

**INTEGRATING MIND MAPPING WITH
GROUP INVESTIGATION TO IMPROVE STUDENTS'
WRITING ACHIEVEMENT**

A Thesis

By

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**MASTER IN ENGLISH LANGUAGE TEACHING STUDY PROGRAM
LANGUAGE AND ARTS EDUCATION DEPARTMENT
TEACHER TRAINING AND EDUCATION FACULTY
LAMPUNG UNIVERSITY**

2025

ABSTRACT

INTEGRATING MIND MAPPING WITH GROUP INVESTIGATION TO IMPROVE STUDENTS' WRITING ACHIEVEMENT

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This study explores the effectiveness of integrating mind mapping with group investigation in improving students' writing achievement compared to mind mapping alone. The study also aims to measure the improvement of both methods and to identify which aspect improves the most. The research was conducted at SMKN 4 Bandar Lampung, involving 66 participants, with 34 students in the experimental group and 32 in the control group. This study applied a quantitative method with quasi experimental design. Writing tests were administered before and after the treatment to measure the students' progress.

The collected data were analyzed using independent t-test and paired sample t-test. The results showed a significant improvement in the writing performance of students who were taught using mind mapping with group investigation, as indicated by a p-value of less than 0.001. Among the five aspects of writing, mechanics showed the greatest improvement followed by language use, organization, vocabulary, and content. These findings suggest that combining mind mapping with group investigation is an effective strategy for enhancing students' writing skills and can be considered as a valuable technique for teaching writing in the classroom.

Keywords: *Mind Mapping, Group Investigation, writing achievement, teaching strategy*

ABSTRAK

MENGGABUNGKAN MIND MAPPING DENGAN GROUP INVESTIGATION UNTUK MENINGKATKAN PRESTASI MENULIS SISWA

Oleh

Laksmi Dwi Intan

Penelitian ini membahas efektivitas pengintegrasian mind mapping dengan group investigation dalam meningkatkan prestasi menulis siswa dibandingkan dengan mind mapping. Penelitian ini juga bertujuan untuk mengukur peningkatan dari kedua metode tersebut dan mengidentifikasi aspek mana yang paling meningkat. Penelitian ini dilakukan di SMKN 4 Bandar Lampung, dengan melibatkan 66 peserta, dengan 34 siswa di kelompok eksperimen dan 32 siswa di kelompok kontrol. Penelitian ini menggunakan metode kuantitatif dengan desain kuasi eksperimen. Tes tertulis diberikan sebelum dan sesudah perlakuan untuk mengukur kemajuan siswa.

Data yang terkumpul dianalisis dengan menggunakan uji-t independen dan uji-t sampel berpasangan. Hasil penelitian menunjukkan adanya peningkatan yang signifikan dalam kinerja menulis siswa yang diajar menggunakan mind mapping dengan group investigation, yang ditunjukkan dengan nilai p-value kurang dari 0,001. Di antara lima aspek menulis, mekanika menunjukkan peningkatan terbesar diikuti oleh penggunaan bahasa, organisasi, kosakata, dan konten. Temuan ini menunjukkan bahwa menggabungkan pemetaan pikiran dengan investigasi kelompok merupakan strategi yang efektif untuk meningkatkan kemampuan menulis siswa dan dapat dianggap sebagai teknik yang bermanfaat untuk mengajar menulis di kelas.

Kata kunci: Mind mapping, Group Investigation, prestasi menulis, strategi pengajaran

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Laksmi Dwi Intan

A Thesis

**Submitted in a Partial Fulfillment of
The Requirements for S-2 Degree**

in

**Language and Arts Education Department
Teacher Training and Education Faculty**



**MASTER IN ENGLISH LANGUAGE TEACHING STUDY PROGRAM
LANGUAGE AND ARTS EDUCATION DEPARTMENT
TEACHER TRAINING AND EDUCATION FACULTY
LAMPUNG UNIVERSITY**

2025

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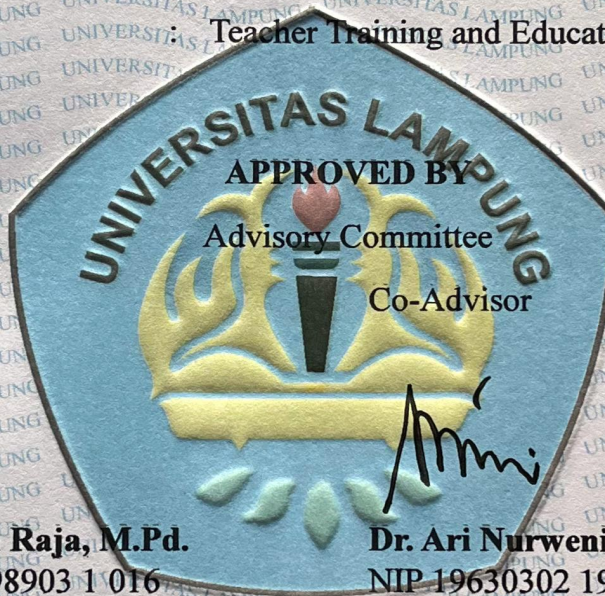
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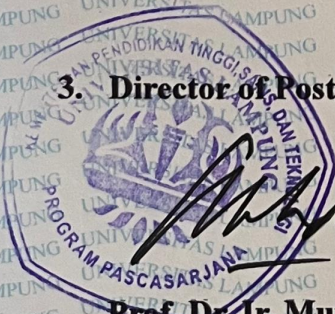
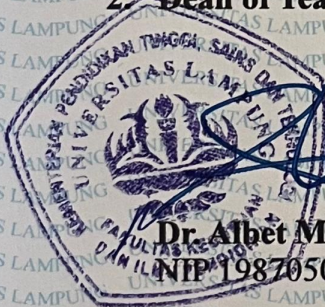
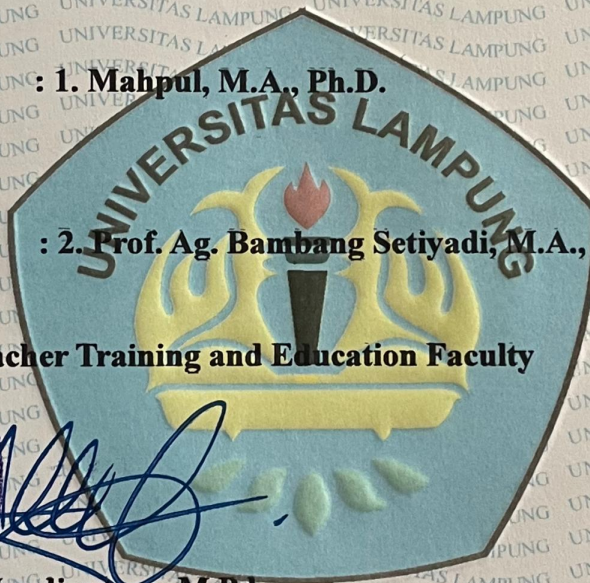
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LEMBAR PERNYATAAN

Dengan ini saya menyatakan dengan sebenarnya bahwa:

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MOTTO

"It always seems impossible until it's done."

(Nelson Mandela)

DEDICATION

With love and appreciation, this thesis is dedicated to:

My beloved family, who always remember me in their prayers and surround me with boundless love and gentle encouragement through every step of this journey.

ACKNOWLEDGEMENTS

Alhamdulillahirobbil'alamiin, all praise is rendered only to the Almighty God, Allah Subhaanahu Wa Ta'ala, for His countless blessings so the author is able to finish her paper entitled "Integrating Think-Pair-Share with Outlining Strategy in Teaching Narrative Writing" as a partial fulfillment of the requirement for S-2 Degree in English Education Study Program, Teacher Training and Education Faculty in Lampung University.

Having done this work, the author realized that there are many individuals who gave a generous suggestion for finishing this paper; therefore, the author would like to express her sincere gratitude and respect to:

1. Prof. Dr. Patuan Raja, M.Pd., the first advisor, for his wisdom, patience, kindness, and thoughtful guidance throughout this research.
2. Dr. Ari Nurweni, M.A., the second advisor, for her sincere support, kind words, and constructive feedback that helped me stay on track and grow as a learner.
3. Mahpul, M.A. Ph.D., the first examiner, for his kindness, encouragement, evaluative feedback, and considerable contributions during seminars and the examination.
4. Prof. Ag. Bambang Setiyadi, M.A., Ph.D., as the second examiner, for his kindness, encouragement, invaluable comments, and suggestions.
5. Her parents (Drs. Azharuddin, M.M. and Dra. Resti Kurniawati) and siblings (Rachmat Adriansyah, S. I.P., and Nadia Silvia Oktaviani, S. T.P.), for their unconditional love, unwavering support, and endless prayers. They are the foundation of everything I have achieved, and this journey would not be possible without them.
6. The lecturers for sharing knowledge, experience, and spirit.

7. Her Sobat Magister: Yulinda Aulia Dahlin, Ervina Agustin, Tri Optaria, Rika Juma Virgosa, Nirmala Bestari, Mia Chairunnisa, Masita Eka Prastyawati, Putri Imaasari Isnaeni for the love, laughter, and relentless support since day one.
8. Her amazing peers in MPBI 2023 for the memorable experiences they shared together.

At the end, the author hopes that this paper can be beneficial for the readers and those who want to carry out this research further.

Bandar Lampung, July 2025

The Author,

Laksmi Dwi Intan

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I. INTRODUCTION

This chapter provides some information of the study. It conducts background, research questions, objectives, uses, scope, and definition of terms.

1.1 Background

Communication is not limited by the place and time because the development of technology has provided any online platforms for everyone to share their idea, thought, and feeling in written form. People cannot deliver their ideas on paper without having ability to write (Liunokas, 2020). When writing, a person should consider aspects of writing to create meaningful written product. Through writing, people can present their insight about particular topics and respond to either transactional or interactional texts. They will arrange the words that consist of information to the addressee. Writing includes several aspects, such as content, language use or grammar, vocabulary, organization, and mechanics in an even-handed portion (Jacobs, et al, 1981). Therefore, writing has an important role in several fields, including education.

Writing in the twenty-first century is crucial for students. Beside offline meeting, communication between teacher and students or students and students are

provided through digital-based technologies such as smartphone with several applications which make teachers and students should be digitally literate (Eryansyah, Erlina, Fiftinova, and Nurweni, 2019). Moreover, the goal of education and learning in the twenty-first century is to develop students' competence in content knowledge, life skill, literacy, and technology uses (Chu, Reynolds, Tavares, Notari, and Lee, 2017). Writing can be a tool to contribute in those competencies, especially in content knowledge and literacy. Ilyosovna, (2020) says that English is the first language that is the most widely used on the internet. They read and write article, news and blog for various purposes, such as entertaining and commercial. Align with the role of English, the elaboration of writing skill is needed to get a deep understanding of the topics, especially for academic purposes.

Furthermore, among skills in English, writing is regarded as the most difficult skill for foreign language learner to be mastered (Ceylan, 2019). It is because the students must transcribe their thoughts into meaningful sentences that are grammatically correct at the same time. This is supported by Heaton (1991), where producing ideas into words, sentences, paragraphs, and compositions are difficult for learners. Constructing sentence is a linguistically demanding task and thus students must be able to use the knowledge of syntax to generate texts that convey their intended meaning. The process of writing involves skills such as arranging and developing the idea, selecting a suitable vocabulary to decrease the level of ambiguity, and setting the idea with accurate grammatical devices to elaborate the idea (Jong and Kim Hua, 2021).

Tseng (2019) says that high school students in foreign language will be taught to write paragraph or essay. At this stage, the students are expected to produce any types of written text, such as descriptive, narrative, recount, procedure, and report text that will help them in academic purpose and professional context. However, the students in EFL countries face challenges in composing texts. Shirejini and Derakhshan, (2020) explain that the EFL students are incapable to express their intention in a clear, correct, and comprehensible manner in written form. One of the reasons because writing needs high degree of organization in developing idea and information.

In Indonesia, Alisha, Safitri, Santoso, and Siliwangi (2019) mention that students feel difficult when they have to write down their ideas or experiences because the students rarely write in English which make them confused to determine what to write, choose suitable words, develop and organize the ideas. It means the students should be given a chance to explore various topics in different contexts to get experience. Flora and Raja (2019) point out that language is comprehended through social and context dependent. It will give them the background of knowledge to write. Hence, new information from the findings in social and different contexts will strengthen background knowledge of the topic, which will help students to plan and write their ideas.

There are several reasons that have resulted students' low ability in writing, one of which is the difficulty in formulating a topic, creating a topic sentence, and

identifying relevant supporting sentences to elaborate the idea. The students have problem in determining what should be developed, especially when they have to write in paragraphs (Tarin and Yawiloeng, 2022; Yamin, 2019). Moreover, Untoro (2016) points out that activity in teaching and learning in writing needs more attention because the teaching process is frequently delivered in a monotonous way through textbook use and teacher explanations. This kind of activities make it difficult for students to develop their ideas, as it focuses on the final result instead of guiding them through the actual process of writing. Therefore, teachers should look up the kinds of methods, strategies, or media to attract students' interest in learning writing.

Teacher, as one of stakeholders in learning should find out the solution. The use of suitable methods, techniques, or media will help students to overcome their problem in writing. Related to the students' difficulties in writing, the concept of Mind mapping is suitable with the problems previously mentioned. Mind mapping is a technique that sets out concept and puts them into categorization. It can be a visual tool used in teaching that allows students to take notes, organize their thoughts, generate ideas, and develop concepts (Shi, Yang, Dou, and Zeng, 2023). Making a mind map is a strategy for note-making before writing; in other words, scribbling down ideas about a topic, developing those ideas, and associating it in mind. It helps students to decide what they will write by making a mind map to begin writing assignments.

Mind mapping has effective result in improving students' writing skill through earlier research. Fu, Lin, Hwang, and Zhang (2019) show the result of their research about using Mind mapping-based contextual gaming approach on EFL students' writing performance. The result shows better writing performance in the aspects of fluency and elaboration. Yunus and Chien (2016) conduct the research about students' perception on the use of Mind mapping in Malaysian English test. The result shows students have positive perception toward Mind mapping because it helps the students in planning their writing, strengthening the concept to understand the topic, and promoting creativity in writing. Moreover, Saad and AL-Omari (2014) conduct a study to know the effectiveness of Mind mapping in developing writing achievement. The result confirms that Mind mapping improves students' writing achievement, triggers their prior knowledge to generate idea, activates the schema of organizing, and develops content to have a quality in writing.

In addition, Mind mapping facilitates students' performance in descriptive writing by improving their ability to organize, sequence, and develop ideas. It also fosters positive attitudes toward writing, making it easier and more enjoyable (Tarin and Yawiloeng, 2022). Mind mapping also shows students gains in vocabulary recall and retention, learning motivation, and WTC (Feng et al., 2023). Al-Inbari, Al-wasy, Mahdi, Nofaie (2023) also find mind mapping technique leads to the generation of new ideas, significantly enhancing their writing suggest that mind maps should not be considered only as a pre-writing strategy, but rather as a while-writing strategy.

Mind mapping strategy is found to be useful for students to record, connect, and develop detailed ideas. Moreover, the previous studies related to Mind mapping always show the advantages in prewriting, that is students organize and structure ideas in planning. Al- Zyoud, Ayed, Al Jamal, and Rahman (2017) also suggest to integrate Mind mapping into EFL learning because the finding of their study shows that Mind mapping has significant difference on students' writing performance. To sum up, Mind mapping is regarded as helpful strategy to create better essay and understand the concept.

Based on the previous studies, mind mapping has been used by several researchers to support students in writing activities. The results consistently show that mind mapping assists students in generating and organizing ideas, expanding their vocabulary, enhancing critical thinking, and encouraging creativity. While mind mapping effectively supports the development content, organization, and vocabulary, it provides limited assistance in improving other important aspects of writing, such as language use and mechanics. This limitation exists because mind mapping does not include a structured procedure that guides students in applying writing rules such as punctuation and grammar. It is necessary to combine mind mapping with another method that can help students strengthen these areas and improve the overall quality of their writing. Related to these shortcomings, group investigation can be a solution offered to overcome the aspects of writing that have not been covered by Mind mapping.

Dishon and O'Leary (1948) explain that cooperative learning is a learning model where students in a group should get involved to achieve goals. They will learn the material and complete the task together to solve the problem with minimal assistance of the teacher. Furthermore, the students also learn social skill through the interaction among the group members which is beneficial to tolerate and value individual differences. Based on the issues, the researcher offers group investigation model inspired by cooperative learning as one way to create a competitive and motivational learning process to students' achievement in writing.

Group investigation (GI) is one of ways to improve writing skill. According to Sharan and Sharan (1992), Group investigation is a method where students are included into small group to examine, experience, and comprehend the topic. Group investigation involves in all writing stages. Student with their friends will be divided into several groups to work together based on their preferred topic. It is beneficial for students to collaborate because students will work actively to determine the goals and its process. Through the process, students will follow several steps with the group members in order to find out the solution. They will form into small groups, plan, investigate, synthesize the group members' findings, and make a presentation to the entire class. Different interactions between teams, group roles, norms, appropriateness, workplace behaviour, status, and cooperation are brought by the combination of heterogeneous members in a group. These are the layout and structure of group cooperative learning, with an emphasis on student involvement and activities (Yuliarsih and Anjarani, 2021). Therefore, the use of group investigation is a good beginning to enhance students' writing skill.

Group investigation has effective result in improving students' writing skill through earlier research. Students feel interested in improving their writing skill and participate actively (Ayu, Supiah, Rasuan, and Rahmaniyyar, 2022). It is because group investigation develops the skills of negotiation and cooperation which ask them to be responsible on particular topic and share what they got to their group members. Similarly, Yuliarsih and Anjarani (2021) discover that group investigation makes an improvement of writing processes which is beneficial to master five aspects of writing. From the previous research, group investigation gives positive impacts to improve writing skill.

Several researchers also combine group investigation with other media or techniques, such as Mulyani, Bakthawar, and Munir (2023) integrate Group investigation and local wisdom that the result shows there is a significant difference of students' writing skill before and after the treatment. It is effective to discover various local wisdom that make students feel confident to write. Listiana, Raharjo, and Hamdani (2020) combine Group investigation with Think Talk Write to enhance self-regulation skill. The result shows the students' self-regulation skills have improved after the implementation of GITTW because every stage reflects independent habit. The previous research of group investigation assists the drawback suffered in writing.

Based on the previous research, there has been found that mind mapping has advantages and disadvantages in teaching writing. Thus, mind mapping with

group investigation are expected to be helpful in improving students' writing achievement especially in five aspects of writing. Many previous studies have been conducted to explore mind mapping, but the studies that overcome the drawbacks of mind mapping by integrating group investigation (GI) with mind mapping to master five aspects of writing is still rare.

1.2 Research Questions

Based on the background, the research problems are formulated as follows:

1. Is there any significant improvement of students' writing achievement after the students are taught by using mind mapping with group investigation?
2. Is there any significant difference of students' writing achievement of mind mapping with group investigation than those who are taught by using the original mind mapping?
3. Which aspect of writing improves significantly after the students are taught by using mind mapping with group investigation?

1.3 Objectives

Based on the problems and research questions, there are several purposes of the research as follows.

1. To find out whether there is a significant improvement of students' writing achievement after the students are taught by using Group investigation with Mind mapping.

2. To find out whether there is a significant difference of students' writing achievement of group investigation with mind mapping than those who are taught by using the original mind mapping.
3. To find out which writing aspect improves significantly after the students are taught using mind mapping with group investigation.

1.4 Uses

The research is expected to give contribution in the language teaching theoretically and practically.

1. Theoretically, hopefully this research can be used by other researchers as a reference to conduct similar research because it provides additional knowledge in understanding mind mapping and group investigation. Further, the conclusion of this research may enhance the previous study.
2. Practically, this research is expected that this research will be beneficial in providing teachers with alternative technique, which will enhance students' writing achievement while easing the learning process.

1.5 Scope

This research focused on the implementation of mind mapping with group investigation and the original mind mapping in teaching writing for Senior High School in eleventh grader. Narrative text was chosen because it is one of texts that should be mastered by eleventh grader. Furthermore, this research concerned with the improvement of students' writing achievement and found what aspect of writing that improved the most after the implementation of integrating mind

mapping (MM) with group investigation (GI) compared with the original mind mapping.

The original mind mapping allowed students to develop the topics, organize the ideas, and enrich vocabulary in the form of writing. Meanwhile, integrating mind mapping with group investigation provided the process of conducting group investigation to master the five aspects of writing. Moreover, the written texts produced by students are assessed by using five components of writing from Jacobs et al (1981): content, language use or grammar, vocabulary, organization, and mechanics in students' writing.

1.6 Definition of Terms

Some terms are defined to clarify the variables. Those are defined as follows:

- **Writing**

Writing is a product from the ability to convert representation of linguistics into written symbols and skill to generate idea

- **Group investigation**

Investigation as a method for classroom instruction in which students work collaboratively in small groups to examine, experience, and understand their topic of study

- **Mind Mapping**

Mind mapping is a technique that associates concepts, thoughts, and information through words and non-linear lines that create connection among them.

- Mind Mapping with Group Investigation

Mind mapping with group investigation is a collaborative method where students collaborate under the direction of facilitator to brainstorm and generate ideas into visual representation, explore the topic, and generate the result of their investigation. They collaborate their roles, effort, and feedback to produce a coherent and critical writing product.

- Writing Achievement

Writing achievement is competences of students to use component of writing including content, organization, vocabulary, language in use, and mechanic

- Narrative Text

Narrative text is sequence of story which explains the plot to entertain and inform the reader or listener

This chapter has explained the background of the problems, questions, objectives, uses, scope, and definitions of related terms. These terms are discussed in the literature review.

II. LITERATURE REVIEW

This chapter discusses theories that are relevant to the research. It consists of concept of writing, aspects of writing, teaching writing, narrative text, mind mapping, steps of mind mapping, and group investigation.

2.1 Concept of Writing

Writing is necessary for human to develop their ability, so they can transfer the information. Different from other skills in English, the process of acquiring writing skill needs to be learned. As Harmer (2004) explains that writing is a process of someone to put their idea through several stages into written form in order to achieve the goals. Moreover, the process of writing is influenced by the topics, types of writing, and media. It means during the process, the writer should consider aspects of writing before arranging their idea so the message can be well understood.

In addition, Brown (2001) defines writing is a compilation of several processes, such as thinking, drafting, and revising procedures that need skill to develop it such how to generate ideas, organize coherently, use discourse markers and rhetorical conventions coherently, revise text for clearer meaning and edit text for

appropriate grammar then produce a final writing product. He also states in process of writing, final writing product will be measured by several criteria, such as content, organization, vocabulary use, grammatical use, and mechanics.

Furthermore, Nation (2009) explains writing as an activity that can be prepared by three skills, including speaking, listening, and reading to help writers get ready for writing. Words that have been utilized receptively may become productive with this preparation. The information related to the topic that has been collected by the writers will provide prior knowledge to encourage a good support for writing.

Based on the above explanation of writing, it can be concluded that writing is an activity that conduct through several processes to develop a specific topic. Beside the process, the writers should have knowledge and skill in writing aspect to create a good writing product and be easy to understand to intended readers.

2.2 Aspects of Writing

In producing writing, writers have to take into account about how to develop idea, organize coherently, use discourse markers, and put the rhetorical convention cohesively, revise the text to get clearer meaning, and check its grammar to make a final product. Based on that, writing needs to consider several aspects to create good writing. According to Jacobs, et al. (1981), there are several aspects of writing, as follows:

1. Content

Content refers to knowledge of writers toward the topic. It covers gathering ideas that should unify and complete. Unify means each paragraph provides one main idea and supporting sentences support the main idea. Meanwhile, complete means development of topic should be well developed so the material is clear and readers will understand easily.

2. Organization

Organization is how ideas are arranged. The movement of sentences must be logical which means the idea and sentence are in well structured and logically ordered. Further, it should be smooth to the next sentence to avoid the sudden jumps so there will be connected one each other.

3. Vocabulary

Vocabulary is the ability to choose words that is suitable for the topic. The words choice should represent the idea of the writers. Additionally, the diction is considered to the use of language, especially when it is used for either formal or informal writing.

4. Language use

Language use refers to the use of grammatical form to generate idea structurally. Grammar focuses on correct sentence structure and construction, such as subject-verb agreement, tense, article and preposition. If the

grammatical rules and syntactical form are taken into account, the idea will be more organized.

5. Mechanics

In the aspect of mechanics, it focuses on the use of capital letter, spelling, and punctuation in writing. Every aspect has its function which is helpful to writers and readers in conveying and understanding the idea.

Based on the explanation, aspects of writing help people to communicate their ideas to various readers in clear and effective manner, convey their ideas, thoughts, and feeling systematically and well organized. Therefore, these are important when people want to create a good writing product.

2.3 Teaching Writing

In teaching writing, teachers have to guide the students to improve their writing skill in order to make a good writing product. It highlights the process of writing to create product in written forms. Brown (2001) states that writing is different with other skills in English because writing cannot be done alone, it needs to be learned by the students from the teachers. He explains that people are naturally always learn to walk or talk, meanwhile writing is similar with swimming that people should be taught to get specific learned behaviour. Furthermore, teaching writing concerns with students as a language creator. Students will focus on content, message, and internal motivation while writing.

The teachers must have solid knowledge to support students' writing development. The knowledge about structure of English and arranged word in sentences will assist students to elaborate their idea in writing (Fillmore, 2000). Moreover, teachers should give feedback on students' writing to polish their writing product. In order to give good feedback, it is necessary for teachers to understand English structure, discuss structural features of written language with their students, and explicitly teach them how to write effectively. Therefore, teachers need to consider appropriate method, technique and media.

In order to assist students in their writing, teachers have to understand the challenges faced by students and find out the solution. Therefore, in teaching writing, teachers should be a good facilitator for students. The efforts are intended to help students overcoming problems and enhancing their writing skill. Harmer (2004) states four fundamental writing stages that focus on the writing process. There are planning, drafting, editing (reflecting and revising), and final version (publishing). Those stages are described as follows:

1. Planning

In planning section, the writers create a plan about what to write. It involves elaboration notes where it the source may come from writer's experience. There are three issues in the planning process. The first, consider the aims of writing since the text will influence others not only the writers but also the readers. Second, think about the audience of the text, including how to arrange the paragraphs, language choice, and formal or informal words. Third, take into

account the content structure, such as how to arrange the facts, ideas, and arguments that will be decided to include.

2. Drafting

Drafting is the first version of a piece of writing such as paragraph and essay. In this stage, writers serve the first draft that will be developed later. As the writing process proceeds into editing, writers focus on writing flow.

3. Editing

In editing section, the writers reread their drafts that have been written to select the suitable words and complete the unclear information. Then, writers arrange the paragraph or create a new introduction. The editing stages can be helped by other readers by giving comment and suggestion. The more skilled people in writing, the more they give detailed feedback, such as grammatical accuracy and the individual word chosen.

4. Final Version/Publishing

In final section, writers have done several previous stages where the result looks different from the first plan. It is because the writers have edited the draft to produce the final version. However, the writing product is ready to be shared to intended readers.

From the explanations above, it can be concluded that writing process is important to writers in order to conduct final writing product. Teachers should

explain that writing is a result of the process, not a finished written product. It provides students' experience as a writer. Thus, to create a good writing, it is necessary for students to apply the stages in writing.

2.4 Narrative Text

Text that tells imaginative story to entertain people called narrative text. Narrative text is a kind of texts that commonly appear in the form of written and spoken, such as in novel, story telling, and in the movie. In narrative text, the generic structures are divided into orientation, complication, resolution. According to Anderson (1977), narrative text is sequence of story which explains the plot to entertain and inform the reader or listener. It can be seen that narrative text concerns with story that consists of sequence of events to entertain audiences. It usually starts with problems which move to the climax and then turn into solution to solve the problem. It tells a story about series of events of actions.

Narrative stories can be fiction or nonfiction. Factual narrative text is a kind of narrative which is related to the real story, for example someone's adventures and historical narrative. While, non-factual narrative text is a kind of story which is unreal for instance, myth, fairytale, legend, and fable. As another word, narrative text is compilation of sequel events that starts with introducing characters, bringing the plot with problems and finishing it through the solution to entertain audiences.

Narrative has several language features, as follows:

1. The text is written in the past tense (Subject+Verb2+Object)
2. Verb that refers what the characters do in the story, such as: went, played, felt.
3. Indicate time signals to link the events, such as: at first, before, after that, then, finally.
4. Use descriptive words to build up and develop the story to create readers' imagination, such as big house.
5. Identify specific character. It usually forms as human but sometimes animals with human character.
6. Can be written in the first person, such as I and we or third person, such as she, he, they.

Based on the explanation above, language features of narrative text are beneficial to understand the context, build up a full picture of the object, and give connection to the reader.

Dewerianka (1990) explains narrative text has three generic structures, as follows:

1. Orientation

Orientation is the part to introduce the main and minor characters, the time and the places. It gives background explanation to the story so it appears in the beginning.

2. Complication

Complication is the part to serve the events including characters that face conflict or problem. It attracts tension and makes the story to be more attractive.

3. Resolution

Resolution is the ending part of the story. After raising the conflict, it will be followed by the solution of the problem. The resolution can be either happy or sad ending.

In conclusion, generic structure of narrative text will make the story line becomes more coherent. Furthermore, it will make the students feel easier to write, and for readers, it will assist them understanding the plot and intended meaning of the story.

Table 2.1 The example of narrative text in Dewerianka (1990)

Text Organisation	Narrative text
Orientation	John slumped in the beanbag. His arms crossed and his face with gloomy frown. He was a new kid in town but no-one knew he was even there. John wasn't the type of person you could have fun with. He didn't like anybody and they didn't like him. All day he sat hunched in the beanbag staring blankly out the window.
Complication	Through the window he caught a glimpse of a gigantic hollow tree in a vacant lot. The tree seemed to beckon him. He stood slowly up as if he was in a trance, then started to walk towards the tree. Its branches were scraggly and tough, its roots dug into the ground like claws. The tree had thorns all over it and vines hung around it. John tried to turn away but he couldn't. a mysterious force pulling him into the hollow.
Resolution	John never reappeared... but no-one noticed or cared.

According to the explanation above, through narrative text, readers will make findings, connect the line stories, look how authors draw the characters, understand the structure, and language feature of narrative which is beneficial for students to make them aware of creating their own stories.

2.5 Mind Mapping

Mind mapping is frequently used by people in the teaching learning process. It helps students to establish a conceptual understanding of topic. Mind mapping is a technique developed by Buzan. According to Buzan (1993), Mind mapping is a technique that associates concepts, thoughts, and information through words and non-linear lines that create connection among them. It assists people to understand and remember the information by focusing on the key ideas that are written down then, looking for branches out and connections between the ideas. In addition, Shi et al., (2023) explains mind mapping can be a visual tool used in teaching that allows students to take notes, organize their thoughts, generate ideas, and develop concepts. It is beneficial for students in pre-writing since they can brainstorm to activate their prior knowledge then elaborate the ideas and give overview to add new information of the topic before the students move into writing.

Moreover, Buzan (1993) mentions that Mind mapping holds several main principles, as follows:

1. Use Emphasis

Emphasis is important for improving memory and creativity. It starts with a central idea that usually appears in the form of image or word on the center of

the page. Moreover, the images have two colours or more and different size of printing can be used wherever it is possible to make it attractive. These following techniques can be used to emphasize the ideas.

2. Use Association

Association is important to take the idea into depth. Mind mapping uses arrow to make connection. Mind mapping generates connection between ideas by using lines. By using these connectors, it makes clearer how several ideas are related to one another. It can be uni-directional, multi-headed, different size. Colour, code, and symbol, such as triangle, tick, or they can elaborate by themselves, either individual or group.

3. Be Clear

A clear mind map can be easy for students to elaborate the ideas. It usually uses one key word or phrase per line. The association of the words through connecting lines will create a neat arrangement which improves clarity and helps to memorize. Each idea sprouts a further set of ideas and is connected by line. All the ideas from the most important until lesser important are shown in the branches.

4. Hierarchy

Hierarchy is crucial in mind mapping because it is the basic ordering idea. A concept extends to wide range, such as car turns into types until the example of subtopic. Numbering the order of ideas in presentation or essay also becomes the options in order to make a chronological sequence.

Based on the explanation of the principles, mind mapping emphasizes the importance of visual and structural techniques to improve organization, creativity, memory, and clarity. It also considers various angles to make a logic association. It also considers various angles to make a logic association. According to Buzan (2005), there are seven stages to create mind mapping as follows:

1. Put the idea in the centre then turns to sideways. The placement is designed to expand the idea freely to any directions. It will give maximum space to elaborate the radiant thinking.
2. Use picture for central idea. It is because picture will make mind mapping is more interesting, help to concentrate, and enhance the understanding of the concept.
3. Use colours in mind mapping to make brain as excited as picture gives an energy to activate creative thinking.
4. Connect central image to branches because the arrangement of the branches will continue to create association. If brain connects the branches, it will help the students to understand and remember the idea easily.
5. Make curved line than straight line because straight line is considered to be boring. Meanwhile, curved line will attract eyes.
6. Use one key word for every line. It is because a word can give flexibility to associate the ideas.
7. Use picture because picture can represent more than one meaning than word.

According to the stages, mind mapping is a simple technique that upholds creativity and critical thinking. Besides, it also helps the students to memorize the idea and strengthen the concept. Through mind mapping, students can assist students to elaborate and organize ideas into good sentences which is helpful to make a good plan in writing. Students will also be pleased with the learning since there are colourful pictures to attract students' attention. Therefore, mind mapping is suitable to learn writing skill.

The aims of this technique are to assist students in pre-writing and elaborate the idea since it develops students' critical thinking and creativity. Previous research on the impacts of a mind mapping based contextual gaming approach on EFL students' writing performance, learning perceptions and generative uses in an English course (Fu et al., 2019) has revealed this. It shows that there is a significant result on fluency and elaboration because mind mapping helps students to produce positive thoughts and feelings, generate diverse ideas, and express actions or intended actions. Students will have guidance to elaborate their ideas and help them writing. Therefore, mind mapping is beneficial to improve students' writing achievement.

2.6 Teaching Writing through Mind Mapping

Writing is necessary for students since it is always included in the syllabus. On the other side, writing is one of English skills that is considered as the most difficult skill to acquire. It is because students should have knowledge about the topic and skill to write. They have to put their idea and set it chronologically and

structurally correct to create a meaningful writing. Therefore, conducting mind mapping is chosen to improve students' writing skill.

Mind mapping is a technique that writes down and visualizes the ideas from a central theme to generate the connection between them which help the student to guide them in writing. In addition, mind mapping facilitated EFL students' performance in descriptive writing by improving their ability to organize, sequence, and develop ideas. It also fostered positive attitudes toward writing, making it easier and more enjoyable (Tarin and Yawiloeng, 2022). Mind mapping also shows students gains more vocabulary recall and retention, learning motivation, and WTC (Feng et al., 2023). Al-Inbari et al. (2023) also find mind mapping technique leads to the generation of new ideas, significantly enhancing their writing suggest that mind map is used during the learning process.

Mind mapping strategy is found to be useful for students to record, connect, and develop detailed ideas. Moreover, the previous studies related to mind mapping always show the advantages in prewriting, that is students organize and structure ideas in planning. Al- Zyoud, Ayed, Al Jamal, and Rahman (2017) also suggest to integrate mind mapping into EFL learning because the finding of their study shows that Mind mapping has significant difference on students' writing performance. Mind mapping is regarded as helpful strategy to create better essay and understand the concept.

In conclusion, mind mapping can enhance students' knowledge and ideas and elaborate more effectively on their writing content. It also increases their creativity and motivation toward writing. Therefore, teachers can use this technique during the planning, drafting, revising, and publishing in the writing process.

2.7 Cooperative Learning

Various ways are employed to increase students' engagement in learning. Kagan (2009) explains cooperative learning is a learning model where students are divided into small, diverse groups then work together to accomplish the same goal. They also share responsibility for each other in learning, so they will combine individual competence and social skill in the process of learning. Cooperation is the goal of the learning in cooperative learning, so the learning emphasizes collaboration, positive interdependent support, and active involvement in the activities. Moreover, Yildiz and Akdağ (2021) explain cooperative learning combines students in a small group to work together and support each other to understand the subject. It gives opportunity for students to explore, ask, apply, and evaluate their knowledge which improves their problem solving, critical thinking, and social skill. According to Johnson (1994), there are four basic principles in cooperative learning as follows:

1. Positive Interdependence

Positive interdependence is the foundation of cooperative learning. The students should understand their responsibility related to the task and support each other

to achieve the same goal. Through working together, students will learn to appreciate other's contribution and recognize that individual success links to group success.

2. Individual Accountability/ Personal Responsibility

Individual accountability is important in cooperative learning because every student should take a part of achieving the goal. Furthermore, the goal of cooperative group is to make every student is stronger. It means when the students do similar task, they can do it themselves.

3. Face to Face Promotive Interaction

In this principle, group members meet face to face because they need to do real work together. Promotive interaction will exist when the students try to help each other in both academic and as support system. It is cued by a student provides necessary assistance, such as exchange information, provide feedback, ask their conclusion and its reason, keep trying to motivated in order to achieve the goal. By interacting face to face, students enhance their social skills, build trust, and foster a positive learning environment.

4. Interpersonal and Small Group Skill

Small group and interpersonal skills are crucial for successful cooperative learning. Cooperative abilities including communication, problem-solving, and conflict resolution are presented and practiced by the students. Students who collaborate effectively will improve their capacity for active listening, clear

communication, and teamwork toward the same goal. Furthermore, these abilities are necessary for success in the workplace and in the classroom.

5. Group processing

group processing is a crucial part of cooperative learning that involves members of the group reflecting on their interaction and performance in order to enhance future cooperation. During the process, decisions are made regarding which behaviours to continue or change based on a discussion of the positive and negative actions of group members. It assists groups in recognizing and resolving problems, rewarding positive behaviour, and creating more effective collaboration strategies, all of which result in better learning outcomes and more powerful collaborative skill.

Based on the principles above, cooperative learning emphasizes small group to enhance every student's potential that foster academic, individual, and social skill. Furthermore, the principles of cooperative learning also reflect in writing stages.

Yusuf, Jusoh, and Yusuf. (2019) show students writing score has increased after being taught with cooperative learning. The idea of putting them into small group makes students confident to share idea with their peers as reflect in the process of planning. The students also take note for some important information before they move to writing stage. The idea of cooperation also appears in drafting stage since they will use the information to start the writing and give mutual support. The

result of their writing then will be discussed among the students to question and give feedback to revise before they publish it.

2.8 Group Investigation

Group investigation is a part of cooperative learning. It is developed by Yael Sharan and Shlomo Sharan in 1992. The students will have positive interdependence, such help their teams in the small group and individual responsibility to achieve particular goal. Sharan and Sharan (1992) define group investigation as a method for classroom instruction in which students work collaboratively in small groups to examine, experience, and understand their topic of study. According to group investigation method, successful learning results from the combination of organizational, social interactive, motivational, and cognitive aspects. Group investigation creates a situation that allows students to use their personal abilities combine with social environment in groups to bear on topics of study as they can use it in the real life.

In addition, Slavin (2008) states that group investigation relates to the activities of collecting, analyzing, and incorporating information in order to solve the problem. The information is gained from the inside or outside the classroom, such as books, internet or society. They will gather the data and insights related to the topic. The collected data will be analyzed to make a pattern or relationship. Then, they incorporate their findings to complete the task. Moreover, group investigation enhances social skill through social environment since they have to cooperate with other students during the process.

In group investigation, the students will combine to other students based on the topic that they considered as interesting. It means each group will contain members of different backgrounds, achievements, and genders to work together. According to Nasir, Gani, and Haqqini, (2019) the students will be divided into small group that consists of four to five people. Each group will choose the sub topic they want to discuss. After that, the students will start to set the plan and look up detail information about the topic from any sources. Then, all the data will be arranged and analysed by the students to make a conclusion. Furthermore, students will present the result and get evaluation to respect their effort. In terms of implementation, Sharan and Sharan (1992) explains that group investigation has six steps that students undergo, as follows:

1. Determine subtopics and organizes into research groups

The teacher introduces one main topic or problem. Students, then, suggest several subtopics by asking questions or giving opinion and organize them into categories. They continue by searching for the source materials such as books, articles, pictures, online resources, or by asking other people. Afterward, the students join the groups who are interested in the same topic.

2. Groups plan their investigations

Every member in each group cooperatively plans their investigation. Students determine what will be investigated and divide all group members by themselves to have equal role in carrying out the project, for instance one student will

scrutinize the first paragraph that focuses on a subtopic previously developed, while other students focus on different subtopics.

3. Groups carry out their investigations

Every group member collects, organizes, and analyzes the information from numerous resources. Then, the result of their findings will be reported to all members. They will discuss the work to exchange viewpoints and information, extend, clarify and merge their findings to have deep insight that leads to the conclusion.

4. Groups plan their presentations

After the students collected all the data, they identify the central message and plan to show their findings. Then, a group representative from each group discusses the final presentation to the class, such as time allocation and taking turn. However, all members in the group will take involved to present the result, so that every student contributes equally.

5. Groups make their presentations

The group presents the result of their investigation toward the topics to all class members. The other groups or viewers will pay attention, analyze, and evaluate the writing product based on the aspects of writing. Then, they will participate through asking questions of the presenter.

6. Teacher and students evaluate their projects

All students give feedback to other groups and tell their experiences about their own topic. After that, both teachers and students give evaluation, such as students' knowledge about the material, how deep the investigation process is carried out, and the students' experiences during the process.

Based on the steps above, Group investigation enhances academic research and social process. Students with their friends will cooperatively find the material that will be learnt through activities. Through investigation, the students will strengthen their analysis and construct the material deeper.

2.9 Teaching Writing Through Mind Mapping with Group Investigation

Mind mapping has been used in various teaching fields because of its benefits, including English. According to Buzan (2003) mind map is a creative note-taking technique to generate ideas structurally by connecting words, colours, lines, and pictures. This technique assists to remember, use time effectively, understand the topic deeper, and foster creativity. The visual appealing of mind mapping, such as colours, images, branching patterns improve the ability to memorize and recall the information. Additionally, mind mapping helps students save time during the planning stage of writing by organizing the ideas clearly. When the students use mind mapping to break down complex topics into smaller parts, they are able to understand the topics more deeply. Furthermore, the flexibility of generating the ideas fosters their imagination which makes writing more fun.

In the context of English language teaching, mind mapping is often used because it encourages the students to become active learners by gathering information, organizing ideas, and producing their own written text. In addition, mind mapping also helps students to develop creative and critical thinking (Luangkrajang, 2022). In writing skill, the use of Mind mapping is helpful to generate ideas which is easier to discover various perspectives. All the ideas will also be arranged hierarchically to ensure the flow is logically ordered, so that the students can create a meaningful writing product. It is explained that mind mapping helps students to organize their thoughts and develop new ideas that enhance writing skills (Al- Zyoud et al., 2017; Al-Inbari et al., 2023; Tarin and Yawiloeng, 2022). Moreover, Feng et al. (2023) explain that mind mapping increases vocabulary retention and learning motivation.

However, the implementation of mind mapping in the classroom has numerous shortcomings since mind mapping supports the development of vocabulary, content, and organization in writing. This technique assists students to brainstorm and arrange the ideas effectively. The previous research also does not explicitly mention that mind mapping addresses other aspects of writing, such as language use and mechanics which requires more focused instruction and practice. On the other side, mind mapping is still beneficial for improving overall quality of writing.

Learning is a process of combining prior and new knowledge to get a new skill through interaction in environment. The teacher may provide particular

environment for students, such as dividing students into small groups to create meaningful interaction. One of cooperative learning strategies is group investigation where the students work collaboratively in a small group to examine, experience, and understand their topic (Sharan and Sharan, 1992). This method provides collaborative learning which leads students to participate actively and be autonomous in the learning process. It is because the students with their group members will plan what to investigate, gather information, discuss and teach their team mates, organize and present the result of their findings.

Furthermore, group investigation method engages learners in activities that reflect organizational structure, social interaction, and cognitive processing throughout the learning process. It believes that students should be given a chance to seek out the information and connect it to their previous knowledge to have experience. These processes encourage students to think critically and freely discuss the ideas to make deep understanding on topics, especially when they want to conduct a writing product.

In line with the previous statement, Tan, Sharan, Lee (2010) also mention group investigation makes students be responsible for their work since they will have experience through the topic that affects students' intrinsic motivation to continue their studies. It is beneficial when the students conduct a writing. Through the processes of group investigation, the students have acquired the information that can be used to produce it in written form. The students will get different perspective from their peers and combine the result of their own investigation

without feeling nervous. The combination of the knowledge will motivate students to write, as they already have the information that can effectively support the construction of their writing.

Mind mapping is a technique that fosters left and right brains to help students organizing, structuring the ideas, understanding concepts and information in creative way which initialized by a central topic. This research will integrate the process of mind mapping with group investigation because mind mapping is incapable to cover all the process of writing. According to Oxford dictionary (2003), integrating means incorporating two or more things, so they gather as a whole. In this case, the integration should be done when the learning model does not work well for the students in the learning process.

2.11 Procedure Teaching Writing through Mind Mapping

Group investigation provides critical thinking and social experience. Students will be organized cooperatively through the problem or topic to investigate. The researcher will conduct theory from Harmer (2004) that has been modified with the principal of mind mapping, as follows:

1. Planning

- Teacher presents the picture to be discussed.
- Teacher describes the concept of mind mapping.
- Teacher explains the concept of narrative text and five aspects of writing.

- Teacher gives example of mind mapping and leads students to put the idea on the centre, add picture for central idea, use colours in their mind mapping, connect central theme to the branches in curved and straight line, use few words for every line.
- Students write how to develop mind mapping into sentence based on five aspects of writing.

2. Drafting

- The student singly writes a story into paragraphs by using mind map as their guideline based on five aspects of writing.

3. Editing

- Each Student does peer feedback.
- Teacher adds some feedback.

4. Final Version/Publishing

- Students revise it based on the feedback given.
- Students revise their writing and write the second draft.
- Student publishes their work

Through the procedure of mind mapping in teaching writing, the students can engage in comprehensive writing process, integrate previous and new, and improve students' critical thinking. In line with the procedure above, mind mapping will not only improve cognitive skill but also creativity.

2.12 The Procedures of Using Original Mind Mapping and Mind Mapping with Group Investigation in Teaching Writing

There is no specific model to teach writing through mind mapping. The teacher can arrange the learning activities in their own lesson plan according to the learning objectives. In this research, the teaching procedure for creating mind mapping was developed by Buzan (2005) and the steps used by Aprilia, Setiyadi, and Mahpul (2017). Moreover, Sharan and Sharan (1992) also mention fundamental steps of group investigation in general that consists of determining subtopics and organizing into research groups, planning investigation, carrying out investigation, planning presentation, presenting, and evaluating the projects. Therefore, the teacher can adapt the steps, particularly in teaching writing.

The procedure of mind mapping with group investigation is similar with the stages in original Mind mapping. However, there are differences in several stages because group investigation is inserted through the writing process. The followings are the additional steps of group investigation in mind mapping, as follows:

- Students are divided into small groups.
- Students divide their roles to decide and plan what they want to investigate.
- Students based on their roles search information from any sources.
- Students develop the paragraphs based on the information they got.
- Students with their group revise the work together
- Group presents their work

The additional steps of group investigation are inserted in writing process based on Harmer (2004) to overcome the drawbacks in Mind mapping. Through the process, the students can maximize the five aspects of writing and create their writing. To be more specified, the following table provides the contrast between the original Group investigation and Group investigation with Mind mapping.

Table 2.2 Procedures of MM and MMGI

Procedures of Mind Mapping	Procedures of Group Investigation	Procedures of Mind Mapping with Group Investigation
Planning 1. Teacher presents the picture to be discussed. 2. Teacher describes the concept of mind mapping. 3. Teacher explains the concept of narrative text and five aspects of writing. 4. Teacher gives example of mind mapping and leads students to put the idea on the center, add picture for central idea, use colours in their mind mapping, connect central theme to the branches in curved and straight line, use few words for every line. 5. Students write how to develop mind mapping into a paragraph based on five aspects of writing.	Planning 1. Teacher presents the picture, topic, or problem to ask students' opinion. (stage 1) 2. Teacher explains the concept of narrative text and five aspects of writing.	Planning 1. Teacher presents the picture, topic, or problem to ask students' opinion. (stage 1) 2. Teacher describes the concept of mind mapping. 3. Teacher explains the concept of narrative text and five aspects of writing. 4. Teacher gives example of mind mapping and leads students to put the idea on the center, add picture for central idea, use colours in their mind mapping, connect central theme to the branches in curved and straight line, use few words for every line. 5. Students write how to develop mind mapping into a paragraph based on five aspects of writing.

6. Each student is given different topic and develop it with mind mapping.	3. Students form groups of five based on common topics of interest. (stage 1) 4. Students with their group members develop the topic and write it into paragraphs. 5. Each student divides their roles and plan to investigate related to 5 aspects of writing. (stage 2) 6. Every student individually collects information from numerous sources based on their roles regarding the flow of mind mapping. (stage 3)	6. Students form groups of five based on common topics of interest. (stage 1) 7. Students with their group members develop the topic with mind mapping and write it into paragraphs. 8. Each student divides their roles and plan to investigate related to 5 aspects of writing. (stage 2) 9. Every student individually collects information from numerous sources based on their roles regarding the flow of mind mapping. (stage 3)
Drafting 1. The student singly writes a story based on his/her mind map as their guideline by considering five aspects of writing.	Drafting 1. Each member in the groups individually develops the paragraph based on five aspects of writing. (stage 4) 2. Students based on his/her roles combine five aspects into paragraphs. (stage 5)	Drafting 1. Each member in the groups individually develops the paragraph based on their mind mapping related to the roles in five aspects of writing. (stage 4) 2. Students based on his/her roles combine five aspects into paragraphs. (stage 5)
Editing 1. Students do peer feedback. 2. Teacher adds some feedback.	Editing 1. The members of groups discuss the writing to exchange viewpoints and information, extends and clarifies idea that leads to conclusion that concerns with content, organization, vocabulary, language use, and mechanic. (stage 6) 2. Teacher gives some feedback related to students' writing of five aspects	Editing 1. The members of groups discuss the writing to exchange viewpoints and information, extends and clarifies idea that leads to conclusion that concerns with content, organization, vocabulary, language use, and mechanic. (stage 6) 2. Teacher gives some feedback related to students' writing of five aspects

4.Final Revision/Publishing	4. Final Revision/ Publishing	4. Final Revision/ Publishing
1. Students revise the writing based on the feedback given. 2. Students write the second draft. 3. Student publishes their work	1. The result of the feedback is returned to every student in the group. Then, they revise it based on the feedback given. (stage 6). 2. Students write the third draft. 3. Student publishes their work	1.The result of the feedback is returned to every student in the group. Then, they revise it based on the feedback given. (stage 6). 2.Students write the third draft. 3.Student publishes their work

From the procedure above, it can be seen that group investigation works as a bridge to maximize the use of mind mapping during the process of teaching writing to improve students' writing achievement. The differences between procedures of mind mapping and MMGI are shown in the table. Teacher provides a picture to introduce the topic. Then, students will be asked to join the groups who have same topic. Meanwhile, in original mind mapping, the teacher will give directly different topic to every student individually. After that, both classes develop their ideas into mind map. The result of their mind map will be transferred into paragraphs by considering five aspects of writing. In the stage two, the students divide their role to investigate each writing aspect and plan what to investigate. This process makes students be responsible and focus to carry out their investigation. In addition, the student develops the paragraph based on the information they got. After that, all group members combine their writing which focuses on different aspects of writing into their next draft. After the writing ends, students and teacher will give feedback and evaluate the learning.

2.13 Advantages and Disadvantages of Mind Mapping with Group

Investigation in Teaching Writing

Every method or technique has its advantages and disadvantages. There are several advantages of integrating mind mapping with group investigation, as follows:

Advantages

These following are the advantages of group investigation with mind mapping:

1. It will improve all aspects of writing because mind mapping will strengthen content, organization, and vocabulary. Meanwhile, group investigation will complement the aspects of language use and mechanics.
2. The integration will promote critical thinking because the students create Mind mapping, then discuss and analyze before transforming it into written form.
3. The combination encourages long writing and extensive information since they explore the topic, generate the idea structurally, and write it in detailed structure.
4. It can improve the quality of the writing because mind mapping will stimulate students' creativity and critical thinking through the picture and connected lines. Additionally, group investigation will bring various perspectives, so the combination will integrate cognitive ability with imaginative visual can inspire new ideas.

In conclusion, integrating mind mapping with group investigation will promote numerous benefits, such as improve critical thinking, creativity, understand topic deeper, and help students in the process of writing.

Disadvantages

Integrating mind mapping with group investigation offers numerous benefits. However, there are several disadvantages of mind mapping with group investigation as follows:

1. It can be time consuming
2. Group dynamics will potentially create conflict between students.
3. Rely on one student that dominates the discussion.

Based on the explanation above, this research is expected to minimize the disadvantages of mind mapping with group investigation through realizing the potential problems above and maximize the strong points in the learning process.

2.14 Theoretical Assumption

As formulated in the literature above, writing is the activity to express one's concept or thought in the written form that takes several processes and aspects to make a good written product. It shows that teaching writing is important to guide students in the writing process. Besides instruction from teacher, there is a technique to develop the idea deeper to create meaningful understanding, such as mind mapping. Mind mapping is a technique that connects thought with visual tool to elaborate, memorize, and strengthen the concept through creative note-taking. Furthermore, mind mapping helps students brainstorm effectively by

creating connections between concepts and ideas to establish clear structure and coherence in writing, especially when they want to make a narrative text which needs imagination.

However, mind mapping cannot discover all five aspects of writing during the process of teaching learning. Instead, the result of previous research shows content, vocabulary, and organization increase through mind mapping. However, the point of language use and mechanics are not specifically mentioned during the research. Language use concerns with language structure, while mechanics deals with spelling, abbreviation, and punctuation. As a result, mind mapping brings out the gaps in students' overall writing achievement because there is not specific procedure to overcome the lack aspects of writing.

To address the drawbacks of mind mapping, there should be a method inserted to provide students in learning language use and mechanics. Cooperative learning can be beneficial since the students can work together, share the information, complete the tasks, understand, and apply five aspects of writing to create writing product. Group investigation is one of cooperative learning strategies that involves students explore, discuss, and improve students' ability in writing, such as language use and mechanics. Students can identify grammatical mistakes, share knowledge, and practice mechanical convention in particular contexts with the help of teacher and peers.

Therefore, this research combines mind mapping with group investigation to assist the development of vocabulary, language use, content, organization, and mechanics in teaching writing, so students will make a good final writing product and the teacher can facilitate the learning process.

2.15 Hypotheses

Based on the theoretical assumption above, two hypotheses are presented based on research questions in this research.

1. There is a significant improvement of students' writing achievement after the students are taught by using mind mapping with group investigation.
2. There is a significant difference of students' writing achievement of mind mapping with group investigation than those who are taught by using the original mind mapping.

The literature review of writing, aspects of writing, teaching writing, narrative text, cooperative learning, concept of mind mapping, teaching writing through mind mapping, group investigation, teaching writing through mind mapping with group investigation, the procedure of teaching writing through mind mapping with group investigation, advantages and disadvantages, theoretical assumption, and hypotheses. The following chapter will go into the methods of this research.

III. METHODS

Research methodology is important to sets up the study and achieves the goal. This chapter will concern about research design, variables, population and sample, research instrument, validity and reliability, data collecting technique, research procedure, data analysis, data treatment, and hypotheses testing.

3.1 Research Design

This research used quantitative approach and employed quasi-experimental design. For the first research question, paired sample t-test used to analyze the data gained, as it aims to investigate the improvement of students' writing achievement after being taught by using mind mapping with group investigation.

For the second research question, independent t-test was used to measure prior knowledge and post knowledge of students' writing achievement after the students were taught by using group investigation with mind mapping and the original group investigation as this research aimed to compare the result of experimental and control group. mind mapping with group investigation were conducted as experimental group. The original mind mapping was used as control group. On

the other side, the third question was analyzed descriptively considering the scoring criteria and the result from the first research question.

The research design formulated by Setiyadi (2018) is presented as follows:

G1: T1 X T2

G2: T1 O T2

Notes:

G1: Experimental group

G2: Control group

T1: Pretest

T2: Posttest

X: Treatment using integrating mind mapping with group investigation

O: Treatment using the original mind mapping

This researcher gave the pretest to find out students' ability in writing before the treatment was given to them. The students were given the posttest after getting the treatment to discover whether any improvement towards the method.

3.2 Variables

Variable is something that has influenced other variables. Variable is a group of people, behaviour and environments which have similar characteristics to differentiate one to another. This research had two variables, there were dependent and independent variable.

a. Dependent Variable

Dependent variable is influenced by independent variable. It is the product or effect of variables interaction in the research. Students' writing achievement was dependent variable in this research.

b. Independent Variable

Independent variable affects dependent variable. The first independent variable in this research was mind mapping with group investigation. The second variable was the original mind mapping.

According to the explanation above, there was a relation between independent and dependent variables. If one of variables was changed, then it influenced the result.

3.3 Population and Sample

A population is a group of individuals who has the same characteristic. The population of this research was vocational high school students with the major was accounting in Bandar Lampung in the academic year of 2024/2025. It was because accounting was prioritized to work after finishing the study students. The skills of writing, collaborating, communicating, investigating, organizing, and critical thinking that appear in mind mapping with group investigation assisted the students to prepare them in the work environment. The samples of the research were two classes of eleventh grade. In order to get the samples, this research used purposive sampling based on the English teacher's recommendation. The first class as experimental group was be taught by using mind mapping with group

investigation. Meanwhile, the second class as control group was be taught by using mind mapping.

3.4 Research Instrument

The use of instrument is to help students producing the data needed. This research used writing test as the instrument to acquire the data. There were two kinds of writing tests, named pretest and posttest to get the data. Pretest was administered at the first meeting before the students from both classes got the treatment to measure students' writing achievement before the treatment. Meanwhile, posttest was administered after both of experimental and control groups ended the lesson to measure students' writing achievement after the treatment.

3.5 Validity and Reliability

A good test should take into account that the instrument used is valid and reliable because it determines the conclusion that reflects the actual circumstances. Therefore, developing instrument should consider the aspects of validity and reliability.

3.5.1 Validity

Validity is the development of solid evidence to demonstrate that the test interpretation including scores about the concept or construct that the test is assumed to measure matches its purpose.

A. Content Validity

Content validity is important to determine the test is accurate to measure the aspects. Creswell (2012) says that content validity is extent to find out how far

the questions represent all the contents or skills that want to be measured. In this research, narrative writing test was conducted to students. The material was chosen from Kurikulum Merdeka in phase F for vocational high school eleventh-grade students, since one of the materials mentioned is to write fictional story. Then, the test was validated by English teacher in the school.

Table 3.1 Phase F

Elements of Writing – Presenting

Students independently write an extensive range of fictional and factual (nonfiction) text types, showing an awareness of purpose and audience. They plan, write, review and revise texts with some evidence of self-correction strategies in writing conventions. They express complex ideas and use a wide range of vocabulary and verb tenses in their writing. They present information using different modes of presentation in print and digital forms to suit different audiences and to achieve different purposes.

B. Construct Validity

Construct validity refers to how well an instrument measures the intended construct or concept. It investigates whether the instrument accurately reflects the construct or concept being measured. The scoring system will provide information about the students related their strength and weakness that is beneficial to measure students' writing achievement

The researcher assessed students' work by using analytical score from Jacobs, et al. (1981). There are five aspects in writing namely, content, organization, vocabulary, language use and mechanics.

Table 3.2 Scoring Rubric from Jacobs et al (1981)

Aspect of Writing	Score	Criteria
Content	27-30	Excellent to very good. Knowledgeable, substantive, thorough development of thesis, relevant to assigned topic.
	22-26	Good to Average. Some knowledge of subject, Adequate range, Limited development of thesis, mostly relevant to topic, but lacks in detail.
	17-21	Fair to Poor. Little substance, limited knowledge of subject, inadequate development of topic.
	13-16	Very Poor. Non-substantive, not pertinent, not enough to be evaluated.
Organization	18-20	Excellent to Very good. Well-organized, logical sequencing, cohesive, the ideas are clearly stated and supported.
	15-17	Good to Average. The sequence is logical yet incomplete, loosely organized but main ideas still stand out.
	10-14	Fair to Poor. The ideas are confusing and disconnected. Lacks of logical sequencing and development.
	7-9	Very Poor. No organization, does not communicate, and not enough to be evaluated.
Vocabulary	18-20	Excellent to Very good. Sophisticated range, effective word/ idiom choice and usage, word form mastery, appropriate register.
	15-17	Good to Average. Adequate range, occasional errors of word/ idiom choice and usage but meaning not obscured.
	10-14	Fair to Poor. Limited range, frequent errors of word/idiom choice and usage. Meaning confused and obscured
	7-9	Very Poor. Little knowledge of English vocabulary.
Language Use	22-25	Excellent to Very good. Almost no errors in of tense, number word order or function, agreement, preposition, pronouns, and etc. Effective complex construction
	18-21	Good to Average. Effective but simple construction, several errors of agreement, tense, preposition, pronouns, number word order or function.
	11-17	Fair to Poor. Many errors of tense, agreement, number word order or function, pronoun, and prepositions. Major problems in simple/complex construction.
	5-10	Very Poor. No mastery of sentence construction. Dominated by errors of tense, preposition, and etc. Not enough to be evaluated.

Mechanic	5	Excellent to Very good. Almost no errors in spelling, capitalization, punctuation, and paragraphing.
	4	Good to Average. Occasional errors in spelling, capitalization, punctuation, paragraphing but the meaning is not obscured.
	3	Fair to Poor. Frequent errors in spelling, capitalization, punctuation, paragraphing. The meaning is confusing and obscured.
	2	Very Poor. Dominated by errors in spelling, capitalization, punctuation, and paragraphing. Poor handwriting and not enough to be evaluated

Based on the table, content, organization, vocabulary, language use, and mechanic were analyzed. These aspects of writing were the guidelines to score students' writing.

3.5.2 Reliability

Reliability is to measure the consistency of an instrument. The scores are compared to see whether they are similar or not. The result is reliable if all raters gave similar result (Fink, 2010). To examine the consistency of the test, this research used inter-rater reliability which is two people examined individual's work. In this research, the researcher was the first rater and English teacher in SMKN4 Bandar Lampung was the second rater. The reliability of students' score was examined by using SPSS based on Jacobs et al (1981).

In this case, the coefficient of rank correlation was analyzed with the standard of reliability as follows:

1. 0.80000–1.0000: Very high reliability
2. 0.60000–0.7900: High reliability
3. 0.40000–0.5900: Average reliability
4. 0.20000–0.3900: Low reliability
5. 0.00000–0.1900: Very low reliability

Referred to the standard of reliability, the writing test is considered reliable if the test reaches the range of 0.60-0.79 which means high reliability. Furthermore, the correlation coefficient of the pretest in this research is presented below:

Table 3.3 Reliability of The Pretest

			RATER 1	RATER 2
Spearman's rho	RATER 1	Correlation Coefficient	1.000	.750**
		Sig. (2-tailed)		<.001
		N	34	34
	RATER 2	Correlation Coefficient	.750**	
		Sig. (2-tailed)	<.001	
		N	34	34

**Correlation is significant at the 0.01 level (2-tailed)

The table above shows that the correlation coefficient of the pretest is 0.750. Therefore, it can be concluded that the pretest used by students is indicated to have high reliability. Furthermore, the reliability coefficient of the posttest is shown in the following table.

Table 3.4 Reliability of the Posttest

			RATER 1	RATER 2
Spearman's rho	RATER 1	Correlation Coefficient	1.000	.755**
		Sig. (2-tailed)		<.001
		N	34	34
	RATER 2	Correlation Coefficient	.755**	
		Sig. (2-tailed)	<.001	
		N	34	34

**Correlation is significant at the 0.01 level (2-tailed)

The Spearman's rho correlation analysis indicated a significant relationship between the assessments of rater 1 and rater 2, with a correlation coefficient of 0.755 ($p < 0.001$). This result suggests a high level of consistency between the two raters in evaluating the same data. The significance at the 0.01 level (two-tailed) confirmed that this relationship reflects a consistent pattern of evaluation between the two raters.

3.6 Data Collecting Technique

Data are necessary in the research. In collecting data, the students were given the tests twice. The first test was pretest and the second was posttest after the students got the treatment.

1. Pretest

Pretest was given by the teacher before students having the treatment, so it was given at the first meeting. Pretest was conducted for experimental and control groups. This test aimed to measure students' prior knowledge before having treatment related to aspects of writing. In this part, the students created

narrative writing product that covered content, organization, vocabulary, language use, and mechanics.

2. Posttest

Posttest was administered by the teacher to experimental and control groups. They did the test same as in the pretest so, the students created narrative text. The result of writing test included several aspects in writing, such as content, organization, vocabulary, language use, and mechanics. Furthermore, the result of posttest was compared with the result of pretest to see the improvement of mind mapping with group investigation in improving students' writing achievement.

Based on the data collecting above, this research took the data through pretest and posttest of students' writing. These tests were used to measure the students' writing the students' writing achievement before and after the treatment.

3.7 Research Procedure

To conduct this research, this research followed several steps so that this research can be conducted sequentially. There were several procedures to collect the data, as followed:

1. Determining the Subject

The students of eleventh grade in SMKN 4 Bandar Lampung were the subject of this research. Additionally, the were two classes used during the learning process namely experimental and control class.

2. Administering the pre-test

The students of both classes were given a pretest at the beginning the research. Pretest was conducted to measure prior knowledge of students before giving treatment to them. The students were asked to choose one topic and write narrative text.

3. Conducting treatment

This research conducted two different treatments. The first treatment was integrating mind mapping with group investigation for the experimental group. The second treatment is using original mind mapping for the control group. The treatment was implemented for three times per each group. In the first meeting, the pretest was administered in the experimental and control class by providing some instructions and a brief overview to the students before the students produced the text. The students were asked to compose narrative text by choosing one of six topics that was provided, including the folklores in Indonesia and foreign countries. Moreover, the aspects of writing were inserted in the direction to ensure that the students paid attention to the writing aspects. Before writing, the students were suggested to create an outline to organize their ideas effectively.

In the three meetings of the treatments, the students were taught by using mind mapping for the control class while mind mapping with group investigation for the experimental class in the learning process. The teacher explained the material about narrative text by bridging their prior knowledge with some questions. After that, the elements of narrative text such as purpose, generic structure, and language feature were explained. Moreover, the teacher also gave an explanation

about five aspects of writing. The material was delivered using various media such as power point, picture, and whiteboard.

Besides that, the teacher showed different examples of narrative text in every meeting in the form of videos. Initially, the researcher planned to introduce the story through picture. However, during the implementation, it was found that many students were unfamiliar with the story which made it difficult for them to understand the topic. Therefore, the researcher decided to use a short video of the story. By watching the same video, the students could build similar perceptions that helped them understand the storyline.

In both classes, the students with the teacher collaboratively created a mind map based on the video presented to reinforce their understanding. The teacher guided them to transform the mind map based on five aspects of writing, while considering key elements of narrative text. Furthermore, the representatives of students were asked to develop the sentences into a well-structured paragraph. In the control class, the activity was continued by giving students two different stories, each story was followed by a series of sequential pictures to assist them in developing and organizing the story. Every student chose one story and created mind map included illustrations and brief description to outline key elements of the narrative. After completing the mind map, they developed it into a clearly structured narrative text.

In the experimental class, the students were divided into several groups which consisted of five students. The number of students was divided based on five aspects of writing and each student in the group was assigned a specific role. The

group members actively discussed the story, analysing the key elements, and brainstorming ideas. Through the discussion, they developed the mind map which included illustration and the points related to the narrative structure. Once the mind map finished, the students converted their outline into coherent narrative text together. The elements of narrative such as characters, plot, and setting were written in detail. During this phase, each student contributed to develop the writing according to their role. For instance, the student who was responsible for content made sure that the plot of story was logic, in organization focused on structuring the paragraphs became coherent and cohesion, in vocabulary enriched the text with suitable word choices, in grammar refined the sentence structure, and in mechanics reviewed spelling, punctuation, and formatting. After each student developed the paragraphs, all the group members reviewed the whole text to ensure that five aspects of writing had been integrated.

Both in the experimental and control classes, their stories were illustrated by using Canva to visualize their narrative story with brief caption. While, in control class, student individually created the illustration. When the illustration was finished, the students uploaded their work to Instagram which followed by a caption that represented the concise summary of the story. The other students also gave feedback to other students through comment column.

4. Administering the posttest

After the researcher gave treatment to experimental and control group, the students were given posttest to measure their improvement in writing. The task was the same as pretest that was to write narrative text. The students were

instructed to write a narrative text based on the topic chose. They could choose the same or different topic from their pretest.

5. Analyzing the test result

After the researcher gained the data from pretest and posttest, the data were processed. Analysis in research meant counting the data with certain measurement and trying to find out relation among the variables. The result of students' writing was assessed by using Jacobs' writing criteria. Moreover, the score of posttest and pretest was compared to discover the students' progress.

6. Drawing conclusion

The conclusion was made based in the result of data analysis.

The following steps were used in this research. It is crucial to understand the procedures of the research because it assisted the researcher to conduct the research well.

3.8 Data Analysis

Data analysis is the process of utilizing the data to form a result. The information will be gained to give information that suits to answer research problem. In order to provide clear answer for the research questions, the first research question used paired sample t-test that had been collected through pretest and posttest. Moreover, to answer the second research question, this research used independent sample t-test since it tried to find out the significant improvement of students' writing achievement between students who were taught by using mind mapping with group investigation and the other group who were taught using original mind

mapping. The first and second research questions were analyzed by using statistical software called SPSS.

Furthermore, to answer the third research question, this research used descriptive analysis considering the scoring rubric from Jacobs, et.al (1981) which considered five aspects of writing.

3.9 Data Treatment

Before processing the data, this research gave normality test to assess the distribution of the data was normally distributed or nor. The research used SPSS Saphiro-Wilk program to analyse the data distribution. The hypotheses of the normality test as follows:

Ho : The distribution of the data is normal

H₁ : The distribution of the data is not normal

The level of the significance used is 0.05. H₀ will be accepted if the result of the normality test is higher than 0.05 ($p > q$).

Table 3.5 Normality Test of the Experimental Class

Tests of Normality							
		Kolmogorov-Smirnov ^b			Shapiro-Wilk		
	GROUP	Statistic	df	Sig.	Statistic	df	Sig.
PRETEST	EXPERIMENT	.117	34	.200*	.940	34	.062
POSTTEST	EXPERIMENT	.091	34	.200*	.968	34	.399

*This is a lower bound of the true significance

a. GROUP = EXPERIMENT

b. Liliefors Significance Correction

The data of the table indicates a normal distribution. For the experimental group, the value of normality in the pretest is 0.062 which means the data are distributed normally. Similarly, the value of the posttest is 0.399. Additionally, the normality of the data in control group can be seen below.

Table 3.6 Normality Test of the Control Class

Tests of Normality ^a							
		Kolmogorov-Smirnov ^b			Shapiro-Wilk		
	GROUP	Statistic	df	Sig.	Statistic	df	Sig.
PRETEST	EXPERIMENT	.073	32	.200*	.940	32	.807
POSTTEST	EXPERIMENT	.146	32	.080	.934	32	.052

*This is a lower bound of the true significance

a. GROUP = EXPERIMENT

b. Liliefors Significance Correction

From the table above, the normality of the data in control group has a normal distribution, with the pretest is 0.807 and the posttest is 0.052. The value indicates that hypothesis is accepted since the values both of classes are higher than 0.05. It implies the data have normal distribution.

3.10 Homogeneity Test

A homogeneity test must be conducted in order to check the similarity of the distribution between the two classes.

The hypotheses are:

H_0 : The data is taken from two samples in the same variances

H_1 : The data is not taken from two samples in the same variances

The null hypothesis (H_0) is accepted if the significant level of the test is higher than 0.05. The result of the homogeneity test in this research is presented in the following table.

Table 3.7 Homogeneity Test

Tests of Homogeneity of Variances					
		Levene Statistic	df 1	df 2	Sig.
PRETEST	Based on Mean	.015	1	64	.903
	Based on Median	.000	1	64	1.000
	Based on Median and with adjusted df	.000	1	62.126	1.000
	Based on trimmed mean	.006	1	64	.940
POSTTEST	Based on Mean	.034	1	64	.855
	Based on Median	.008	1	64	.929
	Based on Median and with adjusted df	.008	1	63.964	.929
	Based on trimmed mean	.039	1	64	.844

The table shows that the value of homogeneity test is more than 0.05. The result of homogeneity shows that the mean for pretest is 0.903 and posttest is 0.855. It means the null hypothesis is accepted.

3.11 Hypotheses Testing

Hypothesis testing was used to determine whether or not the hypotheses proposed in this study are correct. SPSS version 27 was used to examine these research hypotheses. The hypotheses were analyzed at significance level of 0.05. It means that probability of error in hypothesis is only about 5%. The data were analyzed by using independent t-test in order to know the significance of the treatment effect. The hypotheses for the first and second research question as follows:

1. H₁: There is a significant improvement in the students' writing achievement after the students are taught through mind mapping with group investigation.
2. H₂: There is a significant difference in students' writing achievement of mind mapping with group investigation significantly than those who are taught by using the original mind mapping.

The first hypothesis was tested by utilizing paired sample t-test. The second hypothesis was tested by using independent group t-test. So, the students' score from the experimental and control groups were processed in a statistic software, namely Statistical Package for Social Science (SPSS). Meanwhile, the third hypothesis was analyzed descriptively considering the scoring criteria proposed by Jacobs, et al (1981) which concerned to the five aspects of writing.

Based on the explanation above, this chapter has given explanation of some points, such as research design, variables, population and sample, research instrument, validity and reliability, data collecting technique, research procedure, data analysis, data treatment, hypotheses testing.

V. CONCLUSION AND SUGGESTIONS

The final chapter focuses on the discussion of two points. First, the conclusion of the research findings. Second, suggestion for English teachers who want to conduct the modified method in teaching writing and other researchers who want to concern investigation in the same area.

5.1 Conclusion

This section presents the conclusion from the findings and discussions of the research to answer the research questions, which shown as follows.

1. The use of mind mapping with group investigation has proven significantly effective in improving students' writing achievement. The improvement covers all five aspects of writing, namely content, organization, vocabulary, language use, and mechanics. This technique promotes collaborative work and opportunities to improve self-competency. In conclusion, the use of mind mapping combined with group investigation has been proven effective in significantly improving students' writing achievement. The improvement covers all five aspects of writing, namely content, organization, vocabulary, language use, and mechanics. Therefore, this technique can serve as an

alternative strategy for English teachers to enhance students' writing skills in a more structured and collaborative way.

2. In relation to the second research question, both of the methods improve students' writing achievement. However, the integration of mind mapping with group investigation is more effective to enhance students' writing achievement compared to the use of the original mind mapping. This effectiveness may be attributed to the structured procedures in mind map with group investigation which promoted collaborative work, individual accountability, and critical thinking to understand the five aspects of writing. On the other side, the original mind mapping encouraged students to be more creative in developing and organizing students' idea, which its activities focused on content, organization, and vocabulary. There was limited knowledge of students and no collaborative activities impacted students' writing achievement in terms of language use and mechanics.
3. The implementation of mind mapping with group investigation effectively improved students' writing skill, particularly in the mechanics with N-gain 0.67 and language use with 0.49 that had shown limited improvement when the teacher taught the students by using mind mapping alone. It was highlighted that although mind mapping fostered creativity and the development of ideas which affected the content, organization, and vocabulary, but least in the aspects of language use and mechanics. Through mind mapping with group investigation, students were able to explore, organize, and practice, and provide corrective feedback to their peers that enable them to understand the material deeper. Furthermore, students not only

promoted individual competency and worked together but also enhanced critical thinking.

5.2 Suggestions

Following the conclusion, several suggestions are addressed to English teachers and further researchers as elaborated in the subsections below.

1. English Teachers

- Based on the findings, some students lacked prior knowledge about the topic during the classroom activities, which limited their participation in group discussion and hindered the development of the content aspect in writing. Consequently, it is suggested that teachers provide background knowledge or context before starting the activities in mind mapping with group investigation. Students' prior knowledge can be done through storytelling, short video, reading text, or guided question which can lead students to have basic knowledge of the topic when they want to develop their writing to more detailed and relevant content.
- To improve the effectiveness of teaching writing using mind mapping, teacher can insert the learning activities that encourage students to take responsibility for different aspects of writing and explore information from various sources
- This research discovered that several students did not understand particular aspect of writing. It happened because the students were busy on their roles. Therefore, the other group can offer the feedback with specific

suggestions related to the five aspects of writing based on Jacobs, et al (1981).

2. Further Researchers

- The technique of mind mapping with group investigation was used to improve students' writing skill. However, the researcher suggests that the further study will discover its effects on other skills, such as speaking, reading, listening, and the students' perception during the learning process.
- This suggests that future research considers fractured texts and other texts, such as descriptive, recount, and argumentative texts which allow the students to understand various types of texts.
- Since group investigation helped overcome the weakness of mind mapping, future researchers may explore methods similar to group investigation, such as the jigsaw technique. This method allows each student focuses on each aspect of writing and teaches it to their peers.
- The future research may also consider using group investigation to address the challenges in the teaching method that rely heavily on individual task. Activities in group investigation promotes collaboration and active learning, which can help enhance students' learning experiences.
- It is recommended that future research include the involvement of an additional evaluator or interrater, to enhance the validity and reliability of the instrument used for assessing students' writing skills. This addition would help reduce scoring bias, ensure more objective evaluations, and strengthen the overall trustworthiness of the research results.

The explanation above is the conclusion of this research after conducting the use of integrating mind mapping with group investigation. The suggestions provided can be the considerations for other researchers to conduct further studies related with research. Moreover, the findings of this research can be implemented by the teachers in English language teaching.

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