. Moreover,

9.09% of the students always applied the content of previously learned texts to their own writing before the experiment, but 21.21% after the experiment. On the whole, the usage of mind maps to English reading-writing teaching can activate students' interest and confidence in writing to a certain extent.

Table 4.2.3: Question Seven to Question Eight on Reading and Writing Teaching of Experimental Class

Question seven: What problems do you think exist in the present English reading and writing class? (%)		
Multiple Choice	Before the Experiment	After the Experiment
A. Students do not understand what they are reading.	39.39	33.33
B. Students do not know how to write.	51.52	39.39
C. Students do not enjoy reading or writing lessons.	21.21	18.18
D. Teachers pay too much attention on reading lessons and neglect writing lessons.	36.36	21.21
E. Teachers do not make connections between reading and writing lessons.	57.58	39.39
F. The atmosphere in reading and writing classes is dull.	63.64	39.39
G. Reading and writing lessons are often taught separately in schools, and sometimes writing lessons are not even taught.	48.48	18.18
Question eight: How do you think the teaching of English reading and writing should be improved now? (%)		
Multiple Choice	Before the Experiment	After the Experiment
A. Reading and writing lessons can be taught together.	21.21	51.52
B. Establish links between reading and writing lessons.	39.39	63.64
C. Teachers can provide guidance to ensure that 90% of the students can understand the content in general.	81.82	87.88
D. Do more exercises.	39.39	42.42
E. Use multimedia to active the classroom atmosphere.	69.70	81.82
F. Complement extracurricular teaching materials to arouse students' interests.	48.48	42.42

As could be summarized from Table 4.2.3, 48.48% of the students in the experimental class before the experiment considered that separate teaching of reading and writing was one of the main reasons for their difficulties in reading and writing, and this has dropped to 18.18 after the experiment. 63.63% of the students thought that the classroom atmosphere was rather dull before the experiment, and only 39.39% of the students still reckon so after the application of mind mapping. Meanwhile, before the experiment, 39.39% of the students in the experimental class realized that the relationship between reading and writing should be established while after the experiment, the proportion of the students' awareness has increased to 63.64%. In addition, 81.82% of the students believed that teachers' guidance should be paid attention to in class before the experiment, and after utilizing mind-mapping, this part has grown to 87.88%. Overall, the practice of mind maps for integrating reading and writing teaching fosters a more conscious use of what students have learned about reading texts when writing. Nonetheless, there is also a greater desire for reasonable guidance from teachers.

Questions nine and ten are the same open questions before and after the experiment. Item nine is that how much do you know about mind mapping and item ten is that do you have any suggestions for future English reading and writing classes? The majority of the students in the experimental class knew little about mind mapping before the experiment, having only read about it in certain books but not knowing how to use it. Whereas, after the experiment, students have begun to learn to utilize mind maps for reading and essay framing. At the same time, most of the students hope that the teaching of English reading and writing can be more

lively and interesting with the assistance of multimedia devices or other efficient tools.

In short, students pay more attention to the structure of the article and are not reluctant to amass material after class, which is a necessary process for students to enhance their reading and writing competence. Employing mind mapping to teach reading and writing together can allow students to shift from reading input to writing output, effectively promoting students' construction and thinking visualization ability.

4.3 Results and Discussion of the Interviews

The interview is launched with a random sample of ten students from the experimental class for three questions, three questions and the main perspectives are listed as follows:

Question one: Could you show your opinions about any specific aspects that have helped you after using mind maps for reading and writing?

Students' main opinions: Firstly, comprehending long concrete becomes concise, easy to understand and clearly structured with the application of mind mapping. Secondly, mind maps are conducive to discovering key information for later revision. Besides, mind maps help to clarify the direction and specific content of the writing.

Question two: Will you talk about any difficulties you have faced in using mind mapping for reading and writing?

Students' main opinions: On the one hand, drawing mind maps is a bit time-consuming and it would be better with a concise version. On the other hand, dividing the structure of an article and refining crucial words without the guidance of a teacher is a big problem.

Question three: Do you have any other suggestions for teaching English reading and writing in the future?

Students' main opinions: For instance, the classroom atmosphere should be as active as possible. Make a logical connection between reading and writing is a must, one that students can understand and master. There is a gap between book composition and exam composition, which is expected to be explained separately.

Generally speaking, the interviewees possessed positive attitudes towards the implementation of mind mapping in English reading and writing. Intuitive, efficient and tight connection is the merit of mind mapping, but there are also shortcomings in that it is time-consuming and brain-intensive.

5. CONCLUSION

Crucial discoveries, existing limitations, teaching enlightenment and advice from this study are proposed in this portion to promote the implementation of mind mapping in English reading and writing teaching.

5.1 Major Findings of the Study

After six weeks of teaching experiment, combining the results of two tests, two questionnaires and one interview before and after the research, it can be roughly surmised that implementation of mind mapping in the teaching of integrating reading and writing in English can not only train the students' ability to sort out the context, namely, to pay more attention to the structure of the material, but also through the process of input to output, students deepen their comprehension of the content and apply mind maps intuitively and efficiently to their own writing. At the same time, the use of visual tools such as mind maps can stimulate students' creativity in learning and enhance the active atmosphere of teaching reading and writing.

5.2 Limitations of the Study

The relatively short duration of this teaching investigation, and the limited teaching experience and research skills of an undergraduate, means that there are few shortcomings in this study. Above all, the scope of the study participants is narrow, only for the grade eight students, so the suitability of the experiment is less universal due to the differences in students' personalities and learning styles at various stages of junior middle school. Secondly, this study only carries out two tests to reflect whether students' reading and writing skills have improved, but these abilities will be affected by other

factors. In addition, there are variations in the physical and mental states and learning status of the students from stage to stage. Thus, the data may be biased. Last but not least, the majority of the lessons in this experiment are guided by the teacher in mind mapping and students lack hands-on practice.

5.3 Implications for English Reading-Writing Teaching

As a visual thinking tool, mind mapping internalizes the text of English reading into a clear diagram of the thinking process. Students grasp the structure of the text as a whole while meanwhile supplementing individual key points, increasing the flexibility, depth and breadth of their thinking. Besides, mind mapping allows students to connect a large number of conceptions to previously learned content, and in the course of mapping, both prior knowledge and novel ideas are generated in all diagrams because of the diversity of students' personalities. Students learn to take the initiative in this way and teachers are able to teach effectively by tailoring their teaching to the students' understanding.

5.4 Suggestions for Further Research

For those who want to investigate the impact of mind mapping on the teaching of integrated English reading and writing in the future, the research time and the grade span can be expanded by selecting students at all stages for further experimental validation. In order to increase the training of students in drawing mind maps, the teacher's guidance on drawing mind maps is expected to be reduced appropriately. While mind mapping plays a positive role in the teaching English reading and writing, the impact on other English curriculum and subjects can also be tapped.

REFERENCES

- Buran, A., & Filyukov, A. (2015). Mind mapping technique in language learning. *Procedia-Social and Behavioral Sciences*, 206, 215-218.
- Balim, A. G. (2013). Use of technology-assisted techniques of mind mapping and concept mapping in science education: a constructivist study. *Irish Educational Studies*, 32(4), 437-456.
- Buzan, T. (1993). *The Mind Map Book*. London: BBC Books, 1993.
- Chen, C. (2018). Rational Use of Mind Maps to Cultivate Students' English Reading and Writing Literacy. *Basic Education Forum*, 2018(8).
- Chen, X. (2017). Skillfully Using Mind Maps to Facilitate Reading to Promote Writing—A Preliminary Exploration of Strategies to Effectively Improve Junior High School English Teaching of Reading to Promote Writing. *Test and Research: Teaching Forum*, 2017(28).
- Dhindsa, H. S., & Roger Anderson, O. (2011). Constructivist-visual mind map teaching approach and the quality of students' cognitive

- structures. *Journal of Science Education and Technology*, 20(2), 186-200.
- Hallen, D., & Sangeetha, N. (2015). Effectiveness of Mind Mapping in English Teaching among VIII Standard Students. *Journal on English Language Teaching*, 2015.
 - Lee, J., & Schallert, D. L. (2016). Exploring the reading–writing connection: A yearlong classroom-based experimental study of middle school students developing literacy in a new language. *Reading Research Quarterly*, 51(2), 143-164.
 - Merchie, E., & Van Keer, H. (2016). Stimulating graphical summarization in late elementary education: The relationship between two instructional mind-map approaches and student characteristics. *The elementary school journal*, 116(3), 487-522.
 - Ni, L. (2019). An Experimental Study on Applying Mind Maps in Junior High School English Reading and Writing Teaching to Improve Students' Writing Performance. Northwest Normal University, 2019.
 - Omar, A., & Albakri, I. S. M. A. (2016). Thinking maps to promote critical thinking through the teaching of literature in the esl context. *IJELTAL (Indonesian Journal of English Language Teaching and Applied Linguistics)*, 2016.
 - Wette, R. (2017). Using mind maps to reveal and develop genre knowledge in a graduate writing course. *Journal of second language writing*, 38, 58-71.
 - Stokhof, H. J. M., De Vries, B., Bastiaens, T., & Martens, R. (2017). Mins Mind map our way into effective student questioning: A principle-based scenario. *Research In Science*, 2017.
 - Veli, B. (2015). A Meta-analysis Study of Mind Mapping Techniques and Traditional Learning Methods. *The Anthropologist*, 2015.
 - Wan Jusoh, W. N. H., & Ahmad, S. (2016). iMindMap as an innovative tool in teaching and learning accounting: an exploratory study. *Interactive Technology and Smart Education*, 13(1), 71-82.
 - Ye, Q. (2017). Cultivating Reading to Lead Writing—An Exploration of Integrating Reading and Writing in Junior High School English Teaching. *Campus English*, 2017.