International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 09 Issue 06 June 2026
DOI: 10.47191/ijcsrr/V9-i6-23, Impact Factor: 8.048
IJCSRR @ 2026
www.ijcsrr.org

The Effects of Mind Mapping on English Paragraph Writing among Vietnamese High School Students

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ABSTRACT: Writing English paragraphs remains a challenge for many EFL high school students, particularly in organizing ideas, developing relevant content, and producing coherent written texts. Mind mapping has been suggested as a useful pre-writing technique because it helps learners generate ideas visually and arrange them before drafting. This study investigated the effectiveness of mind mapping on Grade 10 students' English paragraph writing at a high school in Hai Phong, Vietnam. A quasi-experimental research design was employed with 77 Grade 10 students from two intact classes. The experimental group consisted of 37 students who were taught paragraph writing through mind mapping, while the control group included 40 students who received conventional writing instruction. Data were collected through a pre-test, progress test, post-test, and a questionnaire. The writing tests were assessed according to five criteria: content, grammar, mechanics, organization, and vocabulary. The findings showed that the experimental group improved more clearly than the control group, especially in organization, content, mechanics, and total writing scores. Questionnaire results also revealed that students generally perceived mind mapping as simple, visually interesting, and useful for generating and organizing ideas. However, some students reported challenges related to time management, selecting relevant ideas, and converting keywords into complete sentences. The study suggests that mind mapping can be an effective pre-writing technique for improving English paragraph writing when implemented with appropriate teacher guidance.

KEYWORDS: mind mapping; paragraph writing; EFL writing; pre-writing technique; high school students.

1. INTRODUCTION

Writing is an essential skill in English language learning because it enables learners to express ideas, organize information, and communicate meaning through written language. In academic contexts, writing is particularly important because students are often required to produce paragraphs, essays, reports, and other written texts. However, writing is also a demanding skill for EFL learners as it requires the simultaneous control of content, organization, grammar, vocabulary, and mechanics. Brown and Lee (2015) and Brown and Abeywickrama (2019) emphasize that effective writing performance involves not only linguistic accuracy but also the logical development and organization of ideas. Similarly, Richards (2015) notes that written communication has become increasingly important in educational, professional, and digital contexts.

Among different forms of writing, paragraph writing is a fundamental component of students' academic writing development. A good English paragraph requires a clear topic sentence, relevant supporting details, logical organization, suitable vocabulary, accurate grammar, and correct mechanics. Nevertheless, many EFL students experience difficulties in paragraph writing, especially in generating ideas and arranging them coherently. Students may have some ideas about a topic, but they may not know how to select, organize, and develop those ideas into a complete paragraph. Therefore, suitable pre-writing techniques are needed to help students prepare for writing more effectively.

Mind mapping is one technique that may support students in the pre-writing stage. It is a visual strategy that helps learners generate ideas and show relationships among them through keywords, branches, colors, and connections. Wette (2017) explains that mind maps can help learners organize conceptual content and develop knowledge structures that support writing. Le et al. (2023) also state that mind mapping can help students brainstorm ideas, arrange thoughts clearly, visualize paragraph structure, and support the stages of writing. In this sense, mind mapping may be useful for paragraph writing because it allows students to plan their ideas before drafting.

Previous studies have provided evidence of the positive effects of mind mapping on EFL writing. Al-Jarf (2009) found that mind mapping software improved EFL students' writing performance, particularly in idea relevance, organization, and coherence. Al Naqbi (2011) reported that mind mapping helped high school students plan and organize their ideas for writing tasks, although some learners faced challenges related to time management and idea selection. Al-Zyoud, Al Jamal, and Baniabdelrahman (2017) also

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found that students who used mind mapping performed better in writing than those who did not. More recently, Tarin and Yawiloeng (2022) showed that mind mapping improved Thai high school students' writing performance and attitudes toward writing.

In Vietnam, research has also indicated the potential value of mind mapping in English writing instruction. Doan (2022) found that mind mapping improved Vietnamese EFL students' writing performance, especially in content and organization. Nguyen, Le, and Nguyen (2024) similarly reported that mind mapping helped improve students' descriptive paragraph writing in several criteria, including grammar, mechanics, organization, content, and vocabulary. However, these Vietnamese studies were mainly conducted with tertiary-level students. Therefore, more research is needed to examine the effectiveness of mind mapping among high school students in Vietnam.

In the context of a high school in Hai Phong, Grade 10 students were observed to face difficulties in English paragraph writing, particularly in organizing ideas and developing supporting details. Since mind mapping provides a visual way to generate and arrange ideas before writing, it may help students improve their paragraph writing performance. For this reason, the present study investigates the effectiveness of mind mapping on Grade 10 students' English paragraph writing. Specifically, it aims to examine the extent to which mind mapping improves students' writing performance and to explore students' perceptions of the benefits and challenges of using mind mapping when writing English paragraphs. The study is guided by the following research questions: (1) To what extent does the use of mind mapping improve Grade 10 students' English paragraph writing? and (2) What are Grade 10 students' perceptions of the benefits and challenges of using mind mapping in writing English paragraphs?

2. LITERATURE REVIEW

2.1. Writing and English Paragraph Writing

Writing is an important skill in English language learning because it enables learners to express ideas, communicate information, and present knowledge in written form. In EFL contexts, writing is often considered a difficult skill because students need to control several aspects at the same time, including content, organization, grammar, vocabulary, and mechanics. Brown and Lee (2015) explain that writing involves different components such as content, organization, discourse, grammar, vocabulary, and mechanics. Similarly, Brown and Abeywickrama (2019) suggest that writing performance can be assessed through organization, logical development of ideas, grammar, punctuation, spelling, mechanics, and quality of expression. Therefore, writing is not only a matter of producing grammatically correct sentences but also of developing and organizing ideas effectively.

Paragraph writing is a basic but important form of academic writing. A paragraph usually focuses on one main idea and develops it through supporting details. In English paragraph writing, students are expected to write a clear topic sentence, provide relevant supporting ideas, arrange information logically, and use appropriate language. Organization is particularly important because it helps readers understand the relationship between the main idea and supporting details. If students cannot organize their ideas clearly, their paragraphs may become confusing even when they have relevant content. Therefore, students need effective strategies that can help them plan and arrange their ideas before writing.

Writing instruction can support learners by focusing on both the process and the product of writing. Harmer (2007) emphasizes that writing involves stages such as planning, drafting, reviewing, and editing. In this process, the planning stage is important because it helps students prepare ideas before producing the final text. Pre-writing activities can therefore play a useful role in helping learners generate ideas, select relevant information, and create a clear structure. One pre-writing technique that can support these tasks is mind mapping.

2.2. Mind Mapping as a Pre-writing Technique

Mind mapping is a visual technique used to generate, connect, and organize ideas. In a mind map, learners usually place a central topic in the middle of the page and then develop related ideas through branches, keywords, colors, and visual connections. Wette (2017) describes mind maps as diagrams that present conceptual content through words or phrases and show relationships among ideas through lines or arrows. Budd (2004) also explains that mind maps organize information into categories and hierarchies, which can support learning and recall. In this way, mind mapping helps learners see the structure of their ideas more clearly.

Mind mapping is closely connected with the planning stage of writing. Before writing a paragraph, students can use a mind map to brainstorm ideas, group related information, and decide the order of supporting details. This process may help students move from scattered ideas to a clearer writing plan. Buzan and Buzan (1995) argue that mind mapping encourages learners to use keywords, images, colors, and associations to make thinking more active and memorable. Le et al. (2023) also state that mind mapping can

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help students brainstorm, establish relationships between ideas, arrange thoughts clearly, visualize paragraph structure, and support the stages of writing.

For EFL students, mind mapping may be especially useful because it reduces the difficulty of starting a writing task. Many learners struggle when they face a blank page because they do not know how to begin or how to organize their ideas. A mind map provides a visible plan that can guide students before they write. It can help them identify the main idea, choose supporting points, and arrange the paragraph in a more logical way. Therefore, mind mapping can be considered a useful pre-writing strategy for English paragraph writing.

2.3. Benefits and Challenges of Mind Mapping in Writing

Mind mapping offers several potential benefits for English writing. First, it can help students generate ideas. When students develop branches from a central topic, they may discover more details and examples to include in their paragraphs. Second, it can help students organize ideas. The visual structure of a mind map allows learners to see the relationship between main ideas and supporting details. Third, mind mapping may increase students' interest in writing because it uses visual elements such as colors, branches, and diagrams. These features can make the planning stage more engaging than a simple list of ideas.

Previous literature supports these benefits. Buzan and Buzan (1995) state that mind mapping can help learners identify relevant keywords, create associations, and discover new ideas. Wette (2017) explains that mind maps can help students develop knowledge structures that support text composition. Le et al. (2023) also highlight that mind mapping can support idea arrangement, creativity, paragraph structure, and the writing process. These benefits are directly related to paragraph writing because students need to generate content, arrange supporting details, and develop a coherent structure.

However, mind mapping may also create some challenges. Al Naqbi (2011) found that some students had difficulties with time management and selecting relevant ideas when using mind mapping. Learners may spend too much time designing the mind map instead of writing the paragraph. They may also include too many ideas, which makes it difficult to choose the most important information. Another possible challenge is converting keywords from the mind map into complete English sentences. Therefore, teachers need to guide students on how to use mind mapping efficiently, especially by encouraging them to focus on keywords, relevant ideas, and simple organization rather than decorative design.

2.4. Previous Studies on Mind Mapping and EFL Writing

A number of studies have examined the use of mind mapping in EFL writing instruction. Al-Jarf (2009) investigated the use of mind mapping software with EFL freshman students in Saudi Arabia. The study found that mind mapping improved students' writing performance, especially in idea relevance, organization, and coherence. This suggests that mind mapping can help learners produce more organized and meaningful written texts.

Al Naqbi (2011) studied the use of mind mapping with Grade 11 students in the United Arab Emirates. The findings showed that mind mapping helped students plan and organize their ideas for writing tasks. However, the study also reported challenges, particularly in relation to time management and selecting relevant ideas. This finding is important because it shows that mind mapping can be beneficial, but students still need guidance in using it effectively.

Other studies have also reported positive effects of mind mapping on writing performance. Bukhari (2016) found that mind mapping helped improve EFL learners' writing, particularly in organization and content. Al-Zyoud, Al Jamal, and Baniabdelrahman (2017) found that students who used mind mapping performed better in writing than those who did not. Similarly, Tarin and Yawiloeng (2022) reported that mind mapping improved Thai high school students' writing performance and attitudes toward writing. These studies indicate that mind mapping can support both writing achievement and students' motivation.

In the Vietnamese context, Doan (2022) examined the effects of mind mapping and outlining on Vietnamese EFL students' writing performance and attitudes. The study found that mind mapping improved writing performance, especially in content and organization. Nguyen, Le, and Nguyen (2024) also investigated mind mapping and outlining as pre-writing techniques for descriptive paragraph writing among Vietnamese EFL students. Their findings showed that mind mapping contributed to improvements in several writing criteria, including grammar, mechanics, organization, content, and vocabulary. These studies provide useful evidence for the effectiveness of mind mapping in Vietnam, although they mainly focused on tertiary-level learners.

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2.5. Research Gap

Previous studies have generally shown that mind mapping can improve EFL students' writing performance, especially in content and organization. However, several gaps remain. First, many studies on mind mapping and EFL writing have been conducted with university students, while fewer studies have focused on high school students. Second, in Vietnam, existing studies have mainly examined tertiary-level learners, which limits the application of the findings to the high school context. Third, more research is needed to examine how mind mapping affects specific aspects of English paragraph writing, including content, organization, grammar, vocabulary, and mechanics.

To address these gaps, the present study investigates the effectiveness of mind mapping on Grade 10 students' English paragraph writing at a high school in Hai Phong. It also explores students' perceptions of the benefits and challenges of using mind mapping in writing English paragraphs. By focusing on high school students in Vietnam, this study aims to provide further evidence on how mind mapping can be applied in EFL writing instruction.

3. METHODOLOGY

This study employed a quasi-experimental research design to investigate the effectiveness of mind mapping on Grade 10 students' English paragraph writing at a high school in Hai Phong, Vietnam. The participants were 77 Grade 10 students from two intact classes, with 37 students assigned to the experimental group and 40 students assigned to the control group. The experimental group was taught English paragraph writing through the use of mind mapping, while the control group learned paragraph writing through conventional teaching methods. The treatment lasted for twelve weeks. Data were collected through three writing tests, including a pre-test, a progress test, and a post-test, as well as a questionnaire administered to the experimental group after the treatment. The writing tests required students to write English paragraphs based on prompts adapted from *Tiếng Anh 10 Global Success* and were assessed using a rubric consisting of five criteria: content, grammar, mechanics, organization, and vocabulary. The questionnaire was used to explore students' perceptions of the benefits and challenges of using mind mapping in writing English paragraphs. Quantitative data from the writing tests were analyzed by comparing mean scores between and within groups, while questionnaire responses were analyzed using descriptive statistics to identify students' overall perceptions.

RESULTS

4.1. Results of the Writing Tests

This section presents the results of the writing tests conducted to examine the effectiveness of mind mapping on Grade 10 students' English paragraph writing. The students' writing performance was measured through three tests: a pre-test, a progress test, and a post-test. The experimental group learned paragraph writing through mind mapping, while the control group learned through conventional writing instruction. The students' paragraphs were assessed according to five criteria: content, grammar, mechanics, organization, and vocabulary. The total score for each writing test was 25 points.

4.1.1. Overview of Pre-test, Progress Test, and Post-test Scores

Table 1 presents the mean scores of the control group and experimental group in the pre-test.

Table 1: Pre-test Mean Scores of the Control and Experimental Groups

Criteria	Control group	Experimental group	Difference
Content	3.13	3.08	-0.05
Grammar	2.85	2.89	+0.04
Mechanics	3.40	3.59	+0.19
Organization	3.00	2.86	-0.14
Vocabulary	3.40	3.49	+0.09
Total	15.78	15.92	+0.14

As shown in Table 1, the two groups had relatively similar writing ability before the treatment. The experimental group had a slightly higher total mean score than the control group, with a difference of only 0.14 points. The control group scored slightly

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higher in content and organization, while the experimental group scored slightly higher in grammar, mechanics, vocabulary, and total score. This suggests that the two groups were generally comparable at the beginning of the study.

Table 2 below shows the progress test scores of the two groups after the first half of the treatment period.

Table 2: Progress Test Mean Scores of the Control and Experimental Groups

Criteria	Control group	Experimental group	Difference
Content	3.05	3.16	+0.11
Grammar	2.83	2.92	+0.09
Mechanics	3.43	3.68	+0.25
Organization	3.03	3.11	+0.08
Vocabulary	3.40	3.51	+0.11
Total	15.73	16.38	+0.65

As indicated in Table 2, the experimental group obtained higher mean scores than the control group in all five writing criteria and in the total score. The total mean score of the experimental group was 16.38, while that of the control group was 15.73. The difference between the two groups increased from 0.14 points in the pre-test to 0.65 points in the progress test. This indicates that the experimental group began to show greater improvement after using mind mapping during the first six weeks of the treatment.

Table 3: Post-test Mean Scores of the Control and Experimental Groups

Criteria	Control group	Experimental group	Difference
Content	3.13	3.43	+0.30
Grammar	2.80	3.08	+0.28
Mechanics	3.50	3.84	+0.34
Organization	3.08	3.51	+0.43
Vocabulary	3.45	3.51	+0.06
Total	16.03	17.38	+1.35

As shown in Table 3, the experimental group outperformed the control group in all criteria in the post-test. The largest difference was found in organization, with the experimental group scoring 0.43 points higher than the control group. This was followed by mechanics, content, grammar, and vocabulary. The total mean score of the experimental group was 17.38, while the control group scored 16.03. The difference in total score increased to 1.35 points, suggesting that the experimental group made more noticeable progress after the full treatment period.

4.1.2. Changes in the Experimental Group's Writing Performance

Table 4 presents the changes in the experimental group's mean scores from the pre-test to the post-test.

Table 4: Changes in the Experimental Group's Writing Scores

Criteria	Pre-test	Progress test	Post-test	Pre-test to post-test gain
Content	3.08	3.16	3.43	+0.35
Grammar	2.89	2.92	3.08	+0.19
Mechanics	3.59	3.68	3.84	+0.25
Organization	2.86	3.11	3.51	+0.65
Vocabulary	3.49	3.51	3.51	+0.02
Total	15.92	16.38	17.38	+1.46

Table 4 shows that the experimental group improved in all writing criteria after the treatment. The greatest improvement was found in organization, which increased from 2.86 in the pre-test to 3.51 in the post-test, with a gain of 0.65 points. This suggests that mind mapping had the strongest effect on students' ability to arrange ideas, structure paragraphs, and present supporting details logically.

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Content also improved notably, with a gain of 0.35 points, indicating that students became better at developing ideas and addressing the writing topic. Mechanics increased by 0.25 points, and grammar improved by 0.19 points. Vocabulary showed only a very small gain of 0.02 points, suggesting that mind mapping had limited influence on vocabulary development.

The total mean score of the experimental group increased from 15.92 in the pre-test to 17.38 in the post-test, with an overall gain of 1.46 points. This indicates that the students' English paragraph writing improved after they were taught using mind mapping.

4.1.3. Comparison of Total Scores Between the Two Groups

Table 5 below summarizes the total mean scores of the control and experimental groups across the three tests.

Table 5: Comparison of Total Mean Scores Between the Two Groups

Test	Control group	Experimental group	Difference
Pre-test	15.78	15.92	+0.14
Progress test	15.73	16.38	+0.65
Post-test	16.03	17.38	+1.35

As shown in Table 5, the two groups started with very similar writing performance. In the pre-test, the difference between the two groups was only 0.14 points. In the progress test, the difference increased to 0.65 points. By the post-test, the difference reached 1.35 points in favor of the experimental group. While the control group showed only slight improvement from 15.78 to 16.03, the experimental group improved more clearly from 15.92 to 17.38. This pattern suggests that the use of mind mapping contributed positively to students' English paragraph writing performance.

Overall, the writing test results show that mind mapping had a positive effect on Grade 10 students' English paragraph writing. The experimental group improved more than the control group across the treatment period. The most significant improvement was found in organization, followed by content, mechanics, and grammar. Vocabulary showed the least improvement. These results suggest that mind mapping was especially useful in helping students organize ideas, develop content, and produce more coherent English paragraphs.

4.2. Results of the Questionnaire

This section presents the results of the questionnaire administered to the experimental group after the twelve-week treatment. The questionnaire was used to explore Grade 10 students' perceptions of their English paragraph writing ability, the benefits of using mind mapping, and the challenges they experienced when applying mind mapping in writing English paragraphs. The results are presented in percentages of disagreement, uncertainty, and agreement.

4.2.1. Students' Perceptions of their English Paragraph Writing Ability

Table 6 presents the students' perceptions of their English paragraph writing ability.

Table 6: Students' Perceptions of Their English Paragraph Writing Ability

Statement	Disagree	Unsure	Agree
I like writing English paragraphs.	22%	19%	59%
I am confident in writing English paragraphs.	32%	27%	41%
I use vocabulary appropriately when writing English paragraphs.	19%	19%	62%
I use appropriate grammar forms when writing English paragraphs.	46%	19%	35%
I do not make errors in spelling, grammar, or punctuation.	22%	19%	59%
I create effective ideas when writing English paragraphs.	32%	19%	49%
I am good at gathering ideas on a topic.	27%	19%	54%
I try to arrange my ideas before writing a paragraph.	22%	16%	62%
The ideas in my paragraphs are arranged logically.	19%	19%	62%
I know how to develop my ideas.	27%	16%	57%
I can organize the ideas in my paragraphs well.	16%	16%	68%
I use linking words in my paragraphs.	14%	16%	70%

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I can write a clear topic sentence.	19%	22%	59%
I always try to finalize my paragraph.	22%	16%	62%
Average	**24%**	**19%**	**57%**

As shown in Table 6, the students generally had positive perceptions of their English paragraph writing ability, with an average agreement rate of 57%. The highest agreement was found in the use of linking words, with 70% of the students agreeing that they used linking words in their paragraphs. In addition, 68% agreed that they could organize ideas well, and 62% agreed that they arranged ideas before writing and presented ideas logically. These results suggest that many students felt relatively positive about their ability to organize paragraph writing.

However, the results also reveal some areas of difficulty. Only 41% of the students agreed that they were confident in writing English paragraphs, while 32% disagreed and 27% were unsure. The weakest area was grammar, as only 35% agreed that they used appropriate grammar forms, while 46% disagreed. This indicates that although students perceived themselves as relatively capable in organization and vocabulary use, many still lacked confidence in grammar and overall writing ability.

4.2.2. Students' Perceptions of the Benefits of Mind Mapping

Table 7 below presents the students' perceptions of the benefits of using mind mapping in English paragraph writing.

Table 7: Students' Perceptions of the Benefits of Mind Mapping

Statement	Disagree	Unsure	Agree
Mind mapping saves time when writing English paragraphs.	49%	24%	27%
Mind mapping is visually interesting.	19%	16%	65%
Mind mapping establishes associations between words and ideas.	22%	24%	54%
Mind mapping leads to the discovery of new ideas.	22%	19%	59%
Mind mapping helps develop schema for composing texts.	19%	24%	57%
Mind mapping is simple to understand.	14%	16%	70%
Mind mapping helps arrange ideas clearly and appealingly.	22%	16%	62%
Mind mapping helps organize paragraph structure.	22%	16%	62%
Mind mapping helps with paragraph length.	27%	24%	49%
Average	**24%**	**20%**	**56%**

The results in Table 7 show that students generally perceived mind mapping positively, with an average agreement rate of 56%. The most strongly perceived benefit was that mind mapping was simple to understand, with 70% of the students agreeing with this statement. Another major benefit was visual interest, with 65% agreeing that mind mapping was visually interesting. These findings indicate that students found mind mapping accessible and engaging.

The results also show that students perceived mind mapping as useful for organizing ideas and paragraph structure. Specifically, 62% agreed that mind mapping helped them arrange ideas and thoughts clearly, and another 62% agreed that it helped them organize the structure of paragraphs. In addition, 59% agreed that mind mapping helped them discover new ideas, and 54% agreed that it helped establish associations between words and ideas. These findings suggest that mind mapping supported students mainly in idea generation and organization.

However, time-saving was not strongly perceived as a benefit. Only 27% agreed that mind mapping saved time, while 49% disagreed. This suggests that although students recognized the organizational and visual benefits of mind mapping, many did not feel that it helped them complete writing tasks more quickly.

The open-ended responses further revealed several additional benefits of mind mapping. The most common benefit was anxiety reduction. Several students reported that mind mapping made them feel less nervous before writing because they had a clear plan to follow. Other students stated that mind mapping helped them recall vocabulary, connect ideas, generate supporting points, and become more engaged in the writing process. These responses show that mind mapping not only supported writing organization but also had positive effects on students' confidence and motivation.

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4.2.3. Students' Perceptions of the Challenges of Mind Mapping

Table 8 presents the students' perceptions of the challenges of using mind mapping in English paragraph writing.

Table 8: Students' Perceptions of the Challenges of Mind Mapping

Statement	Disagree	Unsure	Agree
Mind mapping is time-consuming when writing English paragraphs.	24%	22%	54%
It is difficult to select relevant ideas for the mind map.	35%	19%	46%
It is difficult to convert keywords into full ideas in the paragraph.	32%	19%	49%
It is challenging to order ideas in the paragraph based on the mind map.	27%	16%	57%
Average	**30%**	**19%**	**51%**

As presented in Table 8, a considerable proportion of students experienced challenges when using mind mapping. The average agreement rate for the challenge items was 51%, which shows that about half of the students faced difficulties with this technique. The most common challenge was ordering ideas in the paragraph based on the mind map, with 57% agreement. This means that although mind mapping helped students generate and arrange ideas visually, some students still found it difficult to transfer the structure of the mind map into a written paragraph.

Time management was another major challenge. A total of 54% of the students agreed that mind mapping was time-consuming. This result is consistent with the finding in Table 7, where only 27% believed that mind mapping saved time. These results suggest that some students may have spent too much time designing or decorating their mind maps instead of focusing on writing the paragraph.

In addition, 49% of the students agreed that it was difficult to convert keywords from the mind map into complete ideas in the paragraph. This suggests that some students could generate keywords or short phrases but had difficulty developing them into grammatically correct sentences. Furthermore, 46% agreed that selecting relevant ideas for the mind map was difficult. This indicates that students needed further guidance in choosing important information and avoiding unnecessary details.

The open-ended responses provided more detailed information about these challenges. The most frequently mentioned difficulty was time management, as several students reported spending too much time on colors, drawings, or the design of the mind map. Other students mentioned difficulties in converting keywords into full sentences, dealing with too much information, organizing the structure of the map, and making logical connections between ideas. These findings suggest that while mind mapping was useful, students still needed teacher guidance to use the technique effectively and efficiently.

Overall, the questionnaire results show that the students had generally positive perceptions of mind mapping in English paragraph writing. They believed that mind mapping was simple to understand, visually interesting, and useful for organizing ideas, developing paragraph structure, and generating new ideas. Some students also felt that mind mapping reduced writing anxiety and helped them recall vocabulary. However, the students also reported several challenges, particularly time management, ordering ideas, selecting relevant ideas, and converting keywords into complete sentences. These findings indicate that mind mapping can be a helpful pre-writing technique, but students need clear instruction and practice to use it effectively in paragraph writing.

5. DISCUSSION

The findings of this study indicate that mind mapping had a positive effect on Grade 10 students' English paragraph writing, particularly in organization, content, mechanics, and overall writing performance. The experimental group showed clearer improvement than the control group across the three writing tests, with the total mean score increasing from 15.92 in the pre-test to 17.38 in the post-test. This suggests that mind mapping supported students in planning and developing their paragraphs more effectively. The improvement is consistent with previous verified studies which found that mind mapping can improve EFL learners' writing performance. For example, Al-Jarf (2009) reported that mind mapping improved students' idea relevance, organization, and coherence, while Al-Zyoud, Al Jamal, and Baniabdelrahman (2017) found that students who used mind mapping performed better in writing than those who did not. Similarly, Tarin and Yawiloeng (2022) showed that mind mapping improved high school students' writing performance and attitudes toward writing. Therefore, the present findings support the view that mind mapping can be an effective pre-writing technique in EFL writing instruction.

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Among the five writing criteria, organization showed the greatest improvement in the experimental group. This is an important finding because paragraph writing requires students to arrange ideas logically, provide supporting details, and connect information clearly. Mind mapping appears to have helped students visualize the relationship between the main topic and supporting ideas before writing. This result supports Wette's (2017) view that mind maps can help learners organize conceptual knowledge and use it in text composition. It is also consistent with Le et al. (2023), who state that mind mapping helps students arrange ideas, visualize paragraph structure, and move through the stages of writing. The questionnaire results further support this interpretation, as 62% of the students agreed that mind mapping helped them arrange ideas clearly, and another 62% agreed that it helped them organize paragraph structure. These findings suggest that mind mapping was most effective as a planning tool that helped students transform scattered ideas into a more coherent paragraph structure.

The results also show that mind mapping had a positive influence on students' content development and learning engagement. The experimental group's content score increased from 3.08 in the pre-test to 3.43 in the post-test, suggesting that students became better at addressing the writing topic and developing relevant ideas. This finding is consistent with Bukhari (2016), who found that mind mapping improved EFL learners' writing in content and organization, and with Doan (2022), who reported that mind mapping improved Vietnamese EFL students' writing performance, especially in content and organization. The questionnaire results also revealed that many students believed mind mapping helped them discover new ideas, establish associations between words and ideas, and recall vocabulary. In addition, students perceived mind mapping as visually interesting and simple to understand. These findings suggest that mind mapping not only supported writing performance but also made the pre-writing stage more accessible and engaging for learners.

However, the findings also reveal several challenges in using mind mapping. Although students generally perceived mind mapping positively, many reported that it was time-consuming, difficult to use for ordering ideas, and challenging when converting keywords into complete sentences. This finding is similar to Al Naqbi (2011), who found that students benefited from mind mapping in planning and organizing writing but also experienced difficulties with time management and selecting relevant ideas. In the present study, some students appeared to spend too much time on the visual design of the mind map rather than using it as a quick planning tool. Others had difficulty moving from short keywords to complete grammatically accurate sentences. This explains why grammar and vocabulary improved less than organization and content. Therefore, while mind mapping is useful, it should not be used without teacher guidance. Teachers need to train students to create simple, keyword-based mind maps, limit the time spent on mapping, select only relevant ideas, and transform branches into complete sentences. With appropriate guidance, mind mapping can become a practical and effective technique for improving English paragraph writing in Vietnamese high school classrooms.

6. CONCLUSION

This study investigated the effectiveness of mind mapping on Grade 10 students' English paragraph writing at a high school in Hai Phong. The findings showed that mind mapping had a positive effect on students' writing performance, especially in organization, content, mechanics, and overall writing scores. Among these criteria, organization improved the most, suggesting that mind mapping was particularly useful in helping students arrange ideas, develop paragraph structure, and present supporting details more logically. The questionnaire results also indicated that students generally had positive perceptions of mind mapping. They considered it simple to understand, visually interesting, and helpful for generating ideas and organizing paragraphs. However, some challenges were also identified, including time management, selecting relevant ideas, ordering ideas, and converting keywords into complete sentences. These findings suggest that mind mapping can be an effective pre-writing technique for improving English paragraph writing among high school students, but it should be implemented with clear teacher guidance. Teachers should train students to use simple keyword-based mind maps, manage their planning time effectively, and transform mapped ideas into coherent sentences. Overall, the study provides practical evidence that mind mapping can support English writing instruction in Vietnamese high school classrooms.

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International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 09 Issue 06 June 2026
DOI: 10.47191/ijcsrr/V9-i6-23, Impact Factor: 8.048
IJCSRR @ 2026
www.ijcsrr.org

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Cite this Article: Tuyet, M.T.T. (2026). The Effects of Mind Mapping on English Paragraph Writing among Vietnamese High School Students. International Journal of Current Science Research and Review, 9(6), pp. 3172-3181. DOI: https://doi.org/10.47191/ijcsrr/V9-i6-23